

# Contrail Service Orchestration User Guide

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*Contrail Service Orchestration User Guide*

4.1.0

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# About the Documentation

## IN THIS SECTION

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Use this guide to understand the features and tasks that you can configure and perform from the Contrail Service Orchestration (CSO) UI (Administration Portal, Customer Portal, and Designer Tools). This guide provides feature overviews and procedures that help you understand the features and perform CSO configuration tasks.

## Documentation and Release Notes

To obtain the most current version of all Juniper Networks<sup>®</sup> technical documentation, see the product documentation page on the Juniper Networks website at <https://www.juniper.net/documentation/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <https://www.juniper.net/books>.

## Documentation Conventions

Table 1 on page xxxvii defines notice icons used in this guide.

Table 1: Notice Icons







Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Table 2 on page xxxvii defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> <b>show chassis alarms</b>  No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies guide names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS CLI User Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name:  [edit] root@# <b>set system domain-name</b> <i>domain-name</i>
<b>Text like this</b>	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> <li>To configure a stub area, include the <b>stub</b> statement at the [edit <b>protocols ospf area area-id</b>] hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Encloses optional keywords or variables.	<b>stub</b> <default-metric <i>metric</i> >;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<b>broadcast   multicast</b>  ( <i>string1</i>   <i>string2</i>   <i>string3</i> )
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	<b>community name members [ <i>community-ids</i> ]</b>
Indentation and braces ( { } )	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	

## GUI Conventions

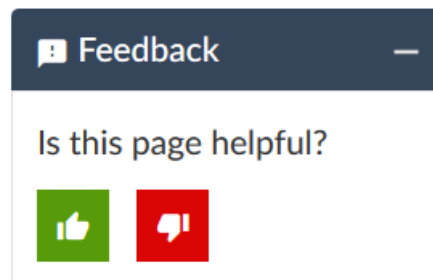
Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
<b>Bold text like this</b>	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Documentation Feedback

We encourage you to provide feedback so that we can improve our documentation. You can use either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the [Juniper Networks TechLibrary](#) site, and do one of the following:



- Click the thumbs-up icon if the information on the page was helpful to you.
- Click the thumbs-down icon if the information on the page was not helpful to you or if you have suggestions for improvement, and use the pop-up form to provide feedback.
- E-mail—Send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net). Include the document or topic name, URL or page number, and software version (if applicable).

## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active Juniper Care or Partner Support Services support contract, or are

covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <https://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

## Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <https://www.juniper.net/customers/support/>
- Search for known bugs: <https://prsearch.juniper.net/>
- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>
- Download the latest versions of software and review release notes: <https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <https://www.juniper.net/company/communities/>
- Create a service request online: <https://myjuniper.juniper.net>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://entitlementsearch.juniper.net/entitlementsearch/>

## Creating a Service Request with JTAC

You can create a service request with JTAC on the Web or by telephone.

- Visit <https://myjuniper.juniper.net>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <https://support.juniper.net/support/requesting-support/>.



# 1

PART

## Administration Portal

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# Introduction

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## Unified Administration and Customer Portal Overview

Contrail Service Orchestration supports a unified portal for both service provider users and tenant users and for the services managed and consumed by the administrators and tenants.

The unified portal contains the features of vCPE, uCPE, and SD-WAN for both Administration and Customer portals; enforces role-based access control (RBAC), which prevents tenants from accessing administrator data; and supports different backend authentication methods for service provider users and tenant users.

The unified portal enable service providers to deploy Juniper Networks security features as a virtualized network function (VNF) function either in distributed or centralized mode or in the branch SRX Series device. This VNF provides advanced firewall and Network Address Translation (NAT) management capabilities to end users from a single pane of glass (SPOG) user interface, in a multitenant environment. Service provider administrators are able to manage all phases of the security policy life cycle more quickly and intuitively, from policy creation through deployment.

Firewall and NAT management features include policy configuration such as rule reordering, event viewer for firewall and NAT events, alerts and alarms, logs and dashboard widgets. All features have RBAC enforced, which enables either the SP administrator or the tenant administrator to configure policies for the tenant.

The unified portal also provides SD-WAN capabilities with integrated firewall, NAT management, and device management.

## RELATED DOCUMENTATION

[SLA Profiles and SD-WAN Policies Overview | 238](#)

[Device Images Overview | 190](#)

## Administration Portal Overview

Administration Portal offers service providers a convenient way to set up and manage resources, customers, and availability of network services through a graphical user interface (GUI).

When you use Administration Portal, you are actually creating and managing objects used by the following APIs in the Cloud CPE Centralized Deployment Model and Cloud CPE Distributed Deployment Model.

- Cloud CPE Tenant, Site, and Service Manager API, which manages customers (also called *tenants*), manages customer sites, and maps each customer's network services to the appropriate gateway resources, such as the Layer 2 access interfaces and routing instances.
- Identity and Access Manager API, which manages identifiers and roles for customers and users.
- Network Service Orchestration API, which manages network services and communicates with Contrail OpenStack, the virtualized infrastructure manager (VIM).
- Contrail OpenStack API, which manages network points of presence (POPs), service chains, and virtual machines (VMs) that contain service chains.

You can also set up and manage the Cloud CPE Centralized Deployment Model and Cloud CPE Distributed Deployment Model through API calls, either manually or from your operational support systems and business support systems (OSS/BSS). This method is more complex, especially if you use your own OSS/BSS, in which case you must perform development and integration work. Use of Administration Portal is particularly beneficial for companies who require a turnkey solution and do not want to expend effort on developing programs to set up and manage the deployment through APIs. Even if you plan to use your own OSS/BSS systems to set up and manage the Cloud CPE Centralized Deployment Model and Cloud CPE Distributed Deployment Model in a production environment, Administration Portal can prove useful for demonstrations and trials of the deployment.

## RELATED DOCUMENTATION

[Setting Up the Cloud CPE Centralized Deployment Model with Administration Portal | 11](#)

[Setting Up the Cloud CPE Distributed Deployment Model with Administration Portal | 12](#)

[Logging in to Administration Portal | 5](#)

## Logging in to Administration Portal

To start Administration Portal:

1. Review the Keystone username and password that you defined for Contrail OpenStack.

You can view these settings on the Contrail Configure and Control node in the files `/etc/contrail/keystonerc` and `/etc/contrail/openstackrc`.

2. Using a Web browser, access the URL for Administration Portal. The URL for Administration Portal is `https://Central-IP-Address`, where the *Central-IP-Address* denotes the IP address of the virtual machine (VM) that hosts the microservices for the central POP.

For example, if the IP address of the VM is 192.0.2.1, then the URL is <https://192.0.2.1>.

**NOTE:** We recommend that you use Google Chrome Version 60 or later to access the Contrail Service Orchestration (CSO) GUIs.

3. Log in with the username **cspadmin** and password that you specified for Contrail OpenStack.

The Dashboard page appears.

**NOTE:** You are prompted to change the password when you login to the portal for the first time.

## RELATED DOCUMENTATION

[Administration Portal Overview | 4](#)

[Personalizing the Unified Administration and Customer Portal | 358](#)

## Switching the Tenant Scope

Administration Portal users can change the tenant scope from all tenants to a specific tenant by using the tenant switcher displayed on the banner.

When you switch scope from all tenants to a specific tenant, the menu and pages displayed are almost the same as those displayed for Customer Portal users, with some additional actions visible to the Administration Portal users. When you switch back to the **All Tenants** scope, the menu and pages for the Administration Portal are displayed.

To switch from one scope to another:

- From the top right corner of the page, select the **All Tenants** scope to access Administration Portal or select a specific tenant (for example, aaa) to access Customer Portal. The menu and pages for Administration Portal or Customer Portal are displayed based on the scope selected from the drop-down list.

### RELATED DOCUMENTATION

[Unified Administration and Customer Portal Overview | 3](#)

[Role-Based Access Control Overview | 298](#)

## Changing the Administration Portal Password

To change the Administration Portal password:

1. Click the administrative username that is located at the right side of the Administration Portal banner.

The drop-down list appears.

2. Click **Change Password**.

The Change Password page appears.

**NOTE:** If you change the password for Administration Portal, the new password is saved in Contrail and applies to other GUIs, such as Network Service Designer.

3. Enter the current password.

4. In the New Password text box, enter your new password.

The login password that you set must conform to a particular set of requirements such as minimum length of 6 characters, a maximum length of 21 characters, and that includes at least one lowercase letter, one uppercase letter, an alpha-numeric character, and a numeric character.

5. In the Confirm Password text box, enter your new password again to confirm it.

You can select the **Show Password** option to view the password.

6. Click **OK**.

You are logged out of the system. To log in to Administration Portal again, you must use your new password. Other sessions logged in with the same username are unaffected until the next login.

## RELATED DOCUMENTATION

[Administration Portal Overview | 4](#)

[Logging in to Administration Portal | 5](#)

## Changing the Password on First Login

To enhance the security related to login credentials, you are prompted to change the password when you login to the portal for the first time.

To change the password when you log in for the first time:

1. Log in to the portal with the default login credentials.

The Change Password page appears with a message that you must change your password for security purposes.

**NOTE:** The Change Password page appears only if you are logging in to the portal for the first time.

2. Change your password following the guidelines provided in [Table 3 on page 8](#).
3. Click **Ok**.

**NOTE:** It is mandatory to change the login password when you log in to the portal for the first time. If you click **Cancel**, you are redirected to the login page.

The login password is changed and you are logged out of the system. To log in to the portal again, you must use your new password.

**Table 3: Fields on the Change Password Page**

Field	Description
New Password	<p>Enter your new password.</p> <p>The login password that you set must be between 6 and 21 characters long, and it must include at least one lowercase letter, one uppercase letter, one special character, and one number.</p> <p><b>NOTE:</b> The password strength indicator displays the efficiency of the password that you enter. You cannot proceed to the next step if the password strength indicator shows that the password is weak.</p>
Confirm Password	<p>Reenter the password for confirmation.</p> <p>You can select <b>Show Password</b> to view the password.</p>

## RELATED DOCUMENTATION

[Logging in to Administration Portal | 5](#)

[Changing the Administration Portal Password | 6](#)

[Resetting the Password | 8](#)

[Setting Password Duration | 10](#)

## Resetting the Password

If you have forgotten your password, you can reset the password from the login screen.

**NOTE:** Your account is locked after five consecutive unsuccessful login attempts.



To reset the password:

1. On the login page, click the **Forgot Password** link.

The Forgot Password page appears, with a message that an e-mail notification with a verification code is sent to your e-mail address.

**NOTE:** The **Forgot Password** link appears only after you specify the username.

2. In **Verification Code**, specify the verification code that you have received through an e-mail.

**NOTE:** The verification code expires after a time duration of 15 minutes.

3. Click **OK**.

The Reset Password page appears.

4. Change your password following the guidelines provided in [Table 4 on page 9](#).

5. Click **OK**.

Your password is reset.

**Table 4: Fields on the Reset Password Page**

Field	Description
Username	Enter your username.
New Password	<p>Enter your new password.</p> <p>The login password that you set must be between 6 and 21 characters long, and it must include at least one lowercase letter, one uppercase letter, one special character, and one number.</p> <p><b>NOTE:</b> The password strength indicator displays the efficiency of the password that you enter. You cannot proceed to the next step if the password strength indicator shows that the password is weak.</p>
Confirm Password	<p>Reenter the password for confirmation.</p> <p>You can select <b>Show Password</b> to view the password.</p>

## RELATED DOCUMENTATION

[Logging in to Administration Portal | 5](#)

[Changing the Administration Portal Password | 6](#)

[Changing the Password on First Login | 7](#)

[Setting Password Duration | 10](#)

## Setting Password Duration

To enhance the security related to login credentials, you can specify the duration (in days) after which the password expires and must be changed. You must set the duration while you are adding a tenant.

To set the duration (in days) after which the password expires:

1. Log in to Administration Portal.

2. Select **Tenants > All Tenants > +**.

The Add Tenant page appears.

3. In the Tenant Info > Password Policy section, for **User Password Expires** select one of the following option:

- **Never**—If you select this option, the password never expires.
- **After specified number of days**—If you select this option, the **Password Expiration Days** field appears.

In **Password Expiration Days**, specify the duration (in days) after which the password expires and must be changed. You can specify the duration (in days) from 1 through 365. The default value is 180 days.

4. Complete the remaining steps for adding a tenant. For more information about adding a tenant, see [“Adding a Single Tenant” on page 259](#).

If the tenant user (Tenant Administrator role or Tenant Operator role) has the password expiration days specified, then the tenant user must change the password after the specified duration elapses.

## RELATED DOCUMENTATION

[Logging in to Administration Portal | 5](#)

[Changing the Administration Portal Password | 6](#)

[Changing the Password on First Login | 7](#)

## Extending the User Login Session

In the unified portal, a login session expires in 60 minutes. After 55 minutes, the **Extend Session** page is displayed and, prompting you to enter your password. You must enter your password to extend the session. The **Extend Session** page is displayed when the **Local** authentication method is configured.

If you have logged in to the portal with SSO authentication, the **Extend Session** page is displayed and you can authenticate with the external SSO server. However, the SSO expiration is not under the control of CSO and the following can happen:

- If the external SSO session is expired, you will be authenticated in the **Extend Session** page. After successful authentication, the **Extend Session** page is closed automatically.
- If the external SSO session is not expired, the **Extend Session** page is closed automatically.

To extend the login session:

1. On the **Extend Session** page, enter your password in the **Password** field. If you want to end your session and exit from the portal, click **Cancel** instead and you are redirected to the Login page.
2. Click **OK**.

The success message **Your Session has been successfully extended** is displayed.

### RELATED DOCUMENTATION

## Setting Up the Cloud CPE Centralized Deployment Model with Administration Portal

In the Cloud CPE Centralized Deployment Model, end users at a specific customer site access most network services in a regional point of presence (POP), while accessing a few specialist network services in the central POP.

You use the following workflow to set up the Cloud CPE Centralized Deployment Model with Administration Portal:

1. Create the POPs and associated resources. See [“Creating a Single POP” on page 58](#) and [“Importing Data for Multiple POPs” on page 70](#).
  - You must create a VIM for each POP.
  - You can add an MX Series router as a physical network element (PNE) to provide a Layer 3 routing service to customer sites through use of virtual routing and forwarding (VRF) instances.
  - You add the Junos Space element management system (EMS) if you use a VNF that requires this EMS.
2. Add customers. See [“Adding a Single Tenant” on page 259](#) and [“Importing Data for Multiple Tenants” on page 274](#).
3. Create and configure sites for each customer, if you add customers one at a time, rather than importing data for multiple tenants:
  - You must create each site individually. You can create the following sites:
    - On-Premise sites—required for all customer sites.
    - Cloud sites—required for all service providers.
    - Data Center—Only required for a network in which users access the Internet through the corporate VPN.
  - If you configured a PNE in Step 1, then associate the PNE with the site and configure a VRF for each customer site. See [“Configuring VRFs and PNE Details for a Site in a Centralized Deployment” on page 832](#)
4. Allocate network services to customers. See [“Allocating a Service to Tenants” on page 209](#)

## RELATED DOCUMENTATION

[Logging in to Administration Portal | 5](#)

[Administration Portal Overview | 4](#)

## Setting Up the Cloud CPE Distributed Deployment Model with Administration Portal

In the Cloud CPE Distributed Deployment Model, end users at a specific customer site access network services in both a regional point of presence (POP) and a central POP.

You use the following workflow to set up the Cloud CPE Distributed Deployment Model with Administration Portal:

1. Add data for the POPs and provider edge (PE) router. See [“Creating a Single POP” on page 58](#) and [“Importing Data for Multiple POPs” on page 70](#).
2. Upload images for devices used in the deployment, such as the vSRX gateway and the NFX 250 platform to the central activation server. See [“Uploading a Device Image” on page 197](#).
3. Upload VNF images. See [“Uploading a Device Image” on page 197](#).
4. Create customers. See [“Adding a Single Tenant” on page 259](#) and [“Importing Data for Multiple Tenants” on page 274](#).
5. If you add customers one at a time, rather than importing data for multiple tenants, create and configure sites for each customer. .
6. Allocate network services to customers. See [“Allocating a Service to Tenants” on page 209](#).

## RELATED DOCUMENTATION

[Logging in to Administration Portal | 5](#)

[Administration Portal Overview | 4](#)

# Managing Objects

## IN THIS CHAPTER

- [Creating Objects | 14](#)
- [Modifying an Object | 15](#)
- [Deleting Objects | 15](#)
- [Viewing Object Details | 16](#)
- [Searching for Text in an Object Data Table | 16](#)
- [Sorting Objects | 17](#)

## Creating Objects

You can use the create icon (+) in the top right corner of a page to create an object on that page.

To create an object:

1. Click the + icon.

The object configuration page appears.

2. Update the configuration as needed.

See the relevant *About the Objects Page* topic for a description of the fields.

3. Click **Upload**.

The object information that you updated appears in the main page.

## RELATED DOCUMENTATION

| [Deleting Objects | 15](#)

## Modifying an Object

You can use the pencil icon in the top right of a page to modify or edit an object on that page.

To modify an object:

1. Select the check box of the object that you want to modify, and click the pencil icon.

The object configuration page appears.

2. Update the configuration as needed.

3. Click **Save**.

The object information that you updated appears in the main page.

### RELATED DOCUMENTATION

| [Deleting Objects](#) | 15

## Deleting Objects

You can use the delete icon (X) in the top right corner of a page to delete an object on that page.

To delete an object:

1. Select the object that you want to delete and click the **X** icon.

The Confirm Delete page appears.

2. Click **Yes** to delete the object or **No** to cancel the deletion.

The object information is deleted from the main page.

### RELATED DOCUMENTATION

| [Creating Objects](#) | 14

## Viewing Object Details

You can use the Detailed View page to view all the configured parameters of an object. Only some of the configured parameters appear in the list of features on the main page.

To view details for an object:

- Right-click the object that you want to see the detailed view for and click **Quick View**, or select the object and click **More > Details**.
- Alternatively, hover over the object name and click the Detailed View icon that appears before it.

The Detailed View page appears showing the configuration information. See the relevant *About the Objects Page* topic for a description of the fields on these pages.

### RELATED DOCUMENTATION

| [Deleting Objects | 15](#)

## Searching for Text in an Object Data Table

You can use the search icon in the top right corner of a page to search for text containing letters and special characters on that page.

To search for text:

1. Enter partial text or full text of the keyword in the search bar and click the search icon.

The search results are displayed.

2. Click **X** next to a search keyword or click **Clear All** to clear the search results.

### RELATED DOCUMENTATION

| [Creating Objects | 14](#)



## Sorting Objects

You can use the **Show Hide Columns** icon in the top right corner of a page to show or hide objects on a page. You can also sort the objects in a page by clicking the object column. The following options are available for sorting the objects:

- Sort text in alphabetical order.
- Sort numbers in ascending or descending order.
- Sort by date or time.
- Rearrange columns in a table.
- Increase or decrease column width.

To show or hide an object:

1. Click the **Show Hide Columns** icon.

The objects that are relevant to the page are displayed. By default all objects are selected and displayed on the page.

2. Select the objects that need to be displayed on the page and clear the objects that are not required to be displayed.

The objects are displayed or hidden as per the selection.

### RELATED DOCUMENTATION

| [Creating Objects](#) | 14

# Using the Dashboard

## IN THIS CHAPTER

- [About the Administration Portal Dashboard | 18](#)

## About the Administration Portal Dashboard

To access this page, click **Administration Portal > Dashboard**.

Each time you log in to the Administration Portal, the first thing you see is a user-configurable dashboard that offers you a customized view of network services through its widgets.

You can drag these widgets from the carousel at the top of your dashboard to your workspace, where you can add, remove, and rearrange them to meet your needs. For example, you can configure a widget to display a graph with the top five tenants receiving alerts, the status of alerts, and the name of tenant sites.

The dashboard automatically adjusts the placement of the widgets to dynamically fit on your browser window without changing their order. You can manually reorder the widgets using the drag and drop option. In addition, you can press and hold the top portion of the widget to move it to a new location.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Customize the dashboard by adding, removing, and rearranging the widgets on a per user basis.
- Update the dashboard or an individual widget by clicking the refresh icon.
- Show or hide widget thumbnails in the carousel by clicking **Select Widgets** at the top of the page.
- Add a widget to the dashboard by dragging the widget from the palette or thumbnail container into the workspace.
- Delete a widget from the dashboard page by clicking the X icon in the title bar.

Field Descriptions

You can quickly view important data using the widgets at the top of your dashboard.

[Table 5 on page 19](#) describes the dashboard widgets.

Table 5: Widgets on the Dashboard

Widget	Description
Alerts Donut Chart	<p>View the total number of alerts grouped by severity level.</p> <p>Click each alert name to view the total number of tenant sites receiving alerts that are critical, major, or minor.</p>
Top 5 POPs with Alerts	<p>View the top five POPs receiving alerts.</p> <ul style="list-style-type: none"><li>● <b>POP</b>—Name of the POP.</li><li>● <b>Tenant</b>—Number of tenants in the POP.</li><li>● <b>Location</b>—Location of the POP.</li><li>● <b>Status</b>—Type of alerts received that are critical, major or minor.</li></ul>
Top 5 Sites with Alerts	<p>View the top five tenant sites receiving alerts.</p> <ul style="list-style-type: none"><li>● <b>Name</b>—Name of the tenant site.</li><li>● <b>Location</b>—Location of the tenant site.</li><li>● <b>Status</b>—Type of alerts received that are critical, major, or minor.</li></ul>
Top 5 Tenants with Alerts	<p>View the top five tenants receiving alerts.</p> <ul style="list-style-type: none"><li>● <b>Name</b>—Name of the tenant.</li><li>● <b>Sites</b>—Number of sites in the tenant location.</li><li>● <b>Status</b>—Type of alerts received that are critical, major, or minor.</li></ul>

RELATED DOCUMENTATION

# Monitoring Alerts and Alarms

## IN THIS CHAPTER

- [About the Monitor Overview Page | 20](#)
- [Alerts Overview | 22](#)
- [About the Generated Alerts Page | 22](#)
- [About the Alert Definitions Page | 24](#)
- [Creating SD-WAN Alert Definitions | 26](#)
- [Editing and Deleting SD-WAN Alert Definitions | 27](#)
- [About the Alarms Page | 29](#)

## About the Monitor Overview Page

To access this page, click **Monitor > Overview**.

You can use the Monitor Overview page to view information about the alarms and alerts for tenants, POPs, connections, and sites on a geographical map. The network operator views the alarms and alerts, and then takes the necessary actions to resolve the issues.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View POP details.
- View site details.
- View connections.
- View only the nodes with alerts.

### Field Descriptions

[Table 6 on page 21](#) shows the descriptions of the fields on the Monitor Overview page.

Table 6: Fields on the Monitor Overview Page

Field	Description
POPs	<p>View the POP in which the site is located.</p> <p>Click the <b>POPs</b> drop-down list and select <b>POP Name</b>. Enter the name of the POP.</p>
Sites	<p>View the sites at which the service is deployed.</p> <p>Click the <b>Sites</b> drop-down list and enter the name of the site.</p>
Connections	<p>View the connections in the network.</p> <p>Click the <b>Connections</b> drop-down list and select <b>Show connections</b>.</p>
Only the node with alerts	<p>View the nodes with issues with the service.</p> <p>Click the drop-down list located next to the <b>Only the nodes with alerts</b> check box and select the type of alerts.</p> <ul style="list-style-type: none"> <li>• <b>Critical</b>—Issues that prevent the node from working and require action from the operator. The nodes with critical alerts are displayed in red.</li> <li>• <b>Major</b>—Issues that prevent the node from working at this time, but they do not require action from the operator. The nodes with major alerts are displayed in orange.</li> <li>• <b>Minor</b>—Issues that allow a node to continue working, but not optimally. The network operator may need to take action to resolve the issue. The nodes with minor alerts are displayed in yellow.</li> </ul> <p><b>NOTE:</b> The nodes without any alerts are displayed in blue.</p>

## RELATED DOCUMENTATION

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[About the Alert Definitions Page | 24](#)


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[Creating SD-WAN Alert Definitions | 26](#)

## Alerts Overview

Alerts and notifications are used to notify administrators about significant events within the system. Notifications can also be sent through e-mail. You will be notified when a predefined network traffic condition is met. The alert trigger threshold is the number of network traffic events crossing a predefined threshold within a period of time.

Alerts and notifications provide options for:

- Defining alert criteria based on a set of predefined filters. You can use the filters defined in the advanced search to create an alert. You can also save filters and add them to security alert definitions.
- Generating an alert message and notifying you when alert criteria are met.
- Searching for specific alerts on the Generated Alerts page based on alert ID, description, or alert type.
- Supporting event-based alerts.

For example, If you are an administrator, you can define a condition such that if the number of firewall-deny events crosses a predefined threshold in a given time range for a specific device, you will receive an e-mail alert.

**NOTE:** If a threshold is crossed and remains so for a long duration, new alerts are not generated. Alerts are generated again when the number of logs matching the alert criteria drops below the threshold and crosses the threshold again.

### RELATED DOCUMENTATION

[About the Generated Alerts Page | 22](#)

[About the Alert Definitions Page | 24](#)

## About the Generated Alerts Page

To access this page, click **Monitor > Alerts & Alarms > Alerts**.

Use this page to view the system event-based alerts in response to a configured alert definition. The generated alerts help you to identify problems that appear in your monitored network environment and displays both security and SD-WAN alerts. You can view statistics such as the number of critical and non-critical alerts.

## Tasks You Can Perform

You can perform the following tasks from this page:

- Select the generated alert and then right-click or click **More > Detail View**. The Alert Detail page appears displaying all the details of the alert.
- Select the generated alert and then right-click or click **More > Clear All Selections**.

## Field Descriptions

[Table 7 on page 23](#) provides information about the fields on the Generated Alerts page.

**Table 7: Fields on the Generated Alerts Page**

Field	Description
Severity	View the severity of the alert.
Time	View the date and time when the alert was generated.
Site	View the name of the tenant site.
Source	View the source of the alert. The source identifies whether an alert is a security alert or an SD-WAN alert.
Description	View the description of the alert.
Alert Type	View the type of alert.
ID	View the alert ID. Alert ID is a unique identification for each alert. For example, b4a3c027-7157-4861-8e3c-c872721cff2d.
Service Instance	View the service instance associated with the alert.
Object Type	View the object type.
Alert Name	View the name of the alert.
Tenant	View the name of the tenant.

## RELATED DOCUMENTATION

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[About the Alert Definitions Page | 24](#)

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[Creating SD-WAN Alert Definitions | 26](#)

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[Editing and Deleting SD-WAN Alert Definitions | 27](#)

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## About the Alert Definitions Page

To access this page, select **Monitor > Alarms & Alerts > Alert Definitions** in the Administration Portal.

Use the Alert Definitions page to manage alert definitions for SD-WAN and view alert definitions for security. An alert definition consists of data criterion for triggering alerts about issues in the SD-WAN environment. Alert definitions also define the necessary action required to resolve issues based on the severity of the alert. An alert is triggered when the event threshold exceeds the data criteria that is defined. You can create an alert definition to monitor your data in real time and identify issues and attacks before they impact your network.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View existing SD-WAN Alert Definitions in the SD-WAN tab. The SD-WAN alert definitions are loading by default when the Alert Definitions page is loaded. See [Table 8 on page 25](#) for descriptions of the fields on the SD-WAN alert definitions pane.
- Create SD-WAN alert definitions. See [“Creating SD-WAN Alert Definitions” on page 26](#).
- Edit or delete an existing SD-WAN alert definition. See [“Editing and Deleting SD-WAN Alert Definitions” on page 27](#).
- View existing security alert definitions by clicking **Security**. See [Table 9 on page 25](#) for descriptions of the fields on the Security alert definitions pane.
- Show or hide columns that contain information about SD-WAN and Security alert definitions. See [“Sorting Objects” on page 384](#).
- Search for alert definitions using keywords. Click the search icon. Enter partial text or full text of the keyword in the search bar and press Enter. The search results are displayed.

### Field Descriptions

[Table 8 on page 25](#) describes the fields on the SD-WAN alert definitions pane.



**Table 8: Fields on the SD-WAN Alert Definitions Pane**

Field	Description
Rule Priority	View the priority of the alert definition. A value of one (1) indicates highest priority.
Alert Description	View the description of the alert.
Filter	View the matching alert criteria to trigger the alert.
Action	View the action to be performed to resolve issues.
Context	View the additional configuration parameters that you can pass on to the rule action function.

[Table 9 on page 25](#) provides guidelines on using the fields on the Security alert definitions pane.

**Table 9: Fields on the Security Alert Definitions Pane**

Field	Description
Alert Name	View the name of the alert.
Alert Description	View the description for the alert.
Filter	View filter values of the alert.
Recipients	View recipients' e-mail addresses where alert notifications are sent.
Status	View the status of the alert.
Alert Type	View the type of alert. Example: Event-based
Tenant	View the tenant who defined the alert.

## RELATED DOCUMENTATION

[Creating SD-WAN Alert Definitions | 26.](#)

[Editing and Deleting SD-WAN Alert Definitions | 27.](#)

## Creating SD-WAN Alert Definitions

You can use the Create SD-WAN Alert Definition page to create an alert definition for SD-WAN that consists of data criteria for triggering alerts about issues in the SD-WAN environment. In the alert definition, you can also define the necessary action that is required to resolve issues based on the severity of the alert.

To create an SD-WAN alert definition:

1. Click the add icon (+) on the **Monitor > Alarms & Alerts > Alert Definitions > SD-WAN** page in Administration Portal.

The Create SD-WAN Alert Definition page appears.

2. Enter the alert definition configuration according to the guidelines provided in [Table 10 on page 26](#).
3. Click **OK** to create the alert definition.

Alternatively, if you want to discard your changes, click **Cancel** instead.

[Table 10 on page 26](#) describes the fields on the Create SD-WAN Alert Definition page.

**Table 10: Fields on the Create SD-WAN Alert Definition Page**

Field	Guidelines
Alert Name	Enter the name of the alert definition. Enter a unique string of alphanumeric characters and some special characters (. -). No spaces are allowed, and the maximum length is 256 characters.
Alert Description	Enter a description for the alert definition; maximum length is 512 characters.
Priority	Enter the priority for the alert definition. A value of 1 indicates highest priority.
Filter	<p>Select the matching severity criteria to trigger an alert. You can match severity, alert type, or object types. You can select one of the following options:</p> <ul style="list-style-type: none"> <li>• To match severity options, select <b>Match Severity Critical</b>, <b>Match Severity Not Critical</b>, <b>Match Severity Major</b>, <b>Match Severity Not Major</b>, <b>Match Severity Normal</b>, <b>Match Severity Not Normal</b>, or <b>Match Severity All</b>. The <b>Match Severity Critical</b> option is selected by default.</li> <li>• To match alert types, such as alerts related to the device host or the application services on the host, select <b>Match Alert Type Service</b> or <b>Match Alert Type Host</b>.</li> <li>• To match object types, such as a single uCPE device or a uCPE VNF, select <b>Match Object Type UCPE DEVICE</b> or <b>Match Object Type UCPE VNF</b> respectively.</li> </ul>

Table 10: Fields on the Create SD-WAN Alert Definition Page (*continued*)

Field	Guidelines
Action	<p>Select the action to be performed to resolve issues based on the severity of the alert. You can select one of the following actions:</p> <ul style="list-style-type: none"> <li>• <b>Alert Action Send to Rmq</b>—Send the alert object to an external RabbitMQ broker. This option is selected by default. If this option is selected, you can also enter additional RabbitMQ broker configuration parameters in the Context field.</li> <li>• <b>Alert Action Discard</b>—Discard the alert object.</li> <li>• <b>Alert Action Resolve Uuids</b>—Resolve UUIDs to a machine-readable format.</li> </ul>
Context	<p>Enter a set of additional configuration parameters for the external RabbitMQ broker. The configuration parameters include the RabbitMQ broker IP address, port number, the exchange name and type, and the username and password. The parameters must be entered in JSON format. The additional parameters are passed as arguments to the action function when the selected action is <b>Alert Action Send to Rmq</b>.</p> <p>Example:</p> <pre>{   "broker_ip": "192.0.2.0",   "broker_port": "5672",   "exchange_name": "external_alert_exchange",   "exchange_type": "topic",   "user": "user-name",   "password": "password" }</pre>

## RELATED DOCUMENTATION

[About the Alert Definitions Page | 24](#)

[Editing and Deleting SD-WAN Alert Definitions | 27](#)

## Editing and Deleting SD-WAN Alert Definitions

You can edit and delete SD-WAN alert definitions from the SD-WAN Alert Definitions page.

## Editing an SD-WAN Alert Definition

To modify an SD-WAN alert definition:

1. Select the check box for the alert definition that you want to modify, and click the edit icon on the **Monitor > Alarms & Alerts > Alert Definitions > SD-WAN** page in the Administration Portal.

The Edit SD-WAN Alert Definition page appears.

2. Update the configuration as needed and according to the guidelines in [“Creating SD-WAN Alert Definitions” on page 26](#).

3. Click **OK** to save your changes.

The alert definition information that you updated appears on the SD-WAN Alert Definitions page.

Alternatively, if you want to discard your changes, click **Cancel** instead.

## Deleting SD-WAN Alert Definitions

If the alert definition is no longer needed, then you can delete the alert definition. To delete an SD-WAN alert definition:

1. Select one or more alert definitions that you want to delete and click the delete icon (X) on the **Monitor > Alarms & Alerts > Alert Definitions > SD-WAN** page in the Administration Portal.

A page requesting confirmation for the deletion appears.

2. Click **Yes** to confirm that you want to delete the alert definition.

The alert definition is deleted.

Alternatively, if you want to cancel the delete operation, click **No** instead.

## RELATED DOCUMENTATION

[About the Alert Definitions Page | 24](#)

[Creating SD-WAN Alert Definitions | 26](#)

## About the Alarms Page

To access this page, select **Monitor > Alerts & Alarms > Alarms** in the Administration Portal.

Use this page to view system generated alarms. Alarms alert you to conditions that might prevent the device from operating normally. System alarm conditions are preset based on fault monitoring and performance monitoring (FMPM) being performed on a device. For example, conditions such as hardware issues, drop in throughput and latency of data, temperature variations, and capacity optimization issues automatically trigger an alarm.

The difference between alerts and alarms lies in the type of events that are being monitored. An alert is used to notify administrators about significant events within the system. For example, when a predefined network traffic condition is met. For more information about alerts, see [“Alerts Overview” on page 22](#).

For example, an alarm is raised when

### Tasks You Can Perform

You can perform the following tasks from this page:

- View alarm activity within a specific time range:
  - You can select the time range by clicking on the options provided—2 hours (2h), 4 hours (4h), 8 hours (8h), 16 hours (16h), 24 hours (24h), or 1 week (1w). By default, alarm activity is displayed for 1 week.
  - You can view alarm activity for a custom time range by clicking on **Custom** and providing the time range.
- View details about the alarm. See [Table 11 on page 29](#) for more information.
- Select the generated alarm and then right-click or click **More > Detail View** to view the details of the alarm.

### Field Descriptions

[Table 11 on page 29](#) provides information about the fields on the Alarms page.

Table 11: Fields on the Alarms Page

Field	Description
Severity	View the severity of the alarm.
Time	View the date and time when the alarm was generated.
Tenant	View the name of the tenant.

Table 11: Fields on the Alarms Page *(continued)*

Field	Description
Site	View the site for which the alarm was generated.
Source	View the source of the alarm.
Description	View the description of the alarm.
ID	View the alarm ID.
Link Name	View the name of the link that generated the alarm.
Service Instance	View the service instance associated with the alarm..
Object Type	View the type of alarm.  Example: Event-based
POP	View the point of presence (POP) of the alarm.

RELATED DOCUMENTATION

<a href="#">About the Generated Alerts Page   22</a>
<a href="#">About the Alert Definitions Page   24</a>

# Monitoring Tenants SLA Performance

## IN THIS CHAPTER

- [Multidepartment CPE Device Support | 31](#)
- [About the SLA Performance of All Tenants Page | 32](#)
- [About the SLA Performance of a Single Tenant Page | 35](#)
- [Monitoring Application-Level SLA Performance for real time-optimized SD-WAN | 39](#)
- [Viewing the SLA Performance of a Site | 41](#)
- [Viewing the SLA Performance of an Application or Application Group | 45](#)
- [Understanding SLA Performance Score for Applications, Links, Sites, and Tenants | 47](#)

## Multidepartment CPE Device Support

Multitenancy enables a single NFX Series device to be mapped to serve across multiple departments within a single tenant. Each department has its own Layer 3 VPN and all Layer 3 VPNs are carried over to the hub using a shared overlay. The traffic is segregated to each department. A single overlay of IPsec or generic routing encapsulation (GRE) tunnels is used to carry all department traffic from the site through MPLS-based traffic separation.

Multitenancy is a cost-effective approach where the cost of a device and its maintenance is shared among multiple departments across a tenant. With multitenant device support, a dedicated share of the device is allocated to each department, and the data is kept private from the other tenants that access the same device.

**NOTE:** Only users with the Tenant Administrator role have access to the Customer Portal GUI.

The tenant administrator can perform the following tasks:

- Manage and monitor all policies and dashboards for all departments.
- Manage applications in the dashboard for each tenant.

- Create SD-WAN and security policies for each tenant and monitor the dashboard at the site level or at the department level.
- View or select SD-WAN or security services on the shared CPE device through the management portal.
- View the shared CPE device and its services and networks even though the WAN links might be shared by multiple departments.

The service provider administrator can see all departments within the CPE device and activate the device.

## RELATED DOCUMENTATION

[About the SLA Performance of a Single Tenant Page | 429](#)

[Viewing the SLA Performance of a Site | 432](#)

## About the SLA Performance of All Tenants Page

To access this page, select **Monitor > Tenants SLA Performance** in the Administration Portal.

You can use the Tenants SLA Performance page to view the SLA performance of all tenants. This page displays the list of tenants with low, medium, and high SLA performance during a specified time range. By default, the data is shown for the previous one day. You can change the time range for which the data is displayed. Tenants with low and medium SLA performance are grouped together. The SLA performance classification is done based on the **Performance Threshold** value you set. You can customize the view by selecting the card or grid view.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Specify performance threshold values based on which tenants can be classified as tenants with low, medium, or high SLA performance.
- View the SLA performance of all tenants that have low or medium SLA performance in the specified time period.
- View the SLA performance of all tenants that have high SLA performance in the specified time period.
- Select grid or card view for tenant SLA performance.

Select the **Card** view or the **Grid** view at the top right of the page to switch between views. By default, the card view is selected.

- You can customize the time range to view the SLA performance of all tenants.



Select the time range for which you want to view SLA performance. You can choose from Previous 1 hour, Previous 1 day, Previous 1 week, Previous 1 month, and Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, Previous 1 day is selected.

## Field Descriptions

Table 12 on page 33 describes the fields on the Tenants SLA Performance page.

**Table 12: Fields on the Tenants SLA Performance Page**

Field	Description
Time range	Select the time range for which you want to view the SLA performance. You can choose from Previous 1 hour, Previous 1 day, Previous 1 week, Previous 1 month, and Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, Previous 1 day is selected.
View	Select the view in which you want to display the SLA performance. You can choose between card and grid views. By default, card view is selected.
Performance Threshold	<p>Specify the performance threshold, in percentage, based on which tenants can be classified as tenants with low, medium, or high SLA performance.</p> <p>To set the performance threshold, click <b>More &gt; Performance Threshold</b>. From the <b>Performance Threshold</b> dialog box, move the slider button to set the low and high thresholds.</p> <p>Tenants that have a performance score below the low threshold are marked as having low SLA performance and tenants that exceed the high threshold are marked as having high SLA performance. Tenants that have a performance score between the low and high are considered as having medium SLA performance.</p>
Tenants with Low and Medium Performance	<p>View tenants that have low and medium SLA performance in the selected time period. The low and medium performance classification is done based on the performance threshold you specify.</p> <p>Click each tenant to view information about the SLA performance of the sites in the tenant. See <a href="#">“About the SLA Performance of a Single Tenant Page” on page 35</a>.</p>
Tenants with High Performance	<p>View the tenants that have high SLA performance in the selected time range.</p> <p>Click each tenant to view information about the SLA performance of the sites in the tenant. See <a href="#">“About the SLA Performance of a Single Tenant Page” on page 35</a>.</p>

Table 13 on page 34 describes the fields in the card and grid views.

**Table 13: Fields on the Tenants SLA Performance Page**

Field	View	Description
Tenant name	Card and Grid	Name of the tenant.
Sites	Card and Grid	Number of sites associated with the tenant.
AppQoE Function	Card and Grid	Shows whether AppQoE is enabled or not. AppQoE is enabled only when the SD-WAN mode is set to Real time-Optimized.
SLA Performance	Card and Grid	Displays the SLA performance score on a scale of 100. Scores that exceed the high performance threshold are displayed in green. Scores that are below the low performance threshold are displayed in red, and the medium scores that are between the low and high performance threshold are displayed in orange. For information about SLA performance score, see <a href="#">“Understanding SLA Performance Score for Applications, Links, Sites, and Tenants”</a> on page 47.
SLA not met events	Card and Grid	Number of events that failed to meet the SLA.
SLA not met duration	Card and Grid	Total duration of time the sessions on the site failed to meet the SLA. For example, if there were 15 sessions that failed to meet SLA for 10 minutes each on the past one hour, the SLA met duration value would be 150 minutes.
Total sessions	Card and Grid	Total number of sessions during the specified period.
Session switch count	Card and Grid	Number of instances when a session switch occurred because of non-compliance with SLA. Note that the session switch count may have a value higher than the total sessions if multiple SLA violations occur for all the sessions.
Total tenant traffic	Card and Grid	Total traffic across all sites and links for the specified tenant.
Transmitted bytes	Card and Grid	Total outgoing traffic from the tenant.
Received bytes	Card and Grid	Total incoming traffic to the tenant.

## RELATED DOCUMENTATION

[About the SLA Performance of a Single Tenant Page](#) | 35

## About the SLA Performance of a Single Tenant Page

To access this page from the Administration Portal, select **Monitor > Tenant SLA Performance** and then, click the name of the tenant for which you want view the site-level SLA performance information. .

You can use the *Tenant-Name* SLA Performance page to view SLA performance of all sites in a tenant. This page displays the list of sites with low, medium, and high SLA performance during the specified time range. By default, the data is shown for the previous one day. You can change the time range for which the data is displayed. Sites with low and medium SLA performance are grouped together. The SLA performance classification is done based on the **Performance Threshold** value you set. You can customize the view by selecting card or grid views

### Tasks You Can Perform

You can perform the following tasks from this page:

- Specify performance threshold values based on which sites can be classified as sites with low, medium, or high SLA performance.
- View the SLA performance of all sites that have low or medium SLA performance in the specified time period.
- View the SLA performance of all sites that have high SLA performance in the specified time period.
- View the SLA performance for all sites in a tenant in grid or card views.

Select the **Card** view or the **Grid** view at the top right of the page. By default, the card view is selected.

- Customize the time range to view the SLA performance for all sites in a tenant.

Select the time range for which you want to view SLA performance. You can choose from Previous 1 hour, Previous 1 day, Previous 1 week, Previous 1 month, and Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, Previous 1 day is selected.

### Field Descriptions

Table 14 on page 36 describes the fields on the SLA Performance of a Single Tenant page.

Table 14: Fields on the SLA Performance of a Single Tenant Page

Field	Description
Time range	Select the time range for which you want to view the SLA performance. You can choose from Previous 1 hour, Previous 1 day, Previous 1 week, Previous 1 month, and Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, Previous 1 day is selected.
View	Select the view in which you want to display the SLA performance for all sites in the tenant. You can choose between card and grid views. By default, card view is selected.
Performance Threshold	<p>Specify the performance threshold based on which sites can be classified as sites with low, medium, or high SLA performance. The performance threshold is specified in percentage terms.</p> <p>To set the performance threshold, click <b>More &gt; Performance Threshold</b>. From the <b>Performance Threshold</b> dialog box, move the slider button to set the low and high thresholds.</p> <p>Sites that have a performance score below the low threshold are marked as having low SLA performance and sites that exceed the high threshold are marked as having high SLA performance. Sites that have a performance score between the low and high are considered as having medium SLA performance.</p>
Sites with Low and Medium Performance	<p>View sites that have low and medium SLA performance in the selected time period. The low and medium performance classification is done based on the performance threshold you specify.</p> <p>Click each site to view information about application-level SLA performance. See <a href="#">“Application and Link Level SLA Performance” on page 37</a>.</p>
Sites with High Performance	<p>View the sites that have high SLA performance in the selected time range.</p> <p>Click each site to view information about the application-level SLA performance. See <a href="#">“Application and Link Level SLA Performance” on page 37</a>.</p>

Table 15 on page 36 describes the fields in the card and grid views.

Table 15: Fields on the SLA Performance of a Single Tenant Page in Card and Grid Views

Table 15: Fields on the SLA Performance of a Single Tenant Page in Card and Grid Views (*continued*)

Site name	Card and Grid	Name of the tenant.
AppQoE Function	Card and Grid	Shows whether AppQoE is enabled or not. AppQoE is enabled only when the SD-WAN mode is set to Real time-Optimized.
SLA Performance	Card and Grid	Displays the SLA performance score on a scale of 100. Scores that exceed the high performance threshold are displayed in green. Scores that are below the low performance threshold are displayed in red, and the medium scores that are between the low and high performance threshold are displayed in orange. For information about SLA performance score, see <a href="#">“Understanding SLA Performance Score for Applications, Links, Sites, and Tenants” on page 47</a> .
SLA not met events	Card and Grid	Number of events that failed to meet the SLA.
SLA not met duration	Card and Grid	Total duration of time the sessions on the site that failed to meet the SLA. For example, if there were 15 sessions that failed to meet SLA for 10 minutes each on the past one hour, the SLA met duration value would be 150 minutes.
Total sessions	Card and Grid	Total number of sessions during the specified period.
Session switch count	Card and Grid	Number of instances when a session switch occurred because of non-compliance with SLA.
Total tenant traffic	Card and Grid	Total traffic across all links for the specified tenant.
Transmitted bytes	Card and Grid	Total outgoing traffic from the site.
Received bytes	Card and Grid	Total incoming traffic to the site.

## Application and Link Level SLA Performance

When AppQoE is enabled, you can view SLA performance of all applications in the site. You can also customize your view by selecting graph view or grid view. In the graph view, you can further select scatter plot or tree map views.

[Table 16 on page 38](#) describes the fields on the SLA Performance of a Single Tenant page.

Table 16: Fields on the SLA Performance of a Single Tenant Page

Field	Description
Time range	Select the time range for which you want to view the SLA performance. You can choose from Previous 1 hour, Previous 1 day, Previous 1 week, Previous 1 month, and Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, Previous 1 day is selected.
View	Select the view in which you want to display the SLA performance. You can choose between graph and grid views. By default, graph view is selected.
View App Names	Select this check box to view the names of the applications in the graph view.
Top 10 applications	Select this check box to see the top 10 applications.
Application SLA Performance	
Departments	Select All Departments to view application SLA data for all departments, or select one department to view application SLA data specific to that department. By default, All Departments is selected.
SLA Parameters	<p>Choose one of the following SLA parameters based on which you want to view the application SLA performance data:</p> <ul style="list-style-type: none"> <li>• Throughput</li> <li>• Latency metric</li> <li>• Packet loss</li> <li>• Jitter metric</li> </ul> <p>By default, Throughput is selected. The data for the selected parameter is displayed in the y-axis in the scatter plot view.</p>
Group by	Select whether you want to group the applications based on the SLA Profile or the Traffic Type. By default, the SLA Profile option is selected.
SLA Profile	If you selected <b>SLA Profile</b> for <b>Group by</b> , select the SLA Profile for which you want to view the SLA performance information. This option is available only if you selected <b>SLA Profile</b> for <b>Group by</b> .
Traffic Type	If you selected <b>Traffic Type</b> for <b>Group by</b> , select the <b>Traffic Type</b> for which you want to view the SLA performance information. This option is available only if you selected <b>Traffic Type</b> for <b>Group by</b> .
Graph	Select whether you want to view the SLA performance information for applications in the <b>Scatter Plot</b> view or in <b>Tree Graph</b> view. By default, <b>Scatter Plot</b> is selected.

Table 16: Fields on the SLA Performance of a Single Tenant Page (*continued*)

Field	Description
Link SLA Performance	
Traffic Type	Select the traffic type for which you want to view the link SLA performance. You can choose either <b>All Traffic Type</b> or one of the available traffic types.
Links	Select the links for which you want to view the SLA performance. You can choose either <b>All Links</b> or one of the available links.

## RELATED DOCUMENTATION

[About the SLA Performance of All Tenants Page | 32](#)

[Viewing the SLA Performance of a Site | 41](#)

[Viewing the SLA Performance of an Application or Application Group | 45](#)

[Creating SLA Profiles | 243](#)

## Monitoring Application-Level SLA Performance for real time-optimized SD-WAN

CSO uses the system log information from SRX devices to monitor application-level SLA performance and displays the relevant information on the **Monitor > Tenant SLA Performance** page of the Admin Portal and the **Monitor > Application SLA Performance** page of the Customer Portal.

In real time-optimized mode, CSO uses the class-of-service values and the probe results to assign each application, site, and tenant scores that indicate the SLA performance. For more information about the SLA performance scores, see [“Understanding SLA Performance Score for Applications, Links, Sites, and Tenants” on page 47](#).

The following sections explain how you can view the SLA performance information at tenant level, site level, and application level:

1. [Viewing SLA Performance of Tenants | 40](#)
2. [Viewing SLA Performance of Sites | 40](#)

## Viewing SLA Performance of Tenants

Service provider administrators can view the SLA performance of all the tenants from the **Monitor > Tenant SLA Performance** page.

To view the SLA performance of all tenants:

1. From the administration portal, click **Monitor > Tenant SLA Performance**.

The “[Tenant SLA Performance](#)” on [page 32](#) page appears.

2. Customize the view to your specific requirements.

For customization options, see [Table 12 on page 33](#)

The Tenants SLA Performance page displays the SLA performance information for all the tenants in the format and for the time range you specified. For each of the tenant, you can view the details as described in [Table 13 on page 34](#)

## Viewing SLA Performance of Sites

Service provider administrators can view SLA performance information for all the sites associated with a tenant.

To view SLA performance information for the sites associated with a tenant:

1. From the administration portal, click **Monitor > Tenant SLA Performance**, and then click the name of the tenant for which you want view the site-level SLA performance information.

The *Tenant Name* SLA Performance page appears. For more information, see “[About the SLA Performance of a Single Tenant Page](#)” on [page 35](#).

2. Customize the view as required. For more information about the customization options, see [Table 14 on page 36](#)

The *Tenant Name* SLA Performance page displays the information in the format and for the time range you specified. For each of the sites, you can view the information as explained in [Table 15 on page 36](#).

3. Click the name of the site to view more details about application-level and link-level SLA performance. A new page appears with graphical representation of SLA performance information for the site as well as the applications and links available in the site.

You can customize the view as described in [Table 16 on page 38](#).



## Viewing the SLA Performance of a Site

### IN THIS SECTION

- [SLA Not Met by SLA Profiles | 41](#)
- [Applications SLA Performance by Throughput | 42](#)
- [SLA Performance for ALL | 44](#)

You can use the **Monitor > Tenant-Name SLA Performance > Site-Name SLA Performance** page in the Administration Portal to view SLA performance for all applications and application groups in a site. You can view the SLA performance for all applications and application groups in a site for a specified time range and in graph or grid views.

The **Site-Name SLA Performance** page is divided into the following three sections:

### SLA Not Met by SLA Profiles

You can use the **SLA Not Met by SLA Profiles** section on the **Site\_name SLA Performance** page to view the SLA profiles for which SLA requirements were not met and the time at which they were not met. The y-axis represents the SLA profiles and the x-axis represents the specified time range. The **SLA Not Met by SLA Profiles** section can be viewed and remains the same in both graph and grid views.

To view a graphical representation of SLA profiles for which SLA target values were not met:

1. Select the time range for which you want to view the SLA profiles for which SLA target values were not met. You can choose from Previous 1 hour, Previous 1 day, Previous 1 week, Previous 1 month, and Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, Previous 1 day is selected.

The graphical representation of SLA profiles for which SLA target values were not met is displayed for the selected time range.

2. (Optional) You can use the sliders at the sides of the graph to further customize the time range.

The graphical representation of SLA profiles for which SLA target values were not met is refreshed and displayed for the customized time range. The graphical representation of SLA performance data in the subsequent sections on the page is also refreshed and displayed for the customized time range.

## Applications SLA Performance by Throughput

You can view average throughput performance of all applications and application groups in a site. You can also customize your view by selecting graph view or grid view. In the graph view, you can further select scatter plot or tree map views.

To view a graphical representation of average throughput performance of all applications and application groups in a site:

1. Select **Graph View** at the top right of the page. By default, Graph View is selected.

A graphical representation of average throughput performance of all applications and application groups in a site against the target throughput is displayed in the **Scatter Plot** view. The y-axis represents the average throughput. 0% on the x-axis represents the target throughput (in %) defined in the SLA profiles, while the regions on the left and right of the target represent percentages below and above the target throughput, respectively.

A carousel at the bottom of the section also displays the list of all applications and application groups with their SLA profiles, target throughput, and average throughput values.

2. Click **Legend** at the bottom right of the section to view the plotting legend.

The items described in the **Legend** are:

- A single application is represented by a blue circle.
- An application group is represented by a blue square.
- An application or application group whose target throughput value in the SLA profile was modified during runtime is represented by an uncolored circle or uncolored square, respectively.
- The SLA profiles are represented by their priority numbers within the colored or uncolored circles and squares.

3. (Optional) You can use the sliders at the sides of the graph further to customize the time range.

The carousel is refreshed for the customized time range.

4. Click the circles or squares to view more information about the application or application groups. See [“Viewing the SLA Performance of an Application or Application Group” on page 45.](#)

**NOTE:** You can also select **Tree Map** at the top right of the section to view a list of all applications and application groups in a site and their average throughput values.

A list of all applications and application groups in a site along with their associated SLA profiles and the average throughput values is displayed.

To view a tabular representation of average throughput performance of all applications and application groups in a site:

1. Select **Grid View** at the top right of the page.

A list of all applications and application groups along with their SLA profiles, average throughput, and target throughput values is displayed in a tabular format.

[Table 17 on page 43](#) describes the fields on the Applications SLA Performance by Throughput grid view.

**Table 17: Fields on the Applications SLA Performance by Throughput Grid View**

Field	Description
Name	View name of the application or application group.
SLA Profile	View the SLA profile associated with the application or application group.
Type	View the type—application or application group
Category	View the category of the application or application group. The value of category can be Messaging, Web, Infrastructure, Remote-Access, Multimedia, Video, and so on.
Sessions	View the number of sessions consumed by the application or application group.
Throughput Avg. Performance	View the average throughput performance value (in %) of the application or application group. The upward triangle on the left of the average throughput performance value indicates that the average throughput is higher than the target throughput configured in the SLA profile of the application or application group. The value (in %) denotes the percentage above the target throughput value. Similarly, the downward triangle on the left of the average throughput performance value indicates that the average throughput is lower than the target throughput configured in the SLA profile of the application or application group. The value (in %) denotes the percentage below the target throughput value.

2. (Optional) Click the details icon to the left of the application or application group name to view more details about the application or application group. See [“Viewing the SLA Performance of an Application or Application Group” on page 45](#).

## SLA Performance for ALL

View a graphical representation of the performance of the SLA parameters such as round-trip time (RTT), latency, packet loss, and jitter for the specified time range for MPLS and Internet WAN links for all SLA profiles. The y-axis represents the SLA parameters and the x-axis represents the specified time range. You can also view the respective target SLA parameters in the graphs.

**NOTE:** The graphical representation of the performance of all SLA parameters for the WAN links is available only in the graph view.

To view a graphical representation of the performance of all SLA parameters for the WAN links:

- Select **All** at the top right of the section. By default, **All** is selected.

A graphical representation of the performance of the SLA parameters such as RTT, latency, packet loss, and jitter for the specified time range for all WAN links is displayed.

- Select **wan\_0**, **wan\_1**, and so on at the top right of the section to view the performance of the SLA parameters for the MPLS and Internet WAN links. You can enable and configure **wan\_0**, **wan\_1**, and so on and map them to MPLS or Internet links when you create a site.

The graphical representation of the performance of the SLA parameters such as RTT, latency, packet loss, and jitter for the specified time range is refreshed and only the performance for the selected WAN link is displayed.

- (Optional) Click **Legend** at the bottom right of the section to view the plotting legend for the horizontal dotted lines parallel to the x-axis in the graphs. The horizontal dotted lines represent the respective target SLA parameters of the SLA profiles.

**NOTE:** RTT is represented as Delay on the [“Application SLA Profiles” on page 242](#) page.

## RELATED DOCUMENTATION

[About the SLA Performance of All Tenants Page | 32](#)

[About the SLA Performance of a Single Tenant Page | 35](#)

[Viewing the SLA Performance of an Application or Application Group | 45](#)

## Viewing the SLA Performance of an Application or Application Group

You can use the **Monitor > Tenant-Name SLA Performance > Site-Name SLA Performance** page in the Administration Portal to view the SLA performance of individual applications and application groups in a site. You can also view the SLA performance of the associated SLA profile for all SLA parameters.

To view SLA performance of an application or application groups:

- Click one of the circles or squares in the **Applications SLA Performance by Throughput** section on the **Site-Name SLA Performance** page.

The page that appears displays SLA performance details of the application or application group.

[Table 18 on page 45](#) describes the fields on the application or application group SLA Performance details page.

**Table 18: Fields on the Application or Application Group Details Page**

Field	Description
Category and Description	View the category of the application or application group. The category can be Messaging, Web, Infrastructure, Remote-Access, Multimedia, Video, and so on.  You can also view a description of the application or application group.
SLA	View the name of the SLA profile associated with the application or application group.
Target	View the current target throughput defined in the SLA profile associated with the application or application group. If the target throughput was modified during runtime, the date and time when the throughput was modified and the previously defined throughput value are also displayed.
Avg. Performance	View the average throughout performance (in %) above or below the configured target throughput. The average throughput (in Mbps) is displayed within parentheses.
SLA Metrics by Throughput	View a graphical representation of the SLA metrics by throughput during the specified time range for that application or application group. The y-axis represents the throughput (in Mbps). The x-axis represents the specified time range. Hover over the graph to view the throughput value and time at any specified point. You can also view the sessions consumed by the WAN links for the application or application group for the specified time range.

Table 18: Fields on the Application or Application Group Details Page (*continued*)

Field	Description
Global SLA Profile Performance	<p>View the performance for all the SLA parameters of the SLA profile associated with the application or application group. The SLA performance is represented by a color-coded donut chart. The section in blue in the donut chart indicates the percentage of time during which SLA requirements for the SLA profile were met. The section in red in the donut chart indicates the percentage of time during which SLA requirements for the SLA profile were not met.</p> <p>Click the red colored section of the donut chart to view more information about when SLA requirements for the SLA profile were not met. The <b>SLA Profile Performance</b> page appears. The SLA Profile Performance page displays the following fields:</p> <ul style="list-style-type: none"> <li>• SLA Profile—SLA profile associated with the application or application group</li> <li>• Target—Target throughput configured in the SLA profile</li> <li>• SLAs Not Met—Percentage of time SLA requirements were not met for the SLA profile</li> <li>• Sessions—Number of sessions consumed by the application or application group</li> <li>• Start Time—Time at which the WAN links associated with the application or application groups started to fail meeting the SLA requirements</li> <li>• End Time—Time at which SLA profile requirements started to be met again</li> <li>• Avg Val—Average throughput (in Mbps) when the SLA requirements started to fail</li> <li>• Duration—Total duration (in seconds) during which SLA requirements were not met</li> <li>• From—Source WAN link</li> <li>• To—Destination WAN link</li> </ul>

## RELATED DOCUMENTATION

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[About the SLA Performance of All Tenants Page | 32](#)


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[About the SLA Performance of a Single Tenant Page | 35](#)


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[Viewing the SLA Performance of a Site | 41](#)

## Understanding SLA Performance Score for Applications, Links, Sites, and Tenants

### IN THIS SECTION

- [Application Score | 47](#)
- [Site Score | 47](#)
- [Tenant Score | 48](#)
- [Link Score | 48](#)

This topic explains the following SLA performance scores:

### Application Score

CSO supports Application Quality of Experience (AppQoE) to improve the user experience at the application level. In real time-optimized SD-WAN networks, CSO monitors application traffic using passive probes, which are inline probes sent along with the application traffic. Based on various parameters collected from the passive probes, CSO assigns a score to each of the applications. Based on the sampling rate you specified as part of the traffic type profile, CSO sends passive probes to detect packet loss, jitter, and violations in RTT. If the probe detects any of these issues, a syslog is generated and a violation count is added for the session.

The following metrics are used to calculate the application score:

- Session Violation Count
- Sampling Percentage
- Total Session Count

**NOTE:** Application score is available only in real time-optimized SD-WAN networks.

### Site Score

For AppQoE enabled (real time-optimized SD-WAN) networks, site score is calculated as an aggregate of individual parameters across all applications in the site. For information about application score calculation, see [“Application Score” on page 47](#).

The site score for bandwidth-optimized networks is calculated as an average of [“Link Score” on page 48](#).

## **Tenant Score**

Tenant score is calculated as the average value of site scores. For information about site score calculation, see [“Site Score” on page 47](#).

## **Link Score**

Link score is calculated based on the following SLA parameters collected using AppQoE active probes (in real time-optimized networks) or RPM probes (in bandwidth-optimized networks):

- Latency
- Jitter
- Packet Loss

For VoIP traffic, the link score calculation also considers the R-Value and MOS.



# Monitoring Jobs

IN THIS CHAPTER

- [About the Jobs Page | 49](#)
- [Viewing Job Details | 51](#)
- [Editing and Deleting Scheduled Jobs | 52](#)
- [Retrying a Failed Job on Devices | 54](#)

## About the Jobs Page

To access this page, click **Monitor > Jobs**.

A job is an action that is performed on any object that is managed by CSO, such as a device, tenant, site, or user. You can monitor the status of jobs that have run or are scheduled to run in CSO. You can run the job immediately or schedule it for a later date and time. You can view the status of the job whether it is completed or failed. You can retry tssm.ztp type jobs that are failed. See [“Retrying a Failed Job on Devices” on page 54](#).

Use this page to view the list of all jobs and the jobs that are scheduled to be executed. You can view general information about the jobs and the overall progress and status of the jobs. You can also edit and delete scheduled jobs.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View details about a job. See [“Viewing Job Details” on page 51](#).
- Retry a job. See [“Retrying a Failed Job on Devices” on page 54](#).
- Edit and delete schedule jobs. See [“Editing and Deleting Scheduled Jobs” on page 52](#).

### Field Descriptions

[Table 19 on page 50](#) provides guidelines on using the fields on the Jobs page.

Table 19: Fields on the Jobs Page

Field	Description
Job Name	View the name of the job.  Example: MSEC_DOWNLOAD_IPS/APPLICATION_SIGNATURES_08_Jul_17_124229_024
Resource Name	View the resource name of the job.  Example: Download IPS/Application Signatures
Status	View the status of the job to know whether the job succeeded or failed.  Example: Success
Owner	View the name of the owner who created the job.  Example: cspadmin
Number of Tasks	View the number of tasks associated with the job.  Example: 2  For example, the tasks <b>site.ucpe-32</b> and <b>customer.sdwan</b> are associated with this job.
Job Type	When a job is initiated from a object in CSO, CSO assigns a unique ID to that job, which serves to identify the job (along with the job type) on the Jobs page. The following is a list of some of the job types supported in CSO: <ul style="list-style-type: none"> <li>• Import POP</li> <li>• Configure Sites</li> <li>• Download Signature</li> <li>• Create Sites</li> <li>• Onboard Tenant</li> <li>• Create OpCo</li> <li>• Remove Site</li> </ul>
Start Date	View the start date and time of a task associated with the job.
End State	View the end date and time of a task associated with the job.

## Field Descriptions

Table 20 on page 51 provides guidelines on using the fields on the Scheduled Jobs page.

Table 20: Fields on the Scheduled Jobs Page

Field	Description
Schedule ID	View the unique ID of the scheduled job. The value is generated by the database when a new schedule record is inserted into the database.  Example: 48
Name	View the unique name of the scheduled job.  Example: Tenant Delete_csp.tssm_remove_site_e340354716ae43859fad5ba15669eee2
Status	View the status of the last triggered job. The following state are available: scheduled, In progress, complete, or failed.  The default status is scheduled.
Job Type	View the job type.  Example: tssm onboard tenant
Owner	View the name of the owner who scheduled the job.  Example: cspadmin
Next Run Time	View the time when the job is scheduled to run next.

## RELATED DOCUMENTATION

[Editing and Deleting Scheduled Jobs | 52](#)

[Retrying a Failed Job on Devices | 54](#)

## Viewing Job Details

You can use the Detailed View page to view all the parameters of a job.

To view details of a job:

- Right-click the job name that you want to see the detailed view for and select **Detail View**, or select the job and click **More > Detail View**.

- Alternatively, hover over the job name and click the Detailed View icon that appears before it.

The Detailed View page appears, showing the details of the job and the number of tasks associated with the job. See the relevant topic [“About the Jobs Page” on page 450](#) for a description of the fields on these pages.

## RELATED DOCUMENTATION

| [About the Jobs Page | 49](#)

## Editing and Deleting Scheduled Jobs

### IN THIS SECTION

- [Editing Scheduled Jobs | 52](#)
- [Deleting Scheduled Jobs | 53](#)

You can edit and delete scheduled jobs. This topic contains the following sections:

### Editing Scheduled Jobs

You can modify the date and time of deployment of scheduled jobs.

To modify a scheduled job:

1. Select **Monitor > Jobs > Scheduled Jobs**.

The Scheduled Jobs page appears.

2. Select the job that you want to reschedule the deployment, and click the edit icon.

The Edit Schedule page appears.

3. To execute the job immediately, delete the existing scheduled entry, create a new entry, and then select the **Run now** option. To reschedule the job for a later date and time, or select the **Schedule at a later time** option.
4. Click **Save** to save the changes.

The modified job and its details are displayed on a page

## Deleting Scheduled Jobs

You can delete one or more scheduled jobs.

To delete a scheduled job:

1. Select **Monitor > Jobs> Scheduled Jobs**.

The Scheduled Jobs page appears with a list of jobs.

2. Select the check box of the job that you want to delete and then click the delete icon (X).

The Confirm Delete page appears.

3. Click **Yes** to confirm.

The scheduled job is deleted.

## RELATED DOCUMENTATION

[About the Jobs Page | 49](#)

[Viewing Job Details | 51](#)

## Retrying a Failed Job on Devices

You can retry **tssm.ztp** type jobs that did not complete successfully on your devices. Retrying a failed job saves time because instead of creating the job again and executing it, you can simply retry the failed job.

**NOTE:**

- The **Retry Job** button is enabled only for failed ZTP jobs.
- You cannot retry bootstrap jobs.

To retry a job that was not successful:

1. Select **Monitor > Jobs**.

The Jobs page appears.

2. Select the failed job (**tssm.ztp** type) that you want to retry.

3. At the top right corner of the Jobs page, click the **Retry Job** button.

The job is executed in the back end and the device status on the Sites page is changed to **PROVISIONED**.

### RELATED DOCUMENTATION

[About the Jobs Page | 49](#)

[Editing and Deleting Scheduled Jobs | 52](#)

# Managing POPs

## IN THIS CHAPTER

- About the POPs Page | 55
- Creating a Single POP | 58
- Importing Data for Multiple POPs | 70
- Viewing the History of POP Data Imports | 76
- Viewing the History of POP Data Deletions | 78
- Managing a Single POP | 79
- About the VIMs Page | 80
- Creating a Cloud VIM | 82
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- Changing the Junos Space Virtual Appliance Password | 89
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## About the POPs Page

To access this page, click **Resources > POPs**.

You can use the POPs page to view the list of available POPs in the service provider network. You can also view information about each POP in the network.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Quickly view important data about POPs in the widgets that appear at the top of the page. See [Table 21 on page 56](#).
- Create a POP. See [“Creating a Single POP” on page 58](#).
- Import data for multiple POPs. See [“Importing Data for Multiple POPs” on page 70](#).
- View the history of POP data imports. See [“Viewing the History of POP Data Imports” on page 76](#).
- View the history of POP data deletions. See [“Viewing the History of POP Data Deletions” on page 78](#).
- View details about a POP. Hover over the name of a POP or click **More > Quick View**. See [“Viewing Object Details” on page 16](#).
- Show or hide columns about the POPs. See [“Sorting Objects” on page 17](#).
- Search an object about the POPs. See [“Searching for Text in an Object Data Table” on page 16](#).
- Delete a POP. See [“Deleting Objects” on page 15](#).

Field Descriptions

[Table 21 on page 56](#) describes the widgets on the POPs page.

Table 21: Widgets on the POPs Page

Widget	Description
Top POPs by CPU Allocation	<p>View the top three POPs using the largest percentage of CPU from the assigned cores.</p> <p>Click a POP name to view detailed information about the resources the POP uses.</p>
Top POPs by Storage Allocation	<p>View the top three POPs using the most storage from the allocated storage space in gigabytes (GB).</p> <p>Click a POP name to view detailed information about the resources the POP uses.</p>
Top POPs by Memory Allocation	<p>View the top three POPs using the most memory from the allocated memory size in megabytes (MB).</p> <p>Click a POP name to view detailed information about the resources the POP uses.</p>

[Table 22 on page 57](#) shows the fields on the POPs page.



Table 22: Fields on the POPs Page

Field	Description
Name	View the name of the POP.  Example: regional
Location	View the location of the POP.  Example: Sunnyvale, CA
CPU Allocated	View the amount of CPU allocated for the POP.
Memory Allocated	View the amount of memory allocated for the POP.
Storage Allocated	View the amount of storage allocated for the POP.
VIMs	View the number of VIMs provisioned in the POP.  <ul style="list-style-type: none"> <li>• 0—Either a distributed deployment or a centralized deployment for which you have not yet configured a VIM.</li> <li>1—Centralized deployment</li> </ul> Example: 1
EMS	View the number of EMS applications provisioned in the POP.  Example: 2
Routers	View the number of routers provisioned in the POP.  Example: 1
Tenants	View the list of tenants in the POP.  Example: Softbank, ATT, and Juniper
Sites	View the number of tenant sites in the POP.  Example: 4

## RELATED DOCUMENTATION

[Creating a Single POP | 58](#)
[About the VIMs Page | 80](#)

## Creating a Single POP

### IN THIS SECTION

- [Adding Information About the POP | 58](#)
- [Adding a Device | 60](#)
- [Adding a VIM | 63](#)
- [Adding an EMS | 67](#)
- [Reviewing and Saving the POP Configuration Settings | 69](#)

You can use the POPs page to create a network point of presence (POP) and its associated resources, such as a provider edge device for the POP, a virtualized infrastructure manager (VIM), a container for a management network for the VIM, and an element management system (EMS).

Creating a single POP involves adding several types of objects, depending on whether the POP is for a centralized or distributed deployment. The sections in this topic describe how to add each type of object to a POP in Administration Portal. You must finish the steps in each section to create the objects that you need for a single POP and to save the POP successfully. This topic includes the following sections:

### Adding Information About the POP

To create a single POP and to add basic information to the POP:

1. Click **Resources > POPs**.

The POPs page appears.

2. Click the plus icon (+).

The Add POP page appears.

3. Complete the configuration settings according to the guidelines provided in [Table 23 on page 59](#).

4. Click **Next** and proceed to "Adding a Device".

The Add Device table appears.

**Table 23: Fields on the Add POP page**

Field	Description
Region	<p>Regions are used to group services for various business reasons such as location, proximity, service distribution and load.</p> <ul style="list-style-type: none"> <li>For a centralized deployment, select the region that you want to use to manage services in the POP; the default is regional.</li> </ul> <p><b>NOTE:</b> The regions are configured during CSO installation.</p> <ul style="list-style-type: none"> <li>For a distributed deployment, the default region is selected and cannot be modified.</li> </ul> <p>Example: regional</p> <p><b>NOTE:</b> The administrator must not delete the region name.</p>
POP Name	<p>Enter the name of the POP. You can use an unlimited number of alphanumeric characters, including special characters.</p> <p>Example: north-east.</p>
Street Address	<p>Enter the street address. You can use an unlimited number of alphanumeric characters, including special characters.</p> <p>Example: 1133 Innovation Way</p>
City	<p>Enter the name of the city. You can use an unlimited number of alphanumeric characters, including special characters.</p> <p>Example: Sunnyvale</p>
State/Province	<p>Enter the name of the state. You can use an unlimited number of alphanumeric characters, including special characters.</p> <p>Example: California</p>
ZIP/Postal Code	<p>Enter the zip code or postal code for the country. You can use an unlimited number of alphanumeric characters, including special characters.</p> <p>Example: 94089</p>
Country	<p>Select the name of the country.</p> <p>Example: USA</p>

## Adding a Device

You can add the following devices to a POP:

- A router that acts as an SDN gateway and provides a Layer 3 routing service to customer sites for a centralized deployment.
- A router that acts as a provider edge (PE) router and an IPsec concentrator for a distributed deployment.

To add a device:

1. Click **Resources > POPs > +**.

The Add POP page appears.

2. Complete the configuration settings according to the guidelines provided in [Table 23 on page 59](#).

3. Click **Next**.

The Device section appears.

4. Click the plus icon (+) in the Add Device section.

The Add Device page appears.

5. Complete the configuration according to the guidelines in [Table 24 on page 61](#).

6. Click **Save**.

7. Proceed as follows:

- For a centralized deployment, click **Next** and proceed to **Adding a VIM**.
- For a distributed deployment, click **5 (Summary)** and proceed to [“Reviewing and Saving the POP Configuration Settings” on page 69](#).

Table 24: Fields on the Add Device Page

Field	Description
Name	<p>Enter the name of the device, such as a data center gateway, a PE router, or an IPsec concentrator. Some device examples are listed below.</p> <ul style="list-style-type: none"> <li>• An MX Series router used as an SDN gateway in a centralized deployment.</li> <li>• An MX Series router used as a provider edge (PE) router in a distributed deployment.</li> <li>• An SRX Services Gateway router or a vSRX instance used as a CPE device in a distributed deployment.</li> </ul> <p>You can use letters, numbers, spaces, periods, dashes, underscores, commas, @, #, \$, %, &amp;, and *. Maximum length is 255 characters.</p> <p>Example: MX-router-10</p>
Family	<p>Select the product family for the device.</p> <p>Example: MX</p>
Device Template	<p>Select the name of the device template for the device:</p> <ul style="list-style-type: none"> <li>• MX as Gateway for vCPE—Customized device template for an MX Series router that prevents the creation of black holes when an administrative user activates a service at a site. Select this option only if you have been advised to do so by Juniper Networks.</li> <li>• MX as Hybrid WAN IPsec HUB—Default template for MX Series router. Select this option for MX routers in centralized and distributed deployments unless Juniper Networks advises use of the <i>MX as Gateway for vCPE</i> device template.</li> <li>• SRX as SDWAN Hub—Device template for an SRX Services Gateway used as a CPE device that offers basic SD-WAN functionality in a distributed deployment. Select this option only if you have been advised to do so by Juniper Networks.</li> <li>• SRX as Hybrid WAN CPE—Device template for an SRX Services Gateway or a vSRX used as a CPE device in a distributed deployment.</li> <li>• SRX as Managed Internet CPE—Device template to manage an SRX Services Gateway devices for a managed internet service.</li> </ul>
Type of Device	<p>Select the type of device:</p> <ul style="list-style-type: none"> <li>• PNE—Device is managed by the EMS. Use this option for devices, such as data center gateway, in a centralized deployment, for an SRX Services Gateway or a vSRX used as a CPE device in a distributed deployment, and for PE routers in a distributed deployment that you want the EMS to manage.</li> <li>• PE/IPsec—Device is not managed by the EMS. Use this option for devices, such as provider edge (PE) router or IPsec concentrator, in a distributed deployment that you do not want the EMS to manage.</li> </ul>

Table 24: Fields on the Add Device Page (*continued*)

Field	Description
PNE package	<p>If you specified that the device is a PNE for a centralized deployment, select the name of the package that contains metadata and configuration instructions for the PNE:</p> <ul style="list-style-type: none"> <li>• SRX—Use with SRX Series device template.</li> <li>• Juniper-MX—Use with the MX as Hybrid WAN IPsec HUB device template.</li> <li>• Juniper-MX-MIS—Customized device template with MX Series configuration that prevents the creation of black holes when an administrative user activates a service at a site. Use with the MX as Gateway for vCPE device template.</li> </ul> <p><b>NOTE:</b> Select Juniper-MX for an MX Series router, unless Juniper Networks recommends the Juniper-MX-MIS package.</p> <p>You must specify the PNE package only for data center gateway device.</p> <p>Do not use the SRX Series package for the MX router.</p>
Management Type	<p>Specify the management type for the PE device. The following options are available:</p> <ul style="list-style-type: none"> <li>• Managed—Select Managed if you use Contrail Service Orchestration to manage the device.</li> <li>• Unmanaged—Select Unmanaged if you use another application to manage the device.</li> </ul> <p>Example: Unmanaged</p>
Device IP	<p>Enter the IPv4 address of the management interface for the device.</p> <p>Example: 192.0.2.15</p>
Internet Gateway (optional)	<p>If you specified that the device is a PE router or an IPsec concentrator for a distributed deployment, then specify the IPv4 address of the Internet gateway. You can also specify a list of public IP addresses of the Internet Key Exchange (IKE) gateways on this device.</p> <p>Example: 192.0.2.20</p>
User Name	<p>You must enter the username that you configured when you set up the device. You use this username to log into the device. Providing login credentials gives Contrail Service Orchestration access to the device.</p>
Password	<p>Enter the password that you configured when you set up the device. You use this password to log into for the device. Providing login credentials gives Contrail Service Orchestration access to the device.</p>

## Adding a VIM

For a centralized deployment, you must specify information about Contrail Cloud Platform, which provides the VIM.

You must add a VIM for a centralized deployment. Do not add a VIM for a distributed deployment.

To add a VIM:

1. Click **Resources > POPs > +**.

The Add POP page appears.

2. Complete the configuration settings according to the guidelines provided in [Table 23 on page 59](#).

3. Click **Next**.

The Device section appears.

4. Click **Next**.

The VIM page appears.

5. In the Connection Information section, specify details for the Contrail Cloud Platform that provides the VIM for this POP.

6. Complete the configuration according to the guidelines in [Table 25 on page 64](#).

7. In the Network Information section, click the plus icon (+) to add each resource pool.

8. In the Network Information section, specify details for the management network in Contrail.

You can either specify details for a management network that you already created in Contrail or specify details for a new management network that Administration Portal notifies Contrail to automatically create.

9. If this POP has a direct connection to the Internet, in the Internet Network section, click the plus icon (+) icon to add information about the Internet network in Contrail.

10. Click **Save**.

11. Proceed as follows:

- If you use virtualized network functions (VNFs) that require an EMS other than the EMS microservice, click **Next** and proceed to "Adding an EMS".

- If you do not need an additional EMS, click **5 (Summary)** and proceed to [“Reviewing and Saving the POP Configuration Settings” on page 69.](#)

**Table 25: Fields on the Add Cloud VIM Page**

Field	Guidelines
Name	<p>Enter the name of the virtualized infrastructure manager (VIM) for a centralized deployment. You can add multiple VIMs to a point of presence (POP). You can use letters, numbers, spaces, periods, dashes, underscores, commas, @, #, \$, %, &amp;, and *. Maximum length is 255 characters.</p> <p>Example: vcpe-vim</p>
Type	<p>View the VIM type. The default VIM type is cloud.</p> <p>Example: Cloud</p>
<i>Connection Information</i>	
IP address	<p>Enter the IPv4 address of the Contrail Controller node in the Contrail Cloud Platform that provides the virtualized infrastructure manager (VIM). If you use a high availability (HA) configuration for the Contrail Cloud Platform, specify the virtual IP address of the Contrail Controller node.</p> <p>Example: 10.102.28.36</p>
Auth URL	<p>Enter the authentication URL for the OpenStack Keystone.</p> <p>Example: http://ip:5000/v3</p>
User Name	<p>Enter the OpenStack Keystone username that you configured.</p> <p>Example: admin</p>
Password	<p>Enter the OpenStack Keystone password that you configured.</p> <p>Example: contrail123</p>
Domain	<p>Enter the name of the OpenStack domain that you configured.</p> <p>Example: default</p>
Tenant	<p>Enter the name of the OpenStack tenant that you configured.</p> <p>Example: admin</p>



Table 25: Fields on the Add Cloud VIM Page (*continued*)

Field	Guidelines
<i>Network Information</i>	
<i>Resource Pools</i>	
Resource Pool Name	<p>Enter a resource pool for each VIM. You can use an unlimited number of alphanumeric characters, including special characters.</p> <p>Example: north-east.</p>
Compute Zone	<p>Enter the availability zone in Contrail OpenStack in which the virtual machines for network services reside. The default availability zone is nova.</p> <p>You can run the <b>nova availability-zone-list</b> command on the Contrail OpenStack to find the list of available zones.</p> <p>Example: nova</p>
Does Management Network Exist?	<p>Select whether to use an existing virtual network in Contrail OpenStack or to create a new one.</p> <ul style="list-style-type: none"> <li>• yes—Import the named virtual network from Contrail OpenStack.</li> <li>• no—Create a virtual network in Contrail OpenStack with the specified name.</li> </ul>
Management Network Name	<p>Enter the name of the existing management network in Contrail or the new management network that you want to create in Contrail.</p> <p>Example: mgmt-net</p>
<i>Management Network Information</i>	
Route Target	<p>Specify one or more route targets for the existing management network in Contrail or the new management network that you want to create in Contrail.</p> <p>Example: 64512:10000.</p>
Subnet	<p>Specify one or more prefixes that define the subnets for the Contrail Compute nodes. You can use an IPv4 address. Specify one or more IPv4 prefixes for the existing network in Contrail or the new network that you want to create in Contrail.</p> <p>Example: 192.0.2.0/24.</p>
<i>Internet Network Information</i>	

Table 25: Fields on the Add Cloud VIM Page (*continued*)

Field	Guidelines
Network Name	<p>Enter the name of the Internet network.</p> <p>Example: int-net</p>
Does Exist	<p>Specify whether to use an existing virtual network in Contrail OpenStack or to create a new one.</p> <ul style="list-style-type: none"> <li>• True—Import the named virtual network from Contrail OpenStack.</li> <li>• False—Create a virtual network in Contrail OpenStack with the specified name.</li> </ul>
Route Target	<p>Select the route target for the internet network in Contrail.</p> <p>Example: 64512:10000.</p>
Subnet	<p>Select the prefix that defines the subnet for the Contrail Compute nodes.</p> <p>You can use an IPv4 address.</p> <p>Example: 192.0.2.0/24.</p>
<i>Service Profile Information</i>	
Profile Name	<p>Enter the name of the service profile in a VIM instance. Create one or more service profiles if you use a dedicated OpenStack Keystone for Contrail Service Orchestration in a centralized deployment. A service profile specifies the Contrail OpenStack tenant, domain, and login credentials. After Contrail Service Orchestration authenticates a tenant (customer), it uses the information in the service profile to provide access to Contrail OpenStack.</p> <p>Example: vim-service-profile</p>
Tenant Name	<p>Enter the name of the infra tenant for whom you want to assign the service profile.</p> <p>Example: test-tenant</p>
Domain Name	<p>Enter the Infra domain name.</p> <p>Example: Default</p>
User Name	<p>Enter the username of the tenant.</p> <p>Example: admin</p>

Table 25: Fields on the Add Cloud VIM Page (*continued*)

Field	Guidelines
Password	<p>Enter the password for the tenant user.</p> <p>Example: password123</p>
Default Service Profile	<p>Select the name of the default service profile if you use a dedicated OpenStack Keystone for Contrail Service Orchestration. If you do not specify a service profile when you configure the tenant, Contrail Service Orchestration uses the default profile to authenticate the tenant.</p> <p>Example: default-service-profile</p>

## Adding an EMS

Configure an element management system (EMS) if you use virtualized network functions (VNFs) that require an EMS other than the EMS microservice.

To add an EMS:

1. Click **Resources > POPs > +**.

The Add POP page appears.

2. Complete the configuration settings according to the guidelines provided in [Table 23 on page 59](#).

3. Click **Next**.

The Device section appears.

4. Click **Next**.

The VIM page appears.

5. Click **Next**.

The EMS page appears.

6. Click the plus icon (+) to add the EMS.

7. Complete the configuration according to the guidelines in [Table 26 on page 68](#).

8. Click **Save**.
9. Click **Next** to review the configuration settings for the POP.

**Table 26: Fields on the Add EMS Page**

Field	Guidelines
Name	<p>Name of the EMS. This field is auto-populated with the name that you specified when you deployed the Junos Space Virtual Appliance.</p> <p>Example: Junos Space</p>
IP	<p>Enter the IPv4 address of the Junos Space Web user interface (UI).</p> <p>For a redundant Contrail Service Orchestration, configure the IP address of the Web UI for the primary Junos Space Virtual Appliance.</p> <p>Example: 192.0.2.3.</p>
Vendor	<p>Enter the vendor name for the EMS.</p> <p>Example: Juniper Networks</p>
Version	<p>Enter the version number of the EMS. The default version is 15.1.</p> <p>Example: 15.1</p>
Authentication URL	<p>Enter the authentication URL for the EMS application.</p>
User Name	<p>Enter the username of the device administrator that you configured. This user should be assigned the admin role in all the tenants. The default username is super.</p> <p>Example: super</p>
Password	<p>Enter the administrator password that you configured. The default password is juniper123.</p> <p>Example: juniper123</p>

## Reviewing and Saving the POP Configuration Settings

After you have configured a POP and its associated resources, you can review and save a copy of the configuration settings. Finally, you must save the POP that you configured.

1. Click **Resources > POPs > +**.

The Add POP page appears.

2. Complete the configuration settings according to the guidelines provided in [Table 23 on page 59](#).

3. Click **Next**.

The Device section appears.

4. Click **Next**.

The VIM page appears.

5. Click **Next**.

The EMS page appears.

6. Click **Next**.

The Summary page appears.

7. Click **Summary > Edit** to edit the configuration settings of the objects that you configured.

8. Click **Download POP Payload** to save a JSON file of the configuration settings of the objects that you configured.

9. Click **OK** to save the POP configuration. If you want to discard your changes, click **Cancel** instead.

### RELATED DOCUMENTATION

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[About the POPs Page | 55](#)

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[About the EMS Page | 86](#)

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[About the VIMs Page | 80](#)

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[About the Routers Page | 90](#)

## Importing Data for Multiple POPs

### IN THIS SECTION

- [Customizing a POP Data File | 70](#)
- [Uploading a POP Data File | 75](#)

You can use the Import POPs page to import a POP and its associated resources, such as a provider edge device for the POP, a virtualized infrastructure manager (VIM), a container for management network for the VIM, and an element management system (EMS).

### Customizing a POP Data File

To customize a POP data file:

1. Select **Resources > POPs**.

2. Click **Import POPs > Import**.

The Import POPs page appears.

3. Click the **Download Sample JSON** link to open and save the sample JSON data file.

The sample file opens at the bottom of the page.

4. Save the file to your computer with an appropriate name.

Example: sample-pop-data.json

**NOTE:** You need to retain the file format as .json to successfully upload the POP details to the Administration Portal.

5. Customize the sample JSON file using the guidelines in [Table 27 on page 71](#).
6. Save the customized file.

Table 27: Fields on the POPs Page

Field	Description
<i>POP Information</i>	
dc_name	Specify the name of the region for this POP.  Example: regional  <b>NOTE:</b> Administrator should not delete the region name.
name	Specify the name of the POP. You can use an unlimited number of alphanumeric characters, including special characters.  Example: pne-pop10
street	Specify the street address.  Example: 1133 Innovation Way
city	Specify the name of the city.  Example: Sunnyvale.
state	Specify the name of the state.  Example: CA
zip_code	Specify the zip code or postal code for the state.  Example: 94089.
country	Specify the name of the country.  Example: USA
<i>VIM Information</i>	
<b>NOTE:</b> You must add a VIM for a centralized deployment. Do not add a VIM for a distributed deployment.	
name	Specify the name of the VIM instance. You can use an unlimited number of alphanumeric characters, including special characters.  Example: vim10
vim_type	Specify the VIM instance type. The default VIM type is cloud.  Example: cloud

Table 27: Fields on the POPs Page (*continued*)

Field	Description
address	Specify the IP address of the primary Contrail Configure and Control node for the Contrail Cloud Reference Architecture (CCRA) for this POP.  Example: 10.102.28.148
auth_url	Specify the authentication URL for the OpenStack Keystone.  Example: http://10.102.28.148:5000/v3
default_domain	Specify the name of the OpenStack domain that you configured.  Example: Default.
password	Specify the OpenStack Keystone password that you configured.  Example: contrail123
default_tenant	Specify the name of the OpenStack tenant that you configured.  Example: admin
username	Specify the OpenStack Keystone username that you configured.  Example: admin
<i>Resource Pool</i>	
name	Specify a resource pool for each VIM. You can use an unlimited number of alphanumeric characters, including special characters.  Example: ResoucePool123
compute_zone	Specify the availability zone in Contrail OpenStack in which the VMs for network services reside. The default availability zone is nova.  You can run the <b>nova availability-zone-list</b> command on the Contrail OpenStack to find the list of available zones.  Example: nova
<i>Management Network</i>	



Table 27: Fields on the POPs Page (*continued*)

Field	Description
vld_name	Specify the name of the virtual link descriptor for the management network. The default name is mgmt.  Example: mgmt
vl_name	Specify the name of the management network in Contrail.  Example: mgmt-net
onboard	Specify the onboard value for the management network.  <ul style="list-style-type: none"> <li>• true—Import named virtual network object from VIM.</li> <li>• false—Create a virtual network in VIM with the specified name.</li> </ul>
route_target	Select the route target for the management network in Contrail.  Example: 8887:887
subnet	Specify one or more prefixes that define the subnets for the Contrail Compute nodes. You can use an IPv4 address.  Example: 10.102.82.0/23
<i>EMS Information</i>	
name	Specify the name of the EMS application.  Example: Junos Space
ip	Specify the IP address of the Junos Space Web user interface (UI). For a redundant Contrail Service Orchestration, configure the IP address of the Web UI for the primary Junos Space Virtual Appliance.  Example: 10.102.86.12
username	Specify the username of the device administrator that you configured. This user should be assigned the admin role in all the tenants. The default username is super.  Example: super

Table 27: Fields on the POPs Page (*continued*)

Field	Description
password	<p>Specify the administrator password that you configured. The default password is juniper123.</p> <p>You can choose a password that is at least eight characters long and contains characters from at least three of the following four character classes: uppercase letters, lowercase letters, numbers (0 through 9), and special characters.</p> <p>Example: juniper123</p>
vendor	<p>Specify the vendor for the EMS.</p> <p>Example: Juniper Networks</p>
version	<p>Specify the version number of the EMS.</p> <p>Example: 15.1</p>
<i>Device Information</i>	
name	<p>Specify the name of the device, such as a physical network element (PNE) for a centralized deployment. You can use any number of alphanumeric characters, including special characters.</p> <p>Example: PNE-MX10</p>
device_ip	<p>Specify the management IP address of the device.</p> <p>Example: 192.0.2.15.</p>
pne_package	<p>Specify the name of the package providing metadata and configuration templates needed to program a PNE device for service chain attachments in the case of a vCSO solution. If you configure a PNE for the POP in a centralized deployment, select a software image from the menu:</p> <ul style="list-style-type: none"> <li>• MX as Hybrid WAN IPsec HUB—Default for MX Series router. Select this option for most installations.</li> <li>• MX as Gateway for vCPE—Customized device profile with MX configuration that prevents the creation of black holes when an administrative user activates a service at a site.</li> </ul> <p>You must specify the PNE package only for a data center gateway device.</p> <p>Do not use the SRX Series package for the PE router or the SDN gateway.</p>

Table 27: Fields on the POPs Page (*continued*)

Field	Description
assigned_device_profile	<p>Select the name of the configuration image for the SDN gateway or the PE router.</p> <ul style="list-style-type: none"> <li>• MX as Hybrid WAN IPsec HUB—Default for MX Series router. Select this option for most centralized deployments and for all distributed deployments.</li> <li>• MX as Gateway for vCPE—Customized device profile with MX Series configuration that prevents the creation of black holes when an administrative user activates a service at a site.</li> <li>• SRX as SDWAN Hub—Device profile for an SRX Services Gateway used as a CPE device that offers basic SD-WAN functionality in a distributed deployment. Select this option only if you have been advised to do so by Juniper Networks.</li> </ul>
username	<p>Specify the username of the device administrator for logging into the device.</p> <p>Example: root</p>
password	<p>Specify the password for logging into the device.</p> <p>Example: pwd123</p>

## Uploading a POP Data File

You can use the Administration Portal to import POP data to support tenant services.

To upload a POP data file:

1. Select **Resources > POPs**.
2. Click **Import POPs > Import**.  
The Import POPs page appears.
3. Click **Browse** and navigate to the directory containing the POP data file.
4. Select the file and click **Open**.
5. Click **Import**. If you want to discard the import process, click **Cancel** instead.

A success message is displayed indicating that the job was uploaded successfully.

SEE ALSO

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[Creating a Single POP | 58](#)

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[Viewing the History of POP Data Imports | 76](#)

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[Viewing the History of POP Data Deletions | 78](#)

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## Viewing the History of POP Data Imports

You can use the Import History page to view the imported POP data. You can also view the details of the imported logs and their status.

To import your POP data, see [“Importing Data for Multiple POPs” on page 70](#).

To view the history of imported POP data:

1. Click **Resources > POPs > Import POPs > Import History**.

The Import History page is displayed. [Table 28 on page 76](#) describes the fields on the Import History page.

2. Click a task name.

The Import POPs Tasks page appears. [Table 29 on page 77](#) describes the fields on the Import Task page.

3. Click the Task ID.

The Job Status page appears. [Table 30 on page 77](#) describes the fields on the Job Status page.

4. Click **OK** to return to the previous page.

**Table 28: Fields on the Import History Page**

Field	Description
In progress	View the number of import tasks that are in progress.
Success	View the number of import tasks that are successful.
Failure	View the number of import tasks that have failed.
Name	View the name of the task.  Example: import_pop_csp.topology_service.import_pop_28c93be6325f4e87a440be096c7e4b58

Table 28: Fields on the Import History Page *(continued)*

Field	Description
Start Date	View the start date and time of the task.
End Date	View the end date and time of the task.
Status	View the status of the task to know whether the task succeeded or failed.
Log	View the import logs. Click a log to access more detailed information about the imported log.

Table 29: Fields on the Import POPs Tasks Page

Field	Description
Task ID	View the ID created for the task.
Status	View the status of the task to know whether the task succeeded or failed.

Table 30: Fields on the Job Status Page

Field	Description
Name	View the name of the task.
Actual Start Time	View the start date and time of the task.
User	View the name of the user who imported the task.
End Time	View the end date and time of the task.
State	View the status of the task to know whether the task succeeded or failed.

## RELATED DOCUMENTATION

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[Importing Data for Multiple POPs | 70](#)
[Viewing the History of POP Data Deletions | 78](#)

## Viewing the History of POP Data Deletions

You can use the Delete History page to view the deleted POP data, status of the delete operation, and log details.

To view the history of deleted POP data:

1. Click **Resources > POPs > Import POPs > Delete History**.

The Delete History page is displayed. [Table 31 on page 78](#) describes the fields on the Delete History page.

2. Click a task name.

The Delete POPs Tasks page appears. [Table 32 on page 79](#) describes the fields on the Delete Task page.

3. Click the Task ID.

The Job Status page appears. [Table 33 on page 79](#) describes the fields on the Job Status page.

4. Click **OK** to return to the previous page.

**Table 31: Fields on the Delete History Page**

Field	Description
Name	View the name of the task.
In progress	View the number of delete tasks that are in progress.
Success	View the number of delete tasks that are successful.
Failure	View the number of delete tasks that have failed.
Start Date	View the start date and time of the task.
End Date	View the end date and time of the task.
Status	View the status of the task to know whether the task is succeeded or failed.
Log	View the import logs. Click on a log to access more detailed information about the deleted log.

Table 32: Fields on the Delete POPs Tasks Page

Field	Description
Success	View the number of times the delete operations has been successful for a POP.
Failure	View the number of times the delete operations has failed for a POP.
Task ID	View the ID created for the task.  Click on the task ID to view the delete log details corresponding to a POP.
Status	View the status of the task to know whether the task succeeded or failed.

Table 33: Fields on the Job Status Page

Field	Description
Name	View the name of the task.
Actual Start Time	View the start date and time of the task.
User	View the name of the user who deleted the task.
End Time	View the end date and time of the task.
State	View the status of the task to know whether the task succeeded or failed.

## RELATED DOCUMENTATION

[Importing Data for Multiple POPs | 70](#)
[Viewing the History of POP Data Imports | 76](#)

## Managing a Single POP

Use the tabs on this page to view and manage resources for this POP.

- [About the VIMs Page on page 80](#)
- [About the EMS Page on page 86](#)
- [About the Routers Page on page 90](#)

## RELATED DOCUMENTATION

[About the POPs Page | 55](#)

[Creating a Single POP | 58](#)

## About the VIMs Page

To access this page, click **Resources > POPs > POP Name > VIMs**.

You can use the VIMs page to create a virtualized infrastructure manager (VIM) and to view information about VIMs provisioned in the POP. The VIM in a Network Functions Virtualization (NFV) implementation manages the hardware and software resources that the service provider uses to create service chains and deliver network services to customers.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Quickly view important data about VIMs created for POPs in the widgets that appear at the top of the page. See [Table 34 on page 81](#).
- Create a Cloud VIM. See [“Creating a Cloud VIM” on page 82](#).
- Select a different POP from the drop-down list above the top left of the table to view the VIM details in grid view.
- View details about a VIM. Click the details icon that appears when you hover over the name of a VIM instance. See [“Viewing Object Details” on page 16](#).
- Show or hide columns about the VIMs. See [“Sorting Objects” on page 17](#).
- Search an object about the VIMs. See [“Searching for Text in an Object Data Table” on page 16](#).

### Field Descriptions

- [Table 34 on page 81](#) describes the widgets on the VIMs page.
- [Table 35 on page 81](#) shows the fields on the VIMs page.



Table 34: Widgets on the VIMs Page

Widget	Description
Top VIMs by CPU Allocation	View the top VIMs using the largest percentage of CPU from the assigned cores.
Top VIMs by Storage Allocation	View the top VIMs using the most storage from the allocated storage space in gigabytes (GB).
Top VIMs by Memory Allocation	View the top VIMs using the most memory from the allocated memory size in megabytes (MB).

Table 35: Fields on the VIMs Page

Field	Description
Name	View the name of the VIM in the POP.
IP Address	View the IP address of the primary Contrail Configure and Control node for the Contrail Cloud Reference Architecture (CCRA) for this POP.
CPU Allocated	View the amount of CPU cores allocated to the POP by the VIM.
Memory Allocated	View the amount of memory allocated to the POP by the VIM.
Storage Allocated	View the amount of storage allocated to the POP by the VIM.
Domains	View the name of the OpenStack domain that you configured.
Vendor	View the vendor name of the VIM instance.
URL	View the uniform resource locator (URL) for the OpenStack Keystone.
Tenants	View the number of OpenStack tenants in the POP.

## RELATED DOCUMENTATION

[About the POPs Page | 55](#)

[About the VIMs Page | 80](#)

[About the Routers Page | 90](#)

[Creating a Single POP | 58](#)

## Creating a Cloud VIM

You can use the VIMs page to create virtualized infrastructure managers (VIMs) for each POP in the network. You create one VIM object for each POP in your network. Although the Contrail Cloud Reference Architecture (CCRA) provides a VIM, when you create a VIM you can specify several Contrail OpenStack settings. See [Table 36 on page 83](#).

You can only create a VIM for a centralized deployment. A distributed deployment has a default VIM that is created when the deployment is installed.

There are two authentication methods, namely, CSO Keystone (Central Keystone) authentication and independent VIM Instances's keystone (also known as *regional keystone*) authentication. Customers can authenticate and authorize their own system through OpenStack. Customers have to configure service profiles as a part of VIM and associate it with a tenant.

For example, consider **ABC** as a service provider and **customer-a** as the tenant for ABC. The workflow for associating the service profile with the tenant is listed below:

1. The **cspadmin** configures the POP (vim-instance and domain creations) along with vim-service-profiles when configuring the vim-instance. The vim-service-profiles contains the respective VIM's infra tenant details.
2. Configure ABC data center as a VIM.
3. ABC admin configures customer-a along with service-profile-name. This enables VIM microservice to map customer-a to equivalent infra tenant as specified in service-profile-name.
4. ABC admin, ABC tenant details, customer-a tenant, and customer-a account details are present in CSO Keystone (Central Keystone), while infra tenant details that are available as part of vim-service-profile is present only in regional keystone.
5. When creating a service, customer-a instantiates a network service. The customer-a's request is received at NSO with customer-a's authentication token from the regional VIM keystone.
6. Based on tenant-name customer-a, the VIM region maps to "admin" infra tenant, because when configuring "customer-a " tenant, the service-profile-name with admin was provided.
7. VIM regional microservice can now use the infra tenant for its service instantiation activities.

To create a VIM in the cloud:

1. Click **Resources > POPs > POP Name > VIMs**.

2. Click the plus icon (+).

The Add Cloud VIM page appears.

3. Configure the fields using the information provided in [Table 36 on page 83](#).

4. Click **Save**. If you want to discard your changes, click **Cancel** instead.

**Table 36: Fields on the Add Cloud VIM Page**

Field	Guidelines
Name	Specify the name of the virtualized infrastructure manager (VIM) for a centralized deployment. You can add multiple VIMs to a point of presence (POP). You can use letters, numbers, spaces, periods, dashes, underscores, commas, @, #, \$, %, &, and *. Maximum length is 255 characters.  Example: vcpe-vim
Type	View the VIM type. The default VIM type is cloud.  Example: Cloud
<i>Connection Information</i>	
IP address	Specify the IP address of the Contrail Controller node in the Contrail Cloud Platform that provides the virtualized infrastructure manager (VIM).  Example: 10.102.28.36
Auth URL	Specify the authentication URL for the Contrail OpenStack Keystone.  Example: http://ip:5000/v3
User Name	Specify the username for logging into Contrail Service Orchestration. The default is cspadmin.  Example: cspadmin
Password	Specify the password for logging into Contrail Service Orchestration. The default is passw0rd.  Example: passw0rd
Domain	Specify the name of the Contrail OpenStack domain that you configured for the Contrail Cloud Platform.  Example: default

Table 36: Fields on the Add Cloud VIM Page (*continued*)

Field	Guidelines
Tenant	<p>Specify the name of the Contrail OpenStack tenant that you configured for the Contrail Cloud Platform.</p> <p>Example: admin</p>
<i>Network Information</i>	
<i>Resource Pools</i>	
Resource Pool	<p>Specify a resource pool name and the corresponding compute zone, which is a group of compute nodes. You configure compute zones as availability zones in Contrail OpenStack. The default availability zone is Nova, and you can run the <code>nova availability-zone-list</code> command on the Contrail controller node to view a list of available zones.</p>
Resource Pool Name	<p>Specify a resource pool, which identifies the location in which the virtual network functions (VNFs) are implemented. You can use an unlimited number of alphanumeric characters, including special characters.</p> <p>Example: north-east.</p>
Compute Zone	<p>Specify the availability zone in Contrail OpenStack in which the virtual machines for network services reside. The default availability zone is nova.</p> <p>You can run the <b>nova availability-zone-list</b> command on the Contrail OpenStack to find the list of available zones.</p> <p>Example: nova</p>
Does Management Network Exists?	<p>Specify whether to use an existing virtual network in Contrail OpenStack or to create a new one.</p> <ul style="list-style-type: none"> <li>• yes—Import the named virtual network from Contrail OpenStack.</li> <li>• no—Create a virtual network in Contrail OpenStack with the specified name.</li> </ul>
Management Network Name	<p>Specify the name of the existing network in Contrail or of the new network that you want to create in Contrail.</p> <p>Example: mgmt-net</p>
<i>Management Network Information</i>	

Table 36: Fields on the Add Cloud VIM Page (*continued*)

Field	Guidelines
Route Target	Specify one or more route targets for the management network to be created in Contrail  Example: 64512:10000.
Subnet	Specify one or more prefixes that define the subnets for the Contrail Compute nodes. You can use an IPv4 address.  Example: 192.0.2.0/24.
<i>Internet Network Information</i>	
Network Name	Specify the name of the Internet network.  Example: int-net
Does Exist?	Select to add a new Internet connection for the VIM in Contrail OpenStack.
Route Target	Select the route target for the internet network in Contrail.  Example: 64512:10000.
Subnet	Select the prefix that defines the subnet for the Contrail Compute nodes.  You can use an IPv4 address.  Example: 192.0.2.0/24.
<i>Service Profile Information</i>	
Profile Name	Specify the name of the service profile in a VIM instance.  Example: vim-service-profile
Tenant Name	Specify the infra tenant for whom you want to assign the service profile.  Example: test-tenant
Domain Name	Specify the Infra domain name.  Example: Default
User Name	Specify the username of the tenant.  Example: admin

Table 36: Fields on the Add Cloud VIM Page (*continued*)

Field	Guidelines
Password	Specify the password for the tenant user.  Example: password123
Default Service Profile	If you use a dedicated OpenStack Keystone for Contrail Service Orchestration, specify the name of the default service profile. If you do not specify a service profile when you configure the tenant, Contrail Service Orchestration uses the default profile to authenticate the tenant.  Example: default-service-profile

**NOTE:** Infra Tenants such as **admin** is available only in Regional Keystone and not in CSO Keystone (Central Keystone).

## RELATED DOCUMENTATION

[About the Routers Page | 90](#)

[Configuring Devices | 94](#)

[Creating an EMS | 88](#)

## About the EMS Page

To access this page, click **Resources > POPs > POP Name > EMS**.

You can use the EMS page to create an element management system and to view information about an EMS configured in your POP. You need to configure your Junos Space Virtual Appliance with the Administration Portal so that the virtual appliance can communicate with other components in your deployment.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create an EMS. See [“Creating an EMS” on page 88](#).
- Change the Junos Space Password. See [“Changing the Junos Space Virtual Appliance Password” on page 89](#).
- Select a different POP from the drop-down list above the top left of the table to view details about an EMS in grid view.
- View details about an EMS. Click the details icon that appears when you hover over the name of an EMS application. See [“Viewing Object Details” on page 16](#).
- Show or hide columns about an EMS. See [“Sorting Objects” on page 17](#).
- Search an object about an EMS. See [“Searching for Text in an Object Data Table” on page 16](#).

Field Descriptions

[Table 37 on page 87](#) shows the fields on the EMS page.

Table 37: Fields on the EMS Page

Field	Description
Name	View the name of the EMS application.  Example: Junos Space
IP Address	View the IP address of the Junos Space Web user interface (UI). For a redundant Contrail Service Orchestration, configure the IP address of the Web UI for the primary Junos Space Virtual Appliance.  Example: 192.0.2.3
Vendor	View the vendor name for the EMS.  Example: Juniper Networks

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Creating a Single POP   58
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About the Routers Page   90

## Creating an EMS

You can use the EMS Management page to configure the primary instance of each element management system (EMS) that you use for the Cloud CPE Centralized Deployment Model. Administration Portal automatically adds an object for the EMS, using the name that you specify when you deploy the Junos Space Virtual Appliance.

Verify that the VIM Management page displays the virtualized infrastructure managers (VIMs).

To create an EMS:

1. Click **Resources > POPs > POP Name > EMS**.

2. Click the plus (+) icon.

The Add EMS page appears.

3. Complete the configuration according to the guidelines provided in [Table 38 on page 88](#).

4. Click **Save**. If you want to discard your changes, click **Cancel** instead.

**Table 38: Fields on the Add EMS Page**

Field	Guidelines
Name	<p>Name of the EMS. This field is auto-populated with the name that you specified when you deployed the Junos Space Virtual Appliance.</p> <p>Example: Junos Space</p>
IP	<p>Specify the IP address of the Junos Space Web user interface (UI).</p> <p>For a redundant Contrail Service Orchestration, configure the IP address of the Web UI for the primary Junos Space Virtual Appliance.</p> <p>Example: 192.0.2.3.</p>
Vendor	<p>Specify the vendor for the EMS.</p> <p>Example: Juniper Networks</p>
Version	<p>Specify the version number of the EMS. The default version is 15.1.</p> <p>Example: 15.1</p>
Authentication URL	<p>Specify the authentication URL for the EMS application.</p>



Table 38: Fields on the Add EMS Page (*continued*)

Field	Guidelines
User Name	Specify the username of the device administrator that you configured. This user should be assigned the admin role in all the tenants. The default username is super.  Example: super
Password	Specify the administrator password that you configured. The default password is juniper123.  Example: juniper123

## RELATED DOCUMENTATION

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[Creating a Cloud VIM | 82](#)

## Changing the Junos Space Virtual Appliance Password

Administration Portal enables you to change the password for your Junos Space Virtual Appliance from the EMS Page.

To change the password:

1. Click **Resources > POPs > POP Name > EMS**.
2. Select the POP name from the drop-down list.
3. Select the Junos Space Virtual Appliance whose password you want to change.
4. Click **More > Change Password**.  
The Change Password page appears.
5. Complete the configuration according to the guidelines provided in [Table 39 on page 90](#).
6. Click **Save**. If you want to discard your changes, click **Cancel** instead.

Table 39: Change Password Fields

Field	Description
Username	Specify the administrator username that you configured.  Example: super
Password	Specify the new password that you want to configure.  You can choose a password that is at least eight characters long and contains characters from at least three of the following four character classes: uppercase letters, lowercase letters, numbers (0 through 9), and special characters.

## RELATED DOCUMENTATION

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[Creating an EMS | 88](#)

## About the Routers Page

To access this page, click **Resources > POPs > POP Name > Routers**.

You can use the Routers page to view information about the gateway router configured in the POP and to create and configure physical network elements (PNEs) associated with a specific customer site. A PNE is a device in the network that you can provision and configure through Contrail Service Orchestration.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a device. See [“Adding Devices” on page 92](#).
- Configure a device. See [“Configuring Devices” on page 94](#).
- Select a different POP from the drop-down list above the top left of the table to view router details in grid view.
- View details about a router. Click the details icon that appears when you hover over the name of a router application. See [“Viewing Object Details” on page 16](#).
- Show or hide columns about the routers. See [“Sorting Objects” on page 17](#).

- Search an object about the router. See [“Searching for Text in an Object Data Table”](#) on page 16.
- Delete a device. See [“Deleting Objects”](#) on page 15.

Field Descriptions

[Table 40 on page 91](#) describes the fields on the Routers page.

Table 40: Fields on the Routers Page

Field	Description
Name	View the name of the device configured in the POP.  Example: blue_device
IP Address	View the IP address of the device.  Example: 10.155.67.6
Serial Number	View the serial number of the device.  Example: JN116548FAFC
Management Status	View the management status of the device.  Example: ACTIVE

RELATED DOCUMENTATION

<a href="#">About the POPs Page   55</a>
<a href="#">About the VIMs Page   80</a>
<a href="#">About the EMS Page   86</a>
<a href="#">Creating a Single POP   58</a>

## Adding Devices

You can use the Routers page to create physical network elements (PNEs) for a data center gateway in a centralized deployment or a provider edge (PE) router or IPsec concentrator in a distributed deployment.

To add a device:

1. Click **Resources > POPs > POP Name > Routers**.

2. Click the plus icon(+).

The Add Device page appears.

3. Complete the configuration according to the guidelines provided in [Table 41 on page 92](#).

4. Click **Save**. If you want to discard your changes, click **Cancel** instead.

**Table 41: Fields on the Add Device Page**

Field	Description
Name	<p>Specify the name of the device, which can be:</p> <ul style="list-style-type: none"><li>• An MX Series router used as an SDN gateway in a centralized deployment.</li><li>• An MX Series router used as a provider edge (PE) router in a distributed deployment.</li><li>• An SRX Series Services Gateway used as an IPsec concentrator in a distributed deployment.</li></ul> <p>You can use any number of alphanumeric characters, including special characters.</p> <p>Example: MX-router-10</p>
Family	<p>Select the product series for the device.</p> <p>Example: MX</p>

Table 41: Fields on the Add Device Page (*continued*)

Field	Description
Device Template	<p>Select the name of the device template for the device:</p> <ul style="list-style-type: none"> <li>• MX as Gateway for vCPE—Customized device template for an MX Series router that prevents the creation of black holes when an administrative user activates a service at a site. Select this option only if you have been advised to do so by Juniper Networks.</li> <li>• MX as Hybrid WAN IPsec HUB—Default template for MX Series router. Select this option for MX Series routers in centralized and distributed deployments.</li> <li>• SRX as SDWAN Hub—Device template for an SRX Services Gateway used as a hub that offers basic SD-WAN functionality in a distributed deployment. Select this option only if you have been advised to do so by Juniper Networks.</li> <li>• SRX as Managed Internet CPE—Device template to manage an SRX Services Gateway devices for a managed internet service.</li> </ul>
Type of Device	<p>Select the type of device:</p> <ul style="list-style-type: none"> <li>• PNE—Use this option to add an MX Series router as an SDN gateway in a centralized deployment.</li> <li>• PE/IPsec—Use this option to add an MX Series router as a PE router, an IPsec concentrator or both, or to add an SRX Series gateway as an IPsec concentrator in a distributed deployment.</li> </ul>
PNE package	<p>If you specified that the device is an MX Series router for a centralized deployment, select the name of the package that contains metadata and configuration instructions for the PNE:</p> <ul style="list-style-type: none"> <li>• Juniper-MX—Use with the MX as Hybrid WAN IPsec HUB device template.</li> <li>• Juniper-MX-MIS—Customized device profile with MX Series configuration that prevents the creation of black holes when an administrative user activates a service at a site. Use with the MX as Gateway for vCPE device template.</li> </ul>
Management Type	<p>If you specified that the device is a PE router, IPsec concentrator, or both, specify whether Contrail Service Orchestration manages the device:</p> <ul style="list-style-type: none"> <li>• Managed—Select this option if you use Contrail Service Orchestration to manage the device.</li> <li>• Unmanaged—Select this option if you use an application other than Contrail Service Orchestration to manage the device. In this case, Contrail Service Orchestration uses the device object that you configure for presentation purposes only.</li> </ul>
Device IP	<p>Specify the IPv4 address of the management interface for the device.</p> <p>Example: 192.0.2.15</p>

Table 41: Fields on the Add Device Page (*continued*)

Field	Description
Internet Gateway (optional)	Specify one or more Internet gateway IPv4 addresses if the device connects to CPE devices that have access to the Internet. An Internet gateway IPv4 address may be the same as the IPv4 address of the endpoint of the IPsec tunnel on the IPsec concentrator for a CPE device.  Example: 192.0.2.20
Connectivity Information	
User Name	Specify the username that you configured when you set up the device. You use this username to log into the device. Providing login credentials gives Contrail Service Orchestration access to the device.  Example: root
Password	Specify the password that you configured when you set up the device. You use this password to log into for the device. Providing login credentials gives Contrail Service Orchestration access to the device.  Example: pwd123

## RELATED DOCUMENTATION

[About the Routers Page | 90](#)
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## Configuring Devices

You can use the Routers page to configure physical network elements (PNEs) associated with a specific customer site.

To configure a device:

1. Click **Resources > POPs > POP Name > Routers**.
2. Select the router that you want to configure.
3. Click **More > PNE Configure**.

The PNE Configure page appears.

4. Click the + icon to add interface configuration details.
5. Complete the configuration according to the guidelines provided in [Table 42 on page 95](#).
6. Click **Ok**. If you want to discard your changes, click **Cancel** instead.

**Table 42: Fields on the PNE Configure Page**

Field	Description
<i>Interface Configuration</i>	
Name	Specify the identifier of the physical interface of the device that acts as the management interface. This interface connects to the management network in Contrail. You either configure this network in Contrail or in Administration Portal when you create the virtualized infrastructure manager (VIM).  Example: xe-1/1/1
Vlan	(Optional) If you use VLANs to segment the VPN, specify the identifier of the VLAN interface that connects to the management network in Contrail. The identifier is an integer in the range 1–4096.  Example: 100
Addr	Specify an IPv4 prefix for the management interface.  Example: 192.0.2.15
<i>BGP Configuration</i>	
AS Number	Specify the autonomous system (AS) number for BGP routing with the Contrail Controller node.  Example: 64512
Local Address	Specify an IPv4 address, such as the loopback address, that the router uses for BGP sessions.  Example: 192.0.2.15

Table 42: Fields on the PNE Configure Page (*continued*)

Field	Description
Remote Address (Contrail Controller)	Select the IPv4 address of the data interface for the Contrail Controller node.  Example: 192.0.2.25.
Contrail Compute Prefix	Select one or more IPv4 prefixes that define the subnets between the SDN gateway and the Contrail Compute nodes.  Example: 192.0.2.0/24.
<i>Management VRF Configuration</i>	
Interface Name	Reenter the management interface identifier that you specified in the Interface Configuration Name field. In the Management VRF Configuration section, you associate this interface with a virtual routing and forwarding instance (VRF).  Example: xe-1/1/1.
Interface VLAN	(Optional) If you use VLANs to segment the VPN, reenter the identifier that you specified in the Interface Configuration VLAN field. In the Management VRF Configuration section, you associate this interface with a virtual routing and forwarding instance (VRF).  Example: 100
Default Gateway	(Optional) Specify the IPv4 address on the router that provides the default route for management traffic.  Example: 192.0.2.40.
Route Target	Specify the route target for the management network used in Contrail.  Example: 64512:10000.
Route Distinguisher	Specify the route distinguisher for the management network used in Contrail.  Example: 64512:10000.
<i>Internet VRF Configuration</i>	



Table 42: Fields on the PNE Configure Page (*continued*)

Field	Description
Interface Name	Specify one or more physical interfaces on the router that connect to the Internet.  Example: xe-2/2/2
Interface VLAN	(Optional) If you use VLANs to segment the VPN, specify the identifiers of the VLAN interfaces that connect to the Internet. A VLAN identifier is an integer in the range 1–4096.  Example:500
Default Gateway	(Optional) Specify the IPv4 address on the router that provides the default route for Internet traffic.  Example: 192.0.2.50
Route Target	Specify the route target for Internet traffic on this interface. This value matches the Route Target value that you configure for the VPN associated with the site.  Example: 64512:12000.
Route Distinguisher	Specify a unique route distinguisher for traffic on this interface. This value matches the Route Distinguisher value that you configure for the VPN associated with the site. You can specify any unique route distinguisher, such as the route target for Internet traffic.  Example: 64512:12000

You can also configure the devices from the POPs landing page.

To configure a device:

1. Select **Resources > POPs > Pop-Name**.

The Pop-Name page appears.

2. Click the **Routers** tab.

3. Select the device that you want to configure and click the **Configure Device** button.

The Stage 2 Config page appears. This page is dynamically rendered based on stage-2 configuration specified in the device profile.

4. Enter the configuration data on the page.

5. Click **Save** to save the configuration.

A confirmation message is displayed and the deployment status changes to pending deployment.

6. Click **Deploy** to save and deploy the configuration.

A confirmation message is displayed indicating that the job is created and subsequently that the job was successful. You can click Deploy History to view the job logs.

7. Click **Cancel** to go back to the Pop-Name page.

## RELATED DOCUMENTATION

[About the Routers Page | 90](#)

[Adding Devices | 92](#)

## View the History of Device Data Deletions

You can use the Delete History page to view the deleted device data, status of the delete operation, and log details.

To view the history of deleted device data:

1. Click **Resources > POPs > POP Name > Routers > More > Delete History**.

The Delete History page is displayed. [Table 43 on page 99](#) describes the fields on the Delete History page.

2. Click a task name.

The Delete Device Tasks page appears. [Table 44 on page 99](#) describes the fields on the Delete Task page.

3. Click the Task ID.

The Job Status page appears. [Table 45 on page 99](#) describes the fields on the Job Status page.

4. Click **OK** to return to the previous page.

Table 43: Fields on the Delete History Page

Field	Description
Name	View the name of the task.
In progress	View the number of delete tasks that are in progress.
Success	View the number of delete tasks that are successful.
Failure	View the number of delete tasks that have failed.
Start Date	View the start date and time of the task.
End Date	View the end date and time of the task.
Status	View the status of the task to know whether the task succeeded or failed.
Log	View the import logs. Click a log to access more detailed information about the deleted log.

Table 44: Fields on the Delete Device Tasks Page

Field	Description
Success	View the number of times the delete operations succeeded for a device.
Failure	View the number of times the delete operations failed for a device.
Task ID	View the ID created for the task.  Click the task ID to view the delete log details corresponding to a device.
Status	View the status of the task to know whether the task succeeded or failed.

Table 45: Fields on the Job Status Page

Field	Description
Name	View the name of the task.
Actual Start Time	View the start date and time of the task.
User	View the name of the user who deleted the task.

Table 45: Fields on the Job Status Page *(continued)*

Field	Description
End Time	View the end date and time of the task.
State	View the status of the task to know whether the task succeeded or failed.

RELATED DOCUMENTATION

<a href="#">Adding Devices   92</a>
<a href="#">Configuring Devices   94</a>

# Managing Devices

## IN THIS CHAPTER

- [About the Tenant Devices Page | 101](#)
- [About the Cloud Hub Devices Page | 104](#)
- [Managing a Tenant Device | 107](#)
- [Managing a Cloud Hub Device | 107](#)
- [Device Redundancy Support Overview | 109](#)
- [Viewing the History of Tenant Device Activation Logs | 112](#)
- [Viewing the History of Cloud Hub Device Activation Logs | 114](#)
- [Secure OAM Network Overview | 116](#)
- [Secure OAM Network Redundancy Overview | 119](#)
- [Adding a Cloud Hub Device | 122](#)
- [Upgrading a Cloud Hub Device | 128](#)
- [Rebooting Tenant Devices and Cloud Hub Devices | 129](#)

## About the Tenant Devices Page

To access this page, click **Resources > Tenant Devices**.

You can use the Tenant Devices page to view the list of available CPE devices in the service provider network. You can also view information about each CPE device in the network.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Quickly view activation data created for CPEs in the widgets that appear at the top of the page. See [Table 46 on page 102](#).
- View the history of tenant device activation logs. See [“Viewing the History of Tenant Device Activation Logs” on page 112](#).
- Reboot a CPE device. See [“Rebooting Tenant Devices and Cloud Hub Devices” on page 129](#).

- Push licenses to devices. Select the devices and click **Push License**.

The Push License page appears displaying the list of licenses uploaded in CSO. Select the license(s) which you want to push to the selected devices. Click **Push Licenses** to push the licenses to the selected devices. To cancel the action, click **Cancel**.

See [“Pushing a License to Devices” on page 357](#).

- View Stage-1 configuration. Click **Resources > Tenant Devices > Device-Name > Stage 1 Config** to view the stage-1 configuration for the device.
- View the device audit logs. Click **Resources > Tenant Devices > Device-Name > Device Audit Logs** to view the audit logs for the device.
- View details about a CPE device. Click the details icon that appears when you hover over the name of a device or click **More > Details**. See [“Viewing Object Details” on page 16](#).
- Deleting a CPE. See [“Deleting Objects” on page 15](#).
- Show or hide columns about the CPE. See [“Sorting Objects” on page 17](#).
- Search an object about the CPE device. See [“Searching for Text in an Object Data Table” on page 16](#).

## Field Descriptions

- [Table 46 on page 102](#) describes widgets on the Tenant Devices page.
- [Table 47 on page 103](#) describes the fields on the Tenant Devices page.

**Table 46: Widgets on the Tenant Devices Page**

Widget	Description
Cloud CPEs by Status	<p>Displays the management status of the CPE devices deployed in the cloud.</p> <ul style="list-style-type: none"> <li>• Pending Activation—Number of CPE devices that are yet to connect to the regional server.</li> <li>• Activation Failed—Number of CPE devices that could not connect to the regional server.</li> <li>• Expected—Number of CPE devices that have yet to connect to the regional server.</li> <li>• Active—Number of CPE devices that have downloaded images, but are not yet configured.</li> <li>• Provisioned—Number of CPE devices on which IPsec tunnels are fully operational.</li> <li>• Provision Failed—Number of CPE devices failed if the vSRX was not instantiated properly.</li> </ul>

Table 47: Fields on the Tenant Devices Page

Field	Description
Device Name	Displays the name of the device.  Example: sunny-NFX-250
Tenant	Displays the name of the tenant.  Example: tenant-blue
Site Name	Displays the name of the tenant site.  Example: site-blue-white
Location	Displays the name of the location.  Example: San Jose, CA
Status Message	Displays the latest status message.  Example: IPsec provision success
WAN Links	Displays the number of WAN links.  Example: 2
POP Name	Displays the name of the POP.  Example: pop_blue
Management Status	Displays the management status of the CPE devices deployed in the cloud. <ul style="list-style-type: none"> <li>• Expected—Regional server has activation details for the CPE device, but CPE device has not yet established a connection with the server.</li> <li>• Active—CPE device has downloaded images, but is not yet configured.</li> <li>• Provisioned—IPsec tunnel on NFX250 device is operational.</li> <li>• Provision Failed—CPE device failed when the vSRX was not instantiated properly.</li> </ul>
Model	Displays the name of the device model.  Example: NFX

Table 47: Fields on the Tenant Devices Page *(continued)*

Field	Description
Active Services	Displays the number of services that are activated for the device.  Example: 3
Image Name	Displays the name of the device image file.  Example: install_nfx_fmmpm_agent_1_0.sh
OS Version	Displays the Junos OS Release version.  Example: 15.1X49-D40
Serial Number	Displays the serial number of the device.  Example: DD0416AA0117

## RELATED DOCUMENTATION

[Viewing the History of Tenant Device Activation Logs](#) | 112

## About the Cloud Hub Devices Page

To access this page, select **Resources > Cloud Hub Devices**.

Use the Cloud Hub Devices page to view the list of cloud hub devices that are owned by the administrator in the service provider network. You can also create new cloud hub devices, delete existing cloud hub devices, and view detailed information about each cloud hub device in the network. You can add an MX Series router, an SRX Series services gateway, or a vSRX instance as a cloud hub (SD-WAN) device in a hub-and-spoke topology and full mesh topology. Contrail Service Orchestration (CSO) uses the cloud hub devices as SD-WAN hubs to setup tunnels and provision site-to-site or site-to-hub traffic. All other configurations such as Internet breakout, hub meshing, and so on must be configured manually on the device.

The hub models that are supported are:

- Cloud hub—This hub can be shared by multiple tenants. You can add a cloud hub by logging in to Administration Portal and following the procedure for creating a cloud hub device.



- Tenant hub—This hub is specific to a tenant. You can add a tenant hub by logging in to Customer Portal and following the site creation procedure.

## Tasks You Can Perform

You can perform the following tasks from the Cloud Hub Devices page:

- Add a cloud hub device. See [“Adding a Cloud Hub Device” on page 122](#).
- Reboot a cloud hub device. Select **Resources > Cloud Hub Devices > Device Name > More > Reboot** to reboot the hub device.
- Activate a cloud hub device that is in **Expected** state. Click **Activate** to initiate the activation process. The status of the operation is displayed on the Device Activation page. After the activation process is completed successfully, the device is provisioned.
- View details about a cloud hub device. See [“Viewing Object Details” on page 16](#).
- Deleting a cloud hub device. See [“Deleting Objects” on page 15](#).
- Show or hide columns that contain details about the cloud hub device. See [“Sorting Objects” on page 17](#).
- Search an object about the cloud hub device. See [“Searching for Text in an Object Data Table” on page 16](#).

## Field Descriptions

- [Table 48 on page 105](#) describes the fields on the Cloud Hub Devices page.

**Table 48: Fields on the Cloud Hub Devices Page**

Field	Description
Device Name	Displays the name of a cloud hub device. Example: mx-cloud-hub
Tenant	Displays the name of the tenant. Example: tenant-blue
Site Name	Displays the name of the tenant site. Example: site-blue-white
Location	Displays the name of the location. Example: San Jose, CA

Table 48: Fields on the Cloud Hub Devices Page *(continued)*

Field	Description
Status Message	Displays the latest status message.  Example: IPsec provision success
WAN Links	Displays the number of WAN links for a device.  Example: 2
POP Name	Displays the name of the POP.  Example: pop_blue
Management Status	Displays the management status of the cloud hub devices deployed in the cloud. <ul style="list-style-type: none"> <li>• <b>Expected</b>—The regional server has activation details for the CPE device, but the CPE device has not yet established a connection with the server. Click <b>Activate</b> to activate the cloud hub device. If the activation process is successful, then the management status changes to <b>Provisioned</b>.</li> <li>• <b>Active</b>—Cloud hub device is yet to be configured.</li> <li>• <b>Provisioned</b>—Cloud hub device is ready to be used.</li> <li>• <b>Provision Failed</b>—Cloud hub device is not yet ready to be used.</li> </ul>
Model	Displays the name of the device model.  Example: MX
OS Version	Displays the Junos OS Release version.  Example: 15.1X49-D40
Serial Number	Displays the serial number of the device.  Example: DD0416AA0117

## RELATED DOCUMENTATION

[About the Tenant Devices Page](#) | 101

## Managing a Tenant Device

You can use the Tenant Devices page to view and manage a single customer premises equipment (CPE) device at the tenant site. To access this page, click **Resources > Tenant Devices > Device-Name**.

You can perform the following operations on the **Overview** tab:

- View the geographical location of the device at the tenant site.
- View the aggregate throughput of the device.
- View the recent alerts for the device.
- View the details of the device, such as serial number, management IP address, OS version, device template, tenant name, site name, site location, operational status, and management status of the device..
- View the recent alarms (critical, major, and minor) for the device.
- View the details of licenses, such as the license name, description, and the time when the license was pushed to the device.

You can perform the following operations on the **Configuration** tab:

- Save the stage-2 configuration template for the device.
- Deploy the stage-2 configuration template for the device.
- Rollback to the previous stage-2 configuration template for the device.
- View the deployment history of the stage-2 configuration template for the device.

### RELATED DOCUMENTATION

[About the Tenant Devices Page](#) | 101

## Managing a Cloud Hub Device

You can use the Cloud Hub Devices page to view details of and manage a single cloud hub device at the tenant site. To access this page, click **Resources > Cloud Hub Devices > Device-Name**.

You can perform the following operations on the **Overview** tab:

- View the geographical location of the device at the tenant site.
- View the aggregate throughput of the device.

- View the recent alerts for the device.
- View the details of the device, such as serial number, management IP address, OS version, device template, tenant name, site name, and site location.

You can perform the following operations on the **Configuration** tab:

- Save the stage-2 configuration template for the device.
- Deploy the stage-2 configuration template for the device.
- Roll back the stage-2 configuration template for the device.
- View the deployment history of the stage-2 configuration template for the device.

#### RELATED DOCUMENTATION

| [About the Cloud Hub Devices Page](#) | 104

## Device Redundancy Support Overview

Contrail Service Orchestration (CSO) supports spoke redundancy for large enterprise SD-WAN on-premise spokes. To protect an SD-WAN site against device or link failures, you can configure the site with two CEP devices that can function as primary and secondary devices. . If the primary device fails, the secondary device takes over the traffic processing.

**NOTE:** You must use the same device model for both primary and secondary devices and the devices must have the same version of Junos OS installed.

The following SD-WAN features are not supported for device redundancy:

- LTE WAN backup link
- Service chaining

**NOTE:** Device redundancy is supported only for SD-WAN deployments.

### Prerequisites for using SRX Series Devices for Device Redundancy

The prerequisites to configure an SD-WAN site with dual CPE SRX Series devices are as follows:

- For SRX Series, you need to form the cluster manually by connecting two SRX Series devices together using a pair of the same type of Ethernet connections. To create an SRX cluster, see [Chassis Cluster Feature Guide for SRX Series Devices](#).
- Log in to any one of the SRX Series devices, copy the **Stage-1** configuration from the **Sites** page and paste it into the console screen and commit the configuration.

### Supported Connection Plans

The following connection plans are supported for device redundancy:

- Dual NFX250 as SD-WAN CPEs—Supports NFX Series devices as CPE devices in an SD-WAN site.
- Dual SRX as SD-WAN CPEs—Supports SRX Series devices as dual CPE devices in an SD-WAN site.
- Dual SRX4x00 as SD-WAN CPEs—Supports SRX 4100 and SRX4200 devices as dual CPE devices in an SD-WAN site.

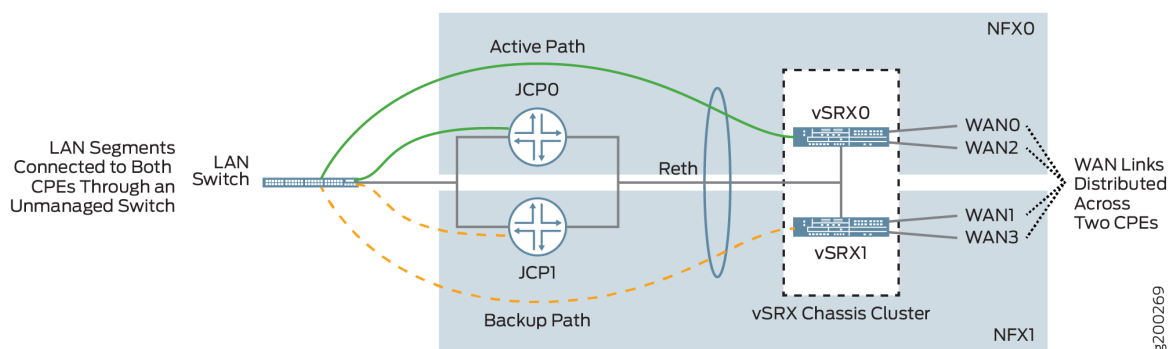
## Create and Configure an SD-WAN Site

You can create and configure an SD-WAN site with dual CPE devices and the two devices back up each other, with one node acting as the primary device and the other as the secondary device. The workflow to add and configure a site with dual CPE devices is similar to the single CPE device. For more information about creating and configuring a site with dual CPE devices, see [“Adding On-Premise Spoke Sites for SD-WAN Deployment” on page 768](#) and [“Configuring a Single Site” on page 804](#).

### Dual CPE Devices Logical Topology for NFX Network Services Platform

[Figure 1 on page 110](#) shows the logical topology of the NFX Series dual CPE devices.

**Figure 1: Dual CPE Device Topology - NFX Network Services Platform**



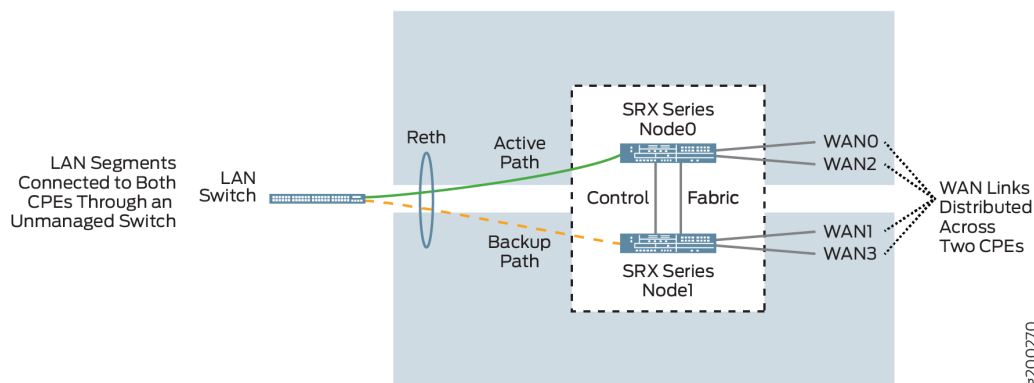
You can form a cluster using two NFX Series devices. The front panel ports of the NFX Series devices are used to interconnect two NFX Series devices and to carry the control and fabric interconnect traffic between the two NFX250 devices.

The Junos Control Plane (JCP) component acts as a switch, controls the front panel ports, and sends the traffic which arrives from the LAN or WAN to the NFX Series devices. On the LAN, the active/backup mechanism is used and if the primary device fails, the secondary device takes over processing of traffic. On the WAN, the active/active mechanism is used and all four WAN links are active and distributed across two NFX Series devices.

### Dual CPE Devices Logical Topology for SRX Series Gateway Devices

[Figure 2 on page 111](#) shows the logical topology of the SRX Series dual CPE devices.

Figure 2: Dual CPE Device Topology - SRX Series Devices



You can form a cluster using two SRX devices. A chassis cluster is formed between these nodes and performs as a single logical router. On the LAN, the active/backup mechanism is used and if the primary device fails, the secondary device takes over traffic processing. On the WAN, the active/active mechanism is used and all four WAN links are active and distributed across two SRX Series device.

**NOTE:** On SRX 4100 and SRX4200 devices, out of the eight 1-Gigabit Ethernet/10-Gigabit Ethernet, a maximum of two ports are used for WAN links, and the remaining ports are used for LAN connectivity. The HA ports are used only for forming the cluster.

## RELATED DOCUMENTATION

[Adding On-Premise Spoke Sites for SD-WAN Deployment](#) | 768

[Configuring a Single Site](#) | 804

[Activating Dual CPE Devices \(Device Redundancy\)](#) | 827

# Viewing the History of Tenant Device Activation Logs

You can use the Activation Logs page to view the history of device activation logs. You can also view the details of the activation logs and their status.

To view the tenant device activation logs:

1. Click **Resources > Tenant Devices**.

The Tenant Devices page appears, which list all devices.

2. Select a device and click **More > Activation Logs**.

The Activation Logs page is displayed. [Table 49 on page 112](#) describes the fields on the Activation Logs page.

3. Click a task name.

The ZTP Logs page appears. [Table 50 on page 113](#) describes the fields on the ZTP Logs page.

4. Click the Task Name.

The Job Status page appears. [Table 51 on page 113](#) describes the fields on the Job Status page.

5. Click **OK** to return to the previous page.

**Table 49: Fields on the ZTP History Page**

Field	Description
In progress	View the number of activated tasks that are in progress.
Success	View the number of activated tasks that are successful.
Failure	View the number of activated tasks that have failed.
Name	View the name of the task.  Example: csp.tssm_ztp-Juniper-site-17-NFX-250-8052cc9451914be28c7c98fb64fd0db3
Start Date	View the start date and time of the task.
End Date	View the end date and time of the task.



Table 49: Fields on the ZTP History Page (continued)

Field	Description
Status	View the status of the task to know whether the task succeeded or failed.
Log	View the import logs. Click a log to access more detailed information about the imported log.

Table 50: Fields on the ZTP Logs Page

Field	Description
Task Name	View the ID created for the task.  Example: install-license-to-device
Status	View the status of the task to know whether the task succeeded or failed.

Table 51: Fields on the Job Status Page

Field	Description
Name	View the name of the task.
Actual Start Time	View the start date and time of the task.
User	View the name of the user who activated the task.
End Time	View the end date and time of the task.
State	View the status of the task to know whether the task succeeded or failed.

## RELATED DOCUMENTATION

[About the Tenant Devices Page](#) | 101

## Viewing the History of Cloud Hub Device Activation Logs

You can use the ZTP History page to view the history of device activation logs. You can also view the details of the activation logs and their status.

To view the device activation logs:

1. Click **Resources > Cloud Hub Devices**.

The Cloud Hub Devices page appears, which list all devices.

2. Select a device and click **More > Activation Logs**.

The ZTP History page is displayed. [Table 52 on page 114](#) describes the fields on the ZTP History page.

3. Click a task name.

The ZTP Logs page appears. [Table 53 on page 115](#) describes the fields on the ZTP Logs page.

4. Click the Task Name.

The Job Status page appears. [Table 54 on page 115](#) describes the fields on the Job Status page.

5. Click **OK** to return to the previous page.

**Table 52: Fields on the ZTP History Page**

Field	Description
In progress	View the number of activated tasks that are in progress.
Success	View the number of activated tasks that are successful.
Failure	View the number of activated tasks that have failed.
Name	View the name of the task.  Example: csp.tssm_ztp-Juniper-site-17-NFX-250-8052cc9451914be28c7c98fb64fd0db3
Start Date	View the start date and time of the task.
End Date	View the end date and time of the task.
Status	View the status of the task to know whether the task succeeded or failed.

Table 52: Fields on the ZTP History Page (continued)

Field	Description
Log	View the import logs. Click a log to access more detailed information about the imported log.

Table 53: Fields on the ZTP Logs Page

Field	Description
Task Name	View the ID created for the task.  Example: install-license-to-device
Status	View the status of the task to know whether the task succeeded or failed.

Table 54: Fields on the Job Status Page

Field	Description
Name	View the name of the task.
Actual Start Time	View the start date and time of the task.
User	View the name of the user who activated the task.
End Time	View the end date and time of the task.
State	View the status of the task to know whether the task succeeded or failed.

## RELATED DOCUMENTATION

| [About the Cloud Hub Devices Page](#) | 104

## Secure OAM Network Overview

### IN THIS SECTION

- [Topology of a Secure OAM Network | 116](#)
- [Workflow for Establishing a Secure OAM Network | 117](#)
- [Benefits of Secure OAM Network | 118](#)

The management and control plane traffic between a customer premises equipment (CPE) device in an SD-WAN on-premise spoke site or gateway site and Contrail Service Orchestration (CSO) consists of SSH and HTTPS sessions between the CPE device and CSO, the BGP session between the CPE device and a virtual route reflector (VRR), and system log traffic between the CPE device and CSO. This traffic must be carried across the network through a secure and redundant communication channel. To provide such a secure and redundant communication channel, you must configure a secure Operation, Administration, and Maintenance (OAM) network between the SD-WAN on-premise spoke sites or gateway sites and CSO.

This topic provides an overview of the secure OAM network, explains the workflow for configuring a secure OAM network, and benefits of a secure OAM network in an SD-WAN deployment.

### Topology of a Secure OAM Network

CSO uses the cloud hub devices as SD-WAN hubs to set up IPsec tunnels and provision site-to-site or site-to-hub traffic. The cloud hub acts as a concentrator for terminating the IPsec tunnels from SD-WAN on-premise spoke sites or gateway sites. The cloud hub device is located in the service provider's point of presence (POP). You can add an MX Series router, SRX Series services gateway, or a vSRX instance as a cloud hub device.

#### NOTE:

- You can add an MX Series router as an SD-WAN cloud-hub device in a brownfield deployment only.
- You can add a high-end SRX Series services gateway as an SD-WAN cloud-hub device in a greenfield deployment only.

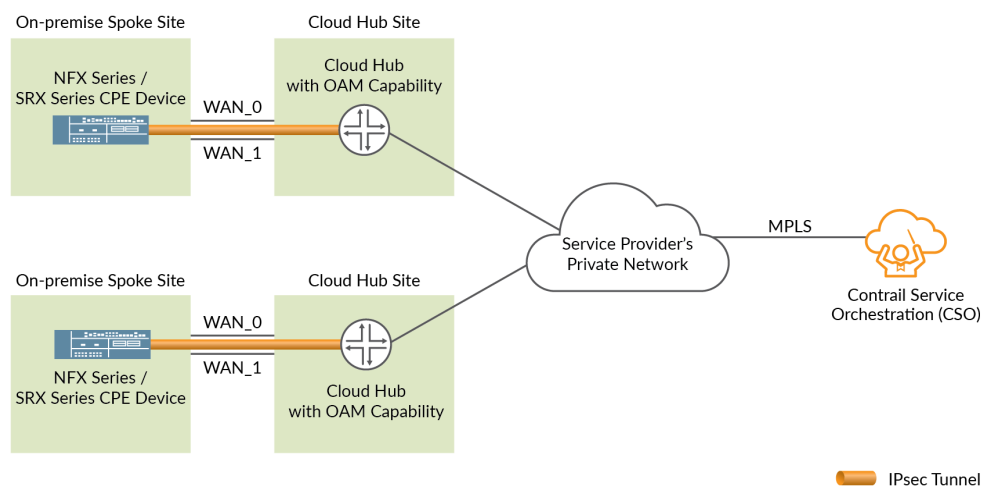
You can configure a cloud hub with the following capabilities:

- Data capability—Used for carrying only data traffic.

- OAM capability—Used for carrying only OAM traffic.
- Data and OAM capability—Used for carrying both data and OAM traffic.

Figure 3 on page 117 shows the connections between the SD-WAN on-premise spoke site or gateway site, cloud hub, and CSO.

**Figure 3: Secure OAM Network**



The secure OAM network is built using the dedicated IPsec tunnel (overlay connection) that is established between the CPE device associated with the SD-WAN on-premise spoke site or gateway site and a cloud hub with OAM capability. The cloud hub is connected to CSO through a secure private network (underlay connection) that is owned by the service provider.

Because the loopback IP address of the CPE device is used for OAM communication, it is fixed and unique across the entire deployment, and is always reachable from CSO over the IPsec tunnel. Even if the WAN interfaces are behind NAT and are assigned private IP addresses (using DHCP), the OAM connectivity between the SD-WAN on-premise spoke site or gateway site and the cloud hub is not impacted. The IPsec tunnel can still be established over the Internet interface including the LTE access type.

The secure OAM network is supported on both hub-and-spoke topology and full-mesh topology. In a hub-and-spoke topology, you must configure each cloud hub with OAM capability. In a full-mesh topology, you must configure at least one cloud hub with OAM capability.

### Workflow for Establishing a Secure OAM Network

Use the following workflow to establish a secure OAM network between the SD-WAN on-premise spoke site or gateway site and the cloud hub. As the cloud hub is located in the service provider's POP, it has a private and secure connectivity to CSO. The workflow has the following prerequisites:

- The CSO installation is managed by the service provider.

- The cloud hub is connected to CSO through the service provider's private network.

To establish a secure OAM network between SD-WAN on-premise spoke sites or gateway sites and the cloud hub:

1. Log in to Administration Portal, and add a cloud hub device with data, OAM, or data and OAM capability.

The first cloud hub device added to the network must be of **Data and OAM** capability. If you select a cloud hub device with data capability in this step, then you must specify a proxy OAM hub device for OAM traffic. Also, specify the management configuration settings such as loopback IP address prefix, OAM interface, OAM interface IP address prefix, OAM interface VLAN ID, and OAM gateway IP address.

2. Log in to Customer Portal, and add a cloud hub site. Associate the cloud hub site with cloud hub device that you created in Step 1 and configure the cloud site.
3. In Customer Portal, add an on-premise spoke site or gateway site for the CPE device in SD-WAN deployment.
4. Configure the site that you created in Step 3. Specify the IP address prefix for the site and select at least one WAN link for OAM traffic. The WAN link with the **Use for OAM traffic** option enabled is used to set up the secure OAM tunnel to the cloud hub device.

**NOTE:** For an NFX250 CPE device, specify at least one WAN link with traffic type as OAM and Data. If device redundancy is enabled, then specify one WAN link for each CPE device with the traffic type as OAM and Data.

If no activation code is needed to activate the device, then the Zero Touch Provisioning (ZTP) workflow is started as soon as device communicates with Contrail Service Orchestration (CSO). If an activation code is needed to activate the device, you must enter an activation code to start the ZTP workflow. For more information, see [“Activating a CPE Device” on page 824](#).

## Benefits of Secure OAM Network

- **IPsec tunnel redundancy**—The secure OAM network supports a maximum of two IPsec tunnels between each SD-WAN on-premise spoke site or gateway site and the cloud hub, thus providing redundancy and ensuring that OAM traffic is not lost even in the case of WAN link failures.
- **Hub device redundancy**—In case of multihoming at the spoke sites, each CPE device at the site is connected to two cloud hubs, and the IPsec tunnels are established from the SD-WAN on-premise spoke site or gateway site to both primary and secondary cloud hub devices. This hub device redundancy ensures that the OAM traffic is not lost even if a hub fails.

## RELATED DOCUMENTATION

| [Adding a Cloud Hub Device](#) | 122

## Secure OAM Network Redundancy Overview

### IN THIS SECTION

- [Topology](#) | 119
- [BGP Configuration](#) | 120
- [Adding and configuring cloud hub devices](#) | 121
- [Adding and configuring an on-premise spoke site and gateway site](#) | 121
- [Failure Detection and Recovery](#) | 121
- [Benefits of Secure OAM Network Redundancy](#) | 122

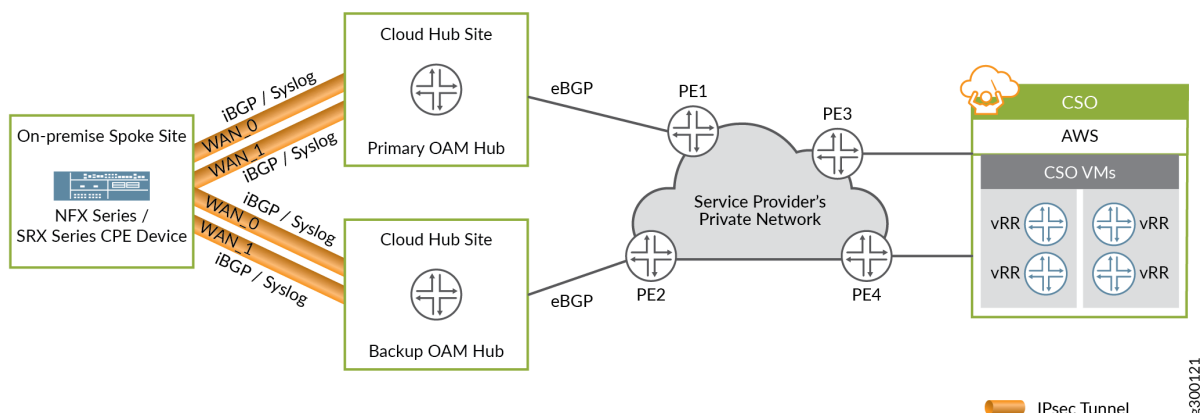
Contrail Service Orchestration (CSO) supports secure Operation, Administration, and Maintenance (OAM) network redundancy for cloud hub devices in an SD-WAN deployment. You can configure two cloud hub devices to act as primary OAM hub and secondary OAM hub device and protect the site against device and link failures. If a fault or an outage occurs at the service provider's OAM network beyond the primary OAM hub, the OAM connectivity is automatically restored through the secondary OAM hub without any user intervention.

The following sections explain the topology and benefits of secure OAM network redundancy in an SD-WAN deployment.

### Topology

[Figure 4 on page 120](#) shows the topology for secure OAM network redundancy model.

Figure 4: Secure OAM Network Redundancy



The CPE device at the on-premise spoke site or gateway site is connected to two cloud hub devices that are configured as OAM hubs. The OAM hub devices are in turn connected to the OAM gateway router. During Zero tTouch Provisioning (ZTP), two separate IPsec tunnels are established from the CPE device to the primary and secondary OAM hub devices. The CPE device has a static route (loopback lo0.1) to both the OAM hubs through the IPsec tunnels.

### BGP Configuration

When the cloud hub device is onboarded, the BGP sessions are established. During the BGP sessions, the OAM hub device advertises the CSO subnet to the CPE device and the CPE device advertises the OAM subnet to the OAM hub device.

BGP supports primary and backup OAM hub by using local preference(hub-primary-select option) on the CPE device at the on-premise spoke site or gateway site. The CPE device decides whether the OAM hub is primary or secondary based on the hub-primary-select option. If the primary OAM hub fails or losses the CSO routes from the OAM gateway, then the secondary OAM hub is used. The CPE device advertises the OAM subnet to the OAM hubs. The OAM hubs, in turn, advertises the OAM subnet to the OAM gateway router.

**NOTE:** In case the SINGLE\_SSH feature is enabled in the device template, then only one IP address (loopback ip) is advertised. In case the SINGLE\_SSH feature is disabled in the device template, then the OAM subnet is advertised.

The details of the BGP session that is established during ZTP are as follows:

- External BGP (eBGP) session is established between the OAM hub device and the OAM gateway router. During the eBGP session, the OAM gateway router advertises the CSO route reachability (CSO prefix and VRR prefixes) to both primary and secondary OAM hubs.



- Internal BGP (iBGP) session is established between the CPE device at the on-premise spoke site or gateway and the OAM hub device. During this session the OAM hub device advertises the learned CSO route to the CPE device at the on-premise spoke site or gateway site. The CPE device learns routes from both primary and secondary OAM hub devices, and configures the primary OAM hub device with a higher preference and the backup OAM hub device with a lower preference.

## Adding and configuring cloud hub devices

The workflow to add and configure cloud hub devices to support redundant secure OAM network is similar to adding a single cloud hub device. For more information about adding and configuring a cloud hub device, see [“Adding a Cloud Hub Device” on page 122](#).

**NOTE:** While adding the first cloud hub device in any deployment, ensure that the capability of the device is set to **DATA and OAM**.

## Adding and configuring an on-premise spoke site and gateway site

The workflow to configure an on-premise spoke site to support redundant secure OAM network is similar to adding a single on-premise spoke site. For more information about adding and configuring an on-premise spoke site, see [“Adding On-Premise Spoke Sites for SD-WAN Deployment” on page 768](#). To add a gateway site, see [“Adding Gateway Sites for SD-WAN Deployments” on page 779](#).

**NOTE:**

- In real time-optimized deployments, you must enable the **Connect to Hubs** feature to establish secure OAM IPsec tunnels.
- In bandwidth-optimized deployments, you must enable the **Use for OAM Traffic** option on at least one WAN link to establish secure OAM IPsec tunnels.
- On NFX250 devices, you must enable the traffic type as **OAM\_AND\_DATA** for at least one WAN link.

## Failure Detection and Recovery

In case of network failure at the service provider’s OAM network behind the primary OAM hub, the route to primary OAM hub breaks and as a result, the primary OAM hub loses the route. The route from primary OAM hub to spoke for CSO breaks. As a result, the spoke obtains the route from the secondary OAM hub. The OAM traffic will move from primary OAM hub to secondary OAM hub.

In case of recovery, when the primary OAM hub is active, the BGP session is established and the primary OAM hub will receive the route and propagate the route to the spoke. As the primary OAM hub is configured with higher preference in the spoke device, when the spoke receives the traffic from primary OAM hub, the OAM traffic will switch back to primary OAM hub.

## Benefits of Secure OAM Network Redundancy

Hub device redundancy—In case of multihoming at the spoke sites, each CPE device at the site is connected to two cloud hubs devices, which function as primary and secondary cloud hub devices. Two separate IPsec tunnels are established from the SD-WAN site to both primary and secondary cloud hub devices. This hub device redundancy ensures that the OAM traffic is not lost even if a hub fails.

### RELATED DOCUMENTATION

[Secure OAM Network Overview | 116](#)

[Adding a Cloud Hub Device | 122](#)

## Adding a Cloud Hub Device

You can add an MX Series router, an SRX Series services gateway, or a vSRX instance as a cloud hub device in a hub-and-spoke topology or full mesh topology.

The device templates that are currently supported for cloud hub devices are:

- MX as SD-WAN Hub
- SRX as SD-WAN Hub

#### NOTE:

- An MX Series router can be added as a cloud-hub device in brownfield deployment only.
- An MX Series router can be used as an SD-WAN hub in single-hub and multihoming deployment.
- When you use an MX Series router as SD-WAN hub, you must configure the NAT pools by using the stage-2 configuration template.

### Before You Begin

Create all the resources required for the network point of presence (POP). See [“Creating a Single POP” on page 58](#).

To add a cloud hub device:

- 1. Select **Resources > Cloud Hub Devices**.

The Cloud Hub Devices page appears.

- 2. Click the add icon (+).

The Add Cloud Hub Device page appears.

- 3. Complete the configuration according to the guidelines provided in [Table 55 on page 123](#).

- 4. Click **Ok**. If you want to discard your changes, click **Cancel** instead.

If you click **Ok**, the cloud hub device is created. The information about the new cloud hub device appears on the Cloud Hub Devices page.

Table 55: Fields on the Add Hub Device Page

Field	Description
Name	Enter the name of the cloud hub device.  You can use alphanumeric characters, including special character(-). The maximum length is 15 characters.  Example: MX-cloud-hub
Management Region	Displays the regional server with which the CPE device communicates. The management region name is populated based on the information from the device template.  Example: regional
POP	Select the POP where the hub device needs to be added.  Example: pop_blue

Table 55: Fields on the Add Hub Device Page (*continued*)

Field	Description
Capability	<p>Select the capability of the cloud hub device. The following options are available:</p> <ul style="list-style-type: none"> <li>• <b>Data</b>—Transmits only data traffic. IPsec data tunnels are configured between spoke and data hub. IPsec OAM tunnels will not be configured between spoke and data hub.</li> <li>• <b>OAM</b>—Transmits only OAM traffic. IPsec OAM tunnels are configured between spoke and OAM hub(s). IPsec data tunnels are configured between spoke and data hub(s).</li> <li>• <b>Data and OAM</b>—Transmits both data traffic and OAM traffic. Both OAM and Data IPsec tunnels are configured between the spoke and the hub. This is the default capability for the hub device.</li> </ul> <p><b>NOTE:</b> You must configure the first cloud hub device in the network with <b>Data and OAM</b> capability.</p>
Proxy OAM Hub Device	For each hub device with data-only capability, select an OAM hub device to handle the OAM traffic. IPsec OAM tunnel is configured between the spoke and the proxy OAM hub.
Device Template	<p>Select the device template that supports SD-WAN deployment.</p> <p>Example: MX as SD-WAN Hub</p>

### Connectivity

Based on the deployment scenario, the following fields are displayed:

GRE Interfaces	<p>Enter one or more interface names for the generic routing encapsulation (GRE) tunnel. Press <b>Enter</b> to provide multiple values. You configure this field when you select the MX Series router as a cloud hub device.</p> <p>Example: gr-0/0/1</p>
----------------	---

Table 55: Fields on the Add Hub Device Page (*continued*)

Field	Description
VT Interfaces	<p>Enter one or more interface names for the virtual tunnel (VT). Press <b>Enter</b> to provide multiple values. You configure this field when you select the MX Series router as a cloud hub device.</p> <p>Example: vt-0/0/1</p>
MS Interfaces	<p>Enter one or more interface names for the multiservices (MS) . Press <b>Enter</b> to provide multiple values. You configure this field when you select the MX Series router as a cloud hub device.</p> <p>Example: ms-0/0/1</p>
OAM Traffic Information	(Optional) Select this option if the management connectivity is initiated by Contrail Service Orchestration (CSO).
<i>Management Connectivity</i>	
OAM Connectivity	
Loopback IP Prefix	<p>Enter an IPv4 address prefix for the loopback interface on the CPE device. The IP address prefix must be a /32 IP address prefix and must be unique across the entire management network.</p> <p>Example: 192.168.1.1/32</p>
OAM Interface	<p>Select an interface on the cloud hub device to connect to the CSO. The interface is used only for OAM connectivity. The interface names are listed based on the configuration in device template for the cloud hub device.</p> <p>Example: ge-0/0/1</p>

Table 55: Fields on the Add Hub Device Page (*continued*)

Field	Description
OAM Interface IP Prefix	<p>Enter an IPv4 address prefix for the OAM interface in the cloud hub device. The OAM IP Prefix must be unique across the entire management network.</p> <ul style="list-style-type: none"> <li>For NFX250 devices, <ul style="list-style-type: none"> <li>If <b>USE_SINGLE_SSH</b> feature is enabled in the device template, then enter the IP address prefix as /32.</li> <li>If <b>USE_SINGLE_SSH</b> feature is disabled in the device template, then enter the IP address prefix as /29 or above.</li> </ul> </li> <li>For NFX 150 devices, enter the IP address prefix based on the <b>USE_SINGLE_SSH</b> option and the number of VNFs being used.</li> </ul> <p>For SRX Series services gateways, specify the IP address prefix as /32.</p>
OAM Interface VLAN ID	<p>Enter an OAM VLAN ID for in-band management of the site. If you specify an OAM VLAN ID, then an in-band OAM traffic reaches the site through the selected OAM interface. The range is 0 through 65535.</p>
OAM Gateway	<p>Enter the IP address of the next-hop through which the CSO connectivity is established.</p>

Table 55: Fields on the Add Hub Device Page (*continued*)

Field	Description
WAN_0	<p>Select a WAN link to enable it. After selecting the link, specify the following information:</p> <ul style="list-style-type: none"> <li>• WAN Interface—Displays the interface name configured in the device template. You cannot modify this field. Example: ge-0/0/0</li> <li>• Link Type—Select the link type (MPLS or Internet) configured in the device template. Example: Internet</li> <li>• Address Assignment—Select the method for IP address assignment. The options available are: <ul style="list-style-type: none"> <li>• DHCP—Select DHCP to assign IP address by using a DHCP server.</li> <li>• STATIC—Select STATIC to assign a static IP address. Example: STATIC <ul style="list-style-type: none"> <li>• Static IP Prefix—Enter a private IPv4 address from the subnet. Example: 192.168.0.2/24</li> <li>• Gateway IP Address—Enter the gateway IP address of the default route. Example: 192.168.0.1</li> </ul> </li> </ul> </li> <li>• Traffic Type—Select the traffic type. The options available are: <ul style="list-style-type: none"> <li>• DATA_ONLY—Select this option if you want to use the WAN link to transmit only data traffic.</li> <li>• OAM_AND_DATA—Select this option if you want to use the WAN link to transmit both data traffic and management traffic. Example: DATA_ONLY</li> </ul> </li> <li>• Mapped OAM Hub Device Link—For each WAN interface that is enabled for a DATA-only hub device, you must select a WAN interface on the corresponding proxy OAM hub device for transmitting OAM traffic.</li> <li>• Data VLAN ID—(Optional) Enter the VLAN ID that is associated with the data link. A data VLAN identifier is an integer in the range 0–65,535. Example: 201</li> </ul>
WAN_1	
WAN_2	
WAN_3	

Table 55: Fields on the Add Hub Device Page (*continued*)

Field	Description
Serial Number	Enter the serial number of the hub device. The serial number is a unique string of alphanumeric characters and it is case-sensitive.  Example: XXXXXXXXXXXXX
User Name	Enter the username that you configured when you set up the device. You use this username to log in to the device. Providing login credentials gives CSO access to the device.
Password	Enter the password that you configured when you set up the device. You use this password to log in to the device. Providing login credentials gives CSO access to the device.

After you add the cloud hub device, select the cloud hub device on the **Resources > Cloud Hub Devices** page and click **Activate Device**. The cloud hub device gets activated. During activation, the cloud hub device is discovered and the required details are stored in CSO.

## RELATED DOCUMENTATION

[About the Cloud Hub Devices Page](#) | 104

## Upgrading a Cloud Hub Device

A cloud hub device is created by the SP Administrator and is shared with multiple tenants. To upgrade a cloud hub device:

1. In Administration Portal, select **Resources > Cloud Hub Devices**.

The Cloud Hub Devices page appears.

2. Select a cloud hub device, and click **More > Upgrade**.

**NOTE:** You cannot upgrade cloud hub devices in bulk.

The Upgrade Cloud Hub Device page appears. This page displays the following information:



- Prerequisites for upgrading a cloud hub device.
  - Impact of upgrading the cloud hub device.
  - Affected tenants and sites.
  - Time required to upgrade the cloud hub device.
  - Post-upgrade tasks.
3. Choose the upgrade time.
    - Select **Run** if you want to upgrade the cloud hub device immediately.
    - Select **Schedule at a later time** if you want to schedule the upgrade for a later date and time.
  4. Click **Upgrade**.

A job is created. Click the job ID to go to the Jobs page and view the status of the cloud hub device upgrade.

#### RELATED DOCUMENTATION

[Upgrading Sites Overview | 755](#)

[Upgrading Sites | 813](#)

## Rebooting Tenant Devices and Cloud Hub Devices

### IN THIS SECTION

- [Rebooting a Tenant Device | 129](#)
- [Rebooting a Cloud Hub Device | 130](#)

You can reboot tenant devices and cloud hub devices by using CSO.

You need to reboot a tenant device or cloud hub device if the device is down or if you want to fix operational errors in the device.

### Rebooting a Tenant Device

To reboot a tenant device:



**CAUTION:** If you reboot a tenant device, deployments that are in progress are stopped.

1. Select **Resources > Tenant Devices**.

The Tenant Devices page appears.

2. Select the tenant device that you want to reboot and select **More > Reboot**.

The Reboot Device page appears, displaying the message **Reboot Device will stop deployments in progress. Continue with reboot?**

3. Click **Yes** to reboot the device.

A device reboot job is triggered and the message **Device Reboot job is created** appears on the Tenant Devices page.

You can click the [Device Reboot](#) link in the message to view the device reboot logs (including job status, start date and time, end date and time) on the Device Reboot Details page. Alternatively, you can view the status of the job on the Jobs (**Monitor > Jobs**) page.

The Status Message column on the Tenant Devices page displays the status as **Reboot in-progress**.

- If the device is rebooted successfully, the Status Message column displays the status as **Reboot Succeeded**.
- If the device reboot fails, the Status Message column displays the status as **Reboot Failed**.

A device reboot may fail because of various reasons such as the reboot time exceeding the timeout value that is set by CSO, or when the device is unreachable.

You can log in to the device CLI and check the logs to identify the reason for reboot failure

## Rebooting a Cloud Hub Device

To reboot a cloud hub device:



**CAUTION:** If you reboot a cloud hub device, deployments that are in progress are stopped.

1. Select **Resources > Cloud Hub Devices**.

The Cloud Hub Devices page appears.

2. Select the Cloud hub device that you want to reboot and select **More > Reboot**.

The Reboot Device page appears, displaying the message **Reboot Device will stop deployments in progress. Continue with reboot?**

3. Click **Yes** to reboot the device.

A device reboot job is triggered and the message **Device Reboot job is created** appears on the Cloud Hub Devices page.

You can click the [Device Reboot](#) link in the message to view the device reboot logs (including job status, start date and time, end date and time) on the Device Reboot Details page. Alternatively, you can view the status of the job on the Jobs (**Monitor > Jobs**) page.

The Status Message column on the Cloud Hub Devices page displays the status as **Reboot in-progress**.

- If the device is rebooted successfully, the Status Message column displays the status as **Reboot Succeeded**.
- If the device reboot fails, the Status Message column displays the status as **Reboot Failed**.

A device reboot may fail because of various reasons such as the reboot time exceeding the timeout value that is set by CSO, or when the device is unreachable.

You can log in to the device CLI and check the logs to identify the reason for reboot failure

## RELATED DOCUMENTATION

[About the Cloud Hub Devices Page | 104](#)

[About the Tenant Devices Page | 101](#)

# Managing Device Templates

## IN THIS CHAPTER

- [Device Template Overview | 132](#)
- [About the Device Template Page | 137](#)
- [Cloning a Device Template | 142](#)
- [Importing a Device Template | 143](#)
- [Configuring Template Settings in a Device Template | 145](#)
- [Updating Stage-2 Configuration Template in a Device Template | 180](#)
- [Configuring Stage-2 Initial Configuration in a Device Template | 184](#)
- [Modifying a Device Template Description | 187](#)
- [Deleting a Device Template | 187](#)
- [APN Overview | 188](#)

## Device Template Overview

### IN THIS SECTION

- [Hybrid WAN CPE | 133](#)
- [SD-WAN CPE | 134](#)
- [Secure Internet CPE | 135](#)
- [Managed Internet CPE | 136](#)

A device template contains configuration and provision settings for a physical device, such as a CPE device or a router, which you manage through Contrail Service Orchestration (CSO). The CSO installation includes several default device templates for CPE devices and other physical devices. You can either use a default CPE device template as is if the template suits your specific topology requirements or customize the default CPE device template to meet your specific requirements. You can also create your own device templates and upload that to CSO. The CPE device templates are specific to the type of device and topology of the solution. The device templates for non-CPE devices are fixed and you cannot customize them. You must assign a device template to each CPE device at the site. You assign a device template to a device in CSO when you add a point of presence (POP). In some cases, you might want all CPE devices to use the same values, through device templates, you have the options to provide the values.

The CPE device templates contain three types of information:

- **Template settings information**—It prepares the device for remote activation, connects the device to the peer router, and establishes an IPsec tunnel with the router.
- **Stage-2 configuration template information**—It specifies the additional settings that you or your customer can configure for the device. For example, you can enable configuration of LAN and firewall policies. You create these configuration templates in Configuration Designer and provide implementation details in the device template.
- **Stage-2 initial configuration information**—It provides the actual values for the stage-2 configuration templates. In general, your customers perform this configuration through the Customer Portal.

The CPE device templates support four deployment models: Hybrid WAN CPE, SD-WAN CPE, Secure Internet CPE, and Managed Internet CPE.

## Hybrid WAN CPE

You can use the **NFX Hybrid WAN CPE** or **SRX Hybrid WAN CPE** device template for a CPE device in hybrid WAN deployment.

[Figure 5 on page 134](#) shows the topology for a hybrid WAN CPE deployment model.

Figure 5: Hybrid WAN CPE

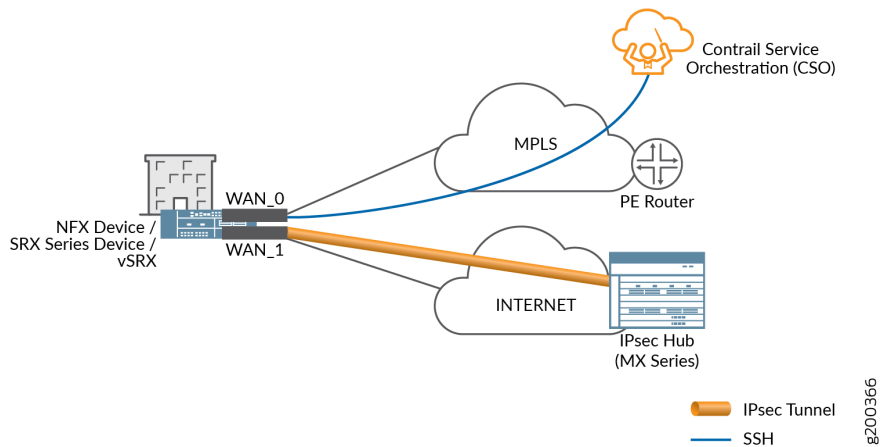


Table 56 on page 134 lists the connectivity details for hybrid WAN CPE.

Table 56: Connectivity Details for Hybrid WAN CPE

Link Name	Type	Default Interface	IP Assignment	Overlay	Traffic
WAN_0	MPLS	ge-0/0/8 (NFX) ge-0/0/0 (SRX)	Static	—	Data, OAM
WAN_1(Optional)	Internet	—	DHCP	IPsec	Backup data path

SD-WAN CPE

You can use the **NFX SDWAN CPE** or **SRX SDWAN CPE** device template for a CPE device in an SD-WAN deployment.

Figure 6 on page 135 shows the topology for an SD-WAN CPE deployment model.

Figure 6: SD-WAN CPE

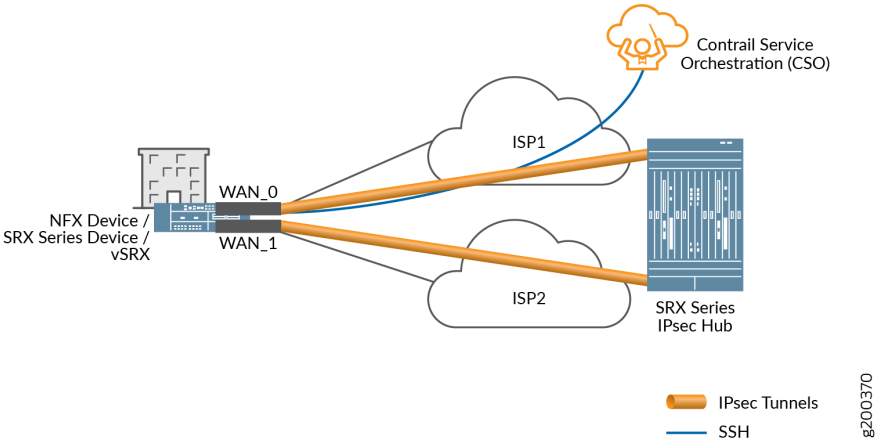


Table 57 on page 135 lists the connectivity details for an SD-WAN CPE.

Table 57: Connectivity Details for SD-WAN CPE

Link Name	Type	Default Interface	IP Assignment	Overlay	Traffic
WAN_0	Internet	ge-0/0/8 (NFX) ge-0/0/0 (SRX)	Static, DHCP	IPsec	Data, OAM
WAN_1	Internet	ge-0/0/9 (NFX) ge-0/0/1 (SRX)	Static, DHCP	IPsec	Data

### Secure Internet CPE

You can use the **NFX Secure Internet CPE** device template to provide a secure Internet connection through the CPE device.

Figure 7 on page 136 shows the topology for a secure Internet CPE deployment model.

Figure 7: Secure Internet CPE

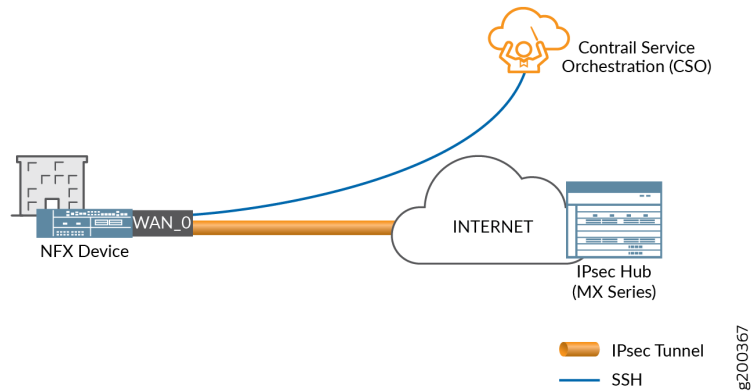


Table 58 on page 136 lists the connectivity details for secure Internet CPE.

Table 58: Connectivity Details for Secure Internet CPE

Link Name	Type	Default Interface	IP Assignment	Overlay	Traffic
WAN_0	Internet	ge-0/0/8 (NFX)	DHCP	IPsec	Data, OAM
WAN_1	—	—	—	—	Not Used

Managed Internet CPE

You can use the **NFX Managed Internet CPE** or **SRX Managed Internet CPE** device template to provide a managed Internet connection through the CPE device.

Figure 8 on page 136 shows the topology for a managed Internet CPE deployment model.

Figure 8: Managed Internet CPE

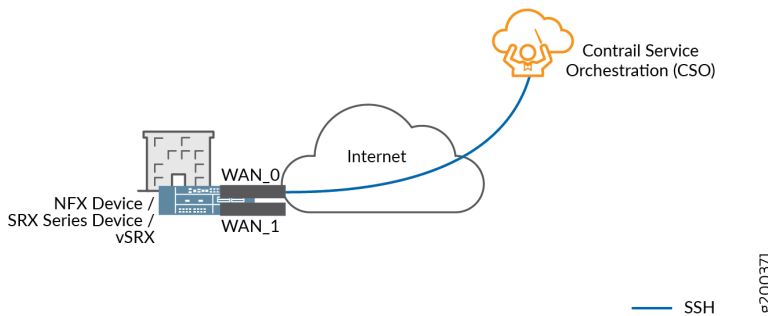


Table 59 on page 137 lists the connectivity details for a managed Internet CPE deployment model.



Table 59: Connectivity details for Managed Internet CPE

Link Name	Type	Default Interface	IP Assignment	Overlay	Traffic
WAN_0	Internet	ge-0/0/8 (NFX) ge-0/0/0 (SRX)	DHCP	—	Data, OAM
WAN_1	—	—	—	—	Not Used

## RELATED DOCUMENTATION

| [About the Device Template Page](#) | 137

## About the Device Template Page

### IN THIS SECTION

- [Tasks You Can Perform](#) | 137
- [Field Descriptions](#) | 138
- [Supported Device Templates](#) | 138

To access this page, click **Resources > Device Templates**.

Use this page to view and manage device templates.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Clone a device template. See [“Cloning a Device Template”](#) on page 142.
- Import a device template from a file. See [“Importing a Device Template”](#) on page 143.
- Configure device template settings. See [“Configuring Template Settings in a Device Template”](#) on page 145.
- Update stage-2 configuration template. See [“Updating Stage-2 Configuration Template in a Device Template”](#) on page 180.

- Configure stage-2 initial configuration. See [“Configuring Stage-2 Initial Configuration in a Device Template” on page 184.](#)
- Modify a device template description. See [“Modifying a Device Template Description” on page 187.](#)
- Delete a device template. See [“Deleting a Device Template” on page 187.](#)
- View details about a device template. See [“Viewing Object Details” on page 16.](#)
- Show or hide columns about the templates. See [“Sorting Objects” on page 17.](#)
- Search an object about the templates. See [“Searching for Text in an Object Data Table” on page 16.](#)

## Field Descriptions

[Table 60 on page 138](#) describes the fields on the Device Templates page.

**Table 60: Fields on the Device Templates Page**

Field	Description
Name	Displays the name of the device template
Description	Displays the description of the device template.  Example: NFX250 device deployed as a CPE device with SD-WAN capability.
Assigned to	Displays the number of tenant sites using the device template.  Example: 2 Tenants (2 Sites)
Workflows	Displays the number of workflows used in the device template.  Example: 7
Target Family	Displays the name of the device family for which the device template is created.  Example: juniper-srx
Last Updated	Displays the date and time when the device template was last updated.  Example: 05/23/2017 06:22

## Supported Device Templates

[Table 61 on page 139](#) describes the list of supported device templates.

Table 61: List of Supported Device Templates

No.	Device Template Name	Device Template Description
1	MX as SD-WAN Hub	Device template for an MX Series router acting as a hub device in an SD-WAN deployment(in hub-and-spoke topology).
2	MX as Hybrid WAN IPsec Hub	Default template for an MX Series router acting as an hub device in hybrid WAN topology. Select this option for MX Series routers in centralized and distributed deployments.
3	MX as Gateway for vCPE	<p>Device template for an MX Series router acting as an SDN gateway that prevents the creation of black holes when an administrative user activates a service at a site or prevents internet null route at sites during VNF instantiation.</p> <p>Select this option only if you have been advised to do so by Juniper Networks.</p>
4	NFX250 as Hybrid WAN CPE	<p>Device template for an NFX250 device acting as a CPE device in a distributed deployment. This template supports port-forwarding with a CSO-initiated connection.</p> <p>This device template supports the NFX250 device as a CPE device with MPLS WAN link and optional Internet WAN link as backup</p>
5	NFX250 as Secure Internet CPE	<p>Device template for an NFX250 device acting as a CPE device in a distributed deployment. This template supports outbound SSH, which is device-initiated connection, with port-forwarding capability.</p> <p>This device template supports the NFX250 device as CPE with one Internet WAN link that has IPsec encryption(DHCP IP address configuration).</p>
6	NFX250 as Managed Internet CPE	<p>Device template for an NFX250 device acting as a CPE for a managed Internet service.</p> <p>This device template supports managed Internet Service with one Gigabit Ethernet WAN link.</p>
7	NFX250 as SD-WAN CPE	<p>Device template for an NFX250 device acting as a CPE in an SD-WAN deployment with hub-and-spoke topology.</p> <p>This device template supports SD-WAN deployment with up to four WAN links.</p>

Table 61: List of Supported Device Templates (*continued*)

No.	Device Template Name	Device Template Description
8	Dual NFX250 as SD-WAN CPEs	<p>Device template for NFX250 devices in device redundancy mode in an SD-WAN deployment.</p> <p>This device template supports device redundancy in SD-WAN deployment with up to four WAN links.</p>
9	NFX150 as Managed Internet CPE	Device template for an NFX150 device as CPE for managed Internet service. This device template supports managed Internet Service with one Gigabit Ethernet WAN link.
10	NFX150 as Hybrid WAN CPE	Device template for an NFX150 device as CPE in a distributed deployment. This device template supports port-forwarding with a CSO-initiated connection, MPLS WAN links, and optional Internet WAN link as backup.
11	NFX150 as Secure Internet CPE	Device template for an NFX150 device as CPE in a distributed deployment. This device template supports port-forwarding with device-initiated connection, one Internet WAN link with IPsec encryption (DHCP IP address configuration) and outbound SSH.
12	NFX150 as SD-WAN CPE	Device template for an NFX150 device as CPE in an SD-WAN deployment with hub-and-spoke topology. This device template supports up to four WAN links.
13	SRX as Hybrid WAN CPE	Device template for an SRX Series Services Gateway or a vSRX instance acting as a CPE device in a distributed hybrid WAN deployment.
14	SRX as Managed Internet CPE	<p>Device template for SRX Series Services Gateway devices acting as a CPE device for managed internet service.</p> <p>This device template supports managed Internet Service with one Gigabit Ethernet WAN link</p>
15	SRX as SD-WAN CPE	<p>Device template for an SRX Series Services Gateway acting as a CPE device in an SD-WAN deployment with hub-and-spoke topology.</p> <p>This device template supports SD-WAN deployment with up to four WAN links.</p>

Table 61: List of Supported Device Templates (*continued*)

No.	Device Template Name	Device Template Description
16	SRX as SDWAN Hub	<p>Device template for an SRX Series Services Gateway acting as a hub device in an SD-WAN deployment with hub-and-spoke topology.</p> <p>This device template supports SD-WAN deployment with up to four WAN links.</p>
17	Dual SRX as SD-WAN CPEs	<p>Device template for SRX Series Services Gateways acting as CPE devices in device redundancy mode in an SD-WAN deployment.</p> <p>This device template supports SD-WAN deployment with up to four WAN links.</p>
18	vSRX as SD-WAN spoke in AWS	<p>Device template for a vSRX instance acting as spoke in AWS for SD-WAN deployment.</p> <p>This device template supports SD-WAN deployment with up to four WAN links.</p>
19	SRX-4x00 as SD-WAN CPE	<p>Device template for an SRX 4000 line Services Gateways acting as a CPE device in an SD-WAN deployment with hub-and-spoke topology.</p> <p>This device template supports SD-WAN deployment with up to four WAN links.</p>
20	Dual SRX4x00 as SD-WAN CPEs	<p>Device template for SRX 4000 line Services Gateways acting as CPE devices in device redundancy mode in an SD-WAN deployment.</p> <p>This device template supports SD-WAN deployment with up to four WAN links.</p>

## RELATED DOCUMENTATION

[Creating a Single POP | 58](#)
[Adding Devices | 92](#)

## Cloning a Device Template

Cloning a device template is useful when you want to create a device template that is similar to an existing one but with small differences. You can clone a device template by using either of the methods mentioned below:

To clone a device template:

1. Select **Resources > Device Templates**.

The Device Template page appears.

2. Select the device template that you want to clone, and click **Clone**.

The Clone Template page appears.

3. Specify an appropriate name for your new device template. For example, SRX as SD-WAN CPE.

4. Click **Ok**.

The cloned device template appears on the Device Template page. You can now edit the new device template and customize the configurations as needed.

You can also clone the device template by performing the following procedure:

1. Select **Resources > Device Templates**.

The Device Template page appears.

2. Select the device template that you want to clone, and then select **Edit Device Template > Template Settings**.

The Template Settings page appears.

3. Modify the configurations as required and click **Save As**.

The Create Device template page appears.

4. Specify an appropriate name for your new device template. For example, SRX as SD-WAN CPE.

5. Click **Ok**.

The cloned device template appears on the Device Template page. You can now edit the new device template and customize the configurations as needed.

## RELATED DOCUMENTATION

[Importing a Device Template | 143](#)

## Importing a Device Template

### IN THIS SECTION

- [Creating a Device Template File | 143](#)
- [Importing a Device Template File | 144](#)

Use the [Resources > Device Templates](#) page to import a device template in JSON format for the customer.

**NOTE:** You must create a device template file before you can import a device template

### Creating a Device Template File

To create a file of device information:

1. Select **Resources > Device Templates > Import Device Template**.

The Import Device Template page appears.

2. Click the **Download Sample JSON** link to open and save the sample JSON data file.

The sample file opens at the bottom of the page.

3. Save the template file with an appropriate name to your computer.

**NOTE:** You must retain the file format as .json to successfully upload the device template details to the Administration Portal.

4. Customize the sample JSON file according to the deployment.
5. Save the customized file.

## Importing a Device Template File

Device templates are used to configure cloud CPE devices on a tenant site and these templates must be assigned to the device before you activate the device.

**NOTE:** A device template data file is required before your import device templates.

To import device template configuration:

1. Select **Resources > Device Templates > Import Device Template**.

The Import Device Template page appears.

2. Click **Browse** and navigate to the directory containing the device template configuration JSON file.
3. Select the file and click **Open**.
4. Click **Import Device Templates**. If you want to discard the import process, click **Cancel** instead.

The Device Templates Import Completed page appears with the details of the successful import.

5. Click **OK** to complete the import process.

The imported device template is displayed on the Device Template page.

## RELATED DOCUMENTATION

| [Creating a Single POP](#) | 58



# Configuring Template Settings in a Device Template

To configure the device template settings:

1. Select **Resources > Device Template**.

The Device Templates page appears.

2. Select the device template for which you want to configure the settings and then select **Edit Device Template > Template Settings**.

The Template Settings page appears.

3. Complete the configuration settings according to the guidelines in [Table 62 on page 145](#).

The configurable settings supported and default values for different device templates are as follows:

- MX Series: [Table 63 on page 152](#)
- NFX250 devices: [Table 64 on page 153](#)
- NFX150 devices: [Table 65 on page 161](#)
- SRX Series: [Table 66 on page 163](#)
- SRX4100 and SRX4200: [Table 67 on page 166](#)

4. Click **Save**.

The changes that you made to the device template are saved and you are returned to the Device Templates page. After you modify a device template and use that device template to add a site, the modified parameters are used in the site addition workflow. The device template modifications do not take effect on existing sites.

**Table 62: Fields on the Template Settings Page for All Device Templates**

Field Name	Description	Applicable To (Device Templates)
<b>SSH Settings</b>		
Prevent root login via SSH?	Specify whether root login (to the device) by using SSH should be allowed or not.	NFX250 NFX150 SRX4100 SRX4200

Table 62: Fields on the Template Settings Page for All Device Templates (*continued*)

Field Name	Description	Applicable To (Device Templates)
Restrict SSH access to be from CSO only	Specify whether SSH access to the device should be restricted only to Contrail Service Orchestration (CSO) or not.	NFX250 NFX150 SRX4100 SRX4200
Max number of SSH connections allowed at any time	Enter the maximum number of SSH connections allowed at any time.  Range: 1 through 250.	NFX250 NFX150 SRX4100 SRX4200
Max number of SSH connections allowed per minute	Enter the maximum number of SSH connections allowed per minute.  Range: 1 through 250.	NFX250 NFX150 SRX4100 SRX4200
Max number of sessions per SSH connection	Enter the maximum number of sessions allowed per SSH connection.  Range: 1 through 250.	NFX250 NFX150 SRX4100 SRX4200
<b>Policer Settings</b>		
Bandwidth limit for ICMP traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for Internet Control Message Protocol (ICMP) traffic towards the device.	NFX250
Burst-size limit for ICMP traffic towards the device	Enter the burst-size limit, in bytes, for ICMP traffic towards the device.	NFX250
Bandwidth limit for trace-route traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for traceroute traffic towards the device.	NFX250

Table 62: Fields on the Template Settings Page for All Device Templates (*continued*)

Field Name	Description	Applicable To (Device Templates)
Burst-size limit for trace-route traffic towards the device	Enter the burst-size limit, in bytes, for traceroute traffic towards the device.	NFX250
Bandwidth limit for DHCP traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for Dynamic Host Configuration Protocol (DHCP) traffic towards the device.	NFX250
Burst-size limit for DHCP traffic towards the device	Enter the burst-size limit, in bytes, for DHCP traffic towards the device.	NFX250
Bandwidth limit for DNS traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for Domain Name System (DNS) traffic towards the device.	NFX250
Burst-size limit for DNS traffic towards the device	Enter the burst-size limit, in bytes, for (DNS) traffic towards the device.	NFX250
<b>Log Rotation Settings</b>		
Max size (MB) for log files	Enter the maximum size, in megabytes (MB), of the log files stored on the device.	NFX250
Max number of log files	Enter the maximum number of log files to be stored on the device at any time.	NFX250
<b>Feature Level Access Settings</b>		
Allow TACACS access	Click the toggle button to open the TACACS+ port on the device; doing so enables the flow of TACACS+ traffic.	NFX250
Allow SNMP access	Click the toggle button to open the SNMP port on the device; doing so enables the flow of TACACS+ traffic.	NFX250
<b>Customer Parameters</b>		
S2_MODEL_HUGEPAGE_COUNT	Enter the number of 1-GB huge pages usable by the virtualized network functions (VNFs) (on an NFX250-S2 device with a total memory of 32 GB.	NFX250

Table 62: Fields on the Template Settings Page for All Device Templates (*continued*)

Field Name	Description	Applicable To (Device Templates)
ADSL_VPI	Enter the Virtual Path Identifier (VPI) setting to connect to the asymmetric digital subscriber line (ADSL) service provider.	NFX250
ADSL_ENCAP	Enter the encapsulation that is used to connect to the ADSL service provider.	NFX250
VNF_OAM_TRANSLATED_PORT_START	Enter the first port number that can be used to expose (by using port translation) a VNF Operation, Administration, and Maintenance (OAM) port on the gateway router OAM interface or the WAN interface. This setting is used in cases where the VNF does not have its own OAM IP address from the in-band OAM network.	NFX250
ADSL_VCI	Enter the VCI (Virtual Channel Identifier) setting to connect to the ADSL service provider.	NFX250
AUTO_INSTALL_LICENSE_TO_DEVICE	Specify whether licenses should be automatically installed on the device during the ZTP workflow or not.	NFX250
AUTO_INSTALL_DEFAULT_TRUSTED_CERTS_TO_DEVICE	Specify whether the Junos OS default trusted certificates should be installed on the device during the ZTP workflow or not.	NFX250
USE_SINGLE_SSH_TO_NFX	Specify whether to manage the NFX250 device and its components by using a single SSH connection between CSO and the NFX250 device.	NFX250
ENC_ROOT_PASSWORD	Specify the Junos OS root password to be set on the device. The password that you type is masked and the password is encrypted and stored.	NFX250

Table 62: Fields on the Template Settings Page for All Device Templates (*continued*)

Field Name	Description	Applicable To (Device Templates)
GWR_VSRX_IMAGE_LOCAL_FILE_PATH	<p>Enter the local path of the vSRX image file present on the NFX250 device; this image file is used when the gateway router virtual machine (VM) is created.</p> <p>For example,  <code>./var/third-party/images/*vsrx*-15.1X*.qcow2</code>.            If this parameter is not set or if the file is not present on the NFX250 device, then a vSRX image with the filename specified in <b>GWR_VSRX_IMAGE_CNAME_IN_CSO</b> is downloaded from the CSO file server to the NFX250 device.</p>	NFX250
GWR_VSRX_IMAGE_CNAME_IN_CSO	<p>Enter the name with which the vSRX image was uploaded into the Image Management Service in CSO. If the vSRX image file specified in <b>GWR_VSRX_IMAGE_LOCAL_FILE_PATH</b> is not present, then an image with the name specified is downloaded to the NFX250 device.</p>	NFX250
ACTIVATION_CODE_ENABLED	Specify whether an activation code must be specified to activate the device or not.	NFX250
INTERNAL_OAM_SUBNET	Enter the IP address for the subnet that is used for internal OAM connectivity between various components of the NFX250 device.	NFX250
AUTO_DEPLOY_STAGE2_CONFIG	Specify whether the stage-2 configuration should be automatically deployed on the device during the ZTP workflow.	NFX250

Table 62: Fields on the Template Settings Page for All Device Templates (*continued*)

Field Name	Description	Applicable To (Device Templates)
OOB_MGMT_ENABLED	<p>Specify whether the out-of-band (OOB) management port of the device is being used for management connectivity or not.</p> <p>If you enable this field, a default route must be available through the OOB interface. If you disable this field, there is no connectivity through the OOB management port of the device and the stage-1 configuration that is generated includes a static default route.</p>	NFX250
S1_MODEL_HUGEPAGE_COUNT	Enter the number of 1-GB huge pages usable by the VNFs on an NFX250-S1 device with a total memory of 16 GB.	NFX250
CONTROL_LINK_PORT_NAME	Enter the physical port name for the control link connection for a dual CPE setup.	NFX250
FAB_LINK_PORT_NAME	Enter the physical port name for fabric link connection for a dual CPE setup.	NFX250
MAX_DVPN_TUNNELS_ON_SITE	Enter the maximum number of Dynamic Virtual Private Network (DVPN) tunnels that are allowed to create at the tenant site.	NFX150 NFX250 SRX Series
MIN_DVPN_TUNNELS_TO_START_DEACTIVATE	Enter the minimum number of DVPN tunnels at the tenant site after which the DVPN tunnels are dynamically deleted.	NFX150 NFX250 SRX Series
WAN_PORT_NAMES	Specify the mapping of the physical port names used for WAN side connectivity	NFX250
LAN_PORT_NAMES	Specify the mapping of the physical port names used for LAN side connectivity	NFX250

Table 62: Fields on the Template Settings Page for All Device Templates (*continued*)

Field Name	Description	Applicable To (Device Templates)
LAN_MEMBER_PORT_NAMES	Specify the physical ports on the dual CPE device that are used on the link aggregation group (LAG) interface connecting to the LAN-side switch.	NFX250
GWR_CPU_PIN	Specify the physical CPUs to which the vCPUs of the vSRX (gateway router) should be pinned.  <b>WARNING:</b> We recommend that you <i>do not</i> modify the preconfigured CPU pinning values because these values are set based on Juniper's performance tests.	NFX250
AUX_Subnets	Specify the IP subnets assigned to the three auxiliary ports on the gateway router to which VNFs can be attached.	NFX250
LAN_Subnets	Specify the IP subnets assigned to the two LAN ports on the gateway router to which VNFs can be attached.	NFX250
<b>Login Security Settings</b>		
Login idle timeout (minutes)	Enter the time (in minutes) after which a session that is idle is timed out.	NFX250
Attempts before locking out	Enter the maximum number of unsuccessful login attempts allowed before the user account is locked.  Range: 3 through 10.	NFX250
Lockout period in minutes	Enter the period (in minutes) for which the user account should be locked.  Range: 1 through 43,200 minutes	NFX250

Table 62: Fields on the Template Settings Page for All Device Templates (*continued*)

Field Name	Description	Applicable To (Device Templates)
Backoff factor in seconds	Specify the delay (in seconds) after each failed login attempt, which increases for each subsequent login attempt after specified login backoff threshold.  Range: 5 through 10.	NFX250
Backoff threshold	Specify the threshold for the number of failed login attempts after which each subsequent login attempt is delayed by the time specified in the login backoff factor.  Range: 1 through 3	NFX250
Maximum time to enter password in seconds	Enter the maximum time allowed (in seconds) to enter a password to log in to the device after entering your username.  Range: 20 through 300 seconds.	NFX250
Maintenance user account	Enter the username of the user account to be used for maintenance activities (for example, troubleshooting) on the device.	NFX250
Announcement	Specify the system login announcement, which is displayed after a user successfully logs in to the device.	NFX250
Banner Message	Specify the system login message, which is displayed before a user logs in to the device.	NFX250

Table 63: Configurable Settings Supported (and Their Defaults) on MX Series Device Template

Field Name	MX as SD-WAN Hub
AUTO_DEPLOY_STAGE2_CONFIG	Disabled
ZTP_ENABLED	Disabled
ACTIVATION_CODE_ENABLED	Disabled



Table 63: Configurable Settings Supported (and Their Defaults) on MX Series Device Template (continued)

Field Name	MX as SD-WAN Hub
OOB_OAM_Port	fxp0
AUTO_INSTALL_LICENSE_TO_DEVICE	Disabled
WAN Port Names	WAN_0 ge-0/0/0 WAN_1 ge-0/0/1 WAN_2 ge-0/0/2 WAN_3 ge-0/0/3

Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates

Field Name	NFX250 as Hybrid WAN CPE	NFX250 as Managed Internet CPE	NFX250 as Secure Internet CPE	NFX250 as SD-WAN CPE	Dual NFX250 as SD-WAN CPE
<b>SSH Settings</b>					
Prevent root login via SSH?	—	—	—	Disabled	Disabled
Restrict SSH access to be from CSO only	—	—	—	Disabled	Disabled
Max number of SSH connections allowed at any time	—	—	—	50	50
Max number of SSH connections allowed per minute	—	—	—	50	50
Max number of sessions per SSH connection	—	—	—	50	50
<b>Policer Settings</b>					
Bandwidth limit for ICMP traffic towards the device	—	—	—	1m	1m

Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates (continued)

Field Name	NFX250 as Hybrid WAN CPE	NFX250 as Managed Internet CPE	NFX250 as Secure Internet CPE	NFX250 as SD-WAN CPE	Dual NFX250 as SD-WAN CPE
Burst-size limit for ICMP traffic towards the device	—	—	—	2k	2k
Bandwidth limit for trace-route traffic towards the device	—	—	—	1m	1m
Burst-size limit for trace-route traffic towards the device	—	—	—	15k	15k
Bandwidth limit for DHCP traffic towards the device	—	—	—	1m	1m
Burst-size limit for DHCP traffic towards the device	—	—	—	15k	15k
Bandwidth limit for DNS traffic towards the device	—	—	—	1m	1m
Burst-size limit for DNS traffic towards the device	—	—	—	15k	15k
<b>Log Rotation Settings</b>					
Max size (MB) for log files	—	—	—	10	10
Max number of log files	—	—	—	10	10
<b>Feature Level Access Settings</b>					

Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates (continued)

Field Name	NFX250 as Hybrid WAN CPE	NFX250 as Managed Internet CPE	NFX250 as Secure Internet CPE	NFX250 as SD-WAN CPE	Dual NFX250 as SD-WAN CPE
Allow TACACS access	—	—	—	Disabled	Disabled
Allow SNMP access	—	—	—	Disabled	Disabled
<b>Customer Parameters</b>					
S2_MODEL_HUGEPAGE_COUNT	21	21	21	13	13
ADSL_VPI	—	—	—	8	8
ADSL_ENCAP	—	—	—	llcsnap-bridged-802.1q	llcsnap-802.1q
VNF_OAM_TRANSLATED_PORT_START	49152	49152	49152	49152	49152
ADSL_VCI	—	—	—	36	36
AUTO_INSTALL_LICENSE_TO_DEVICE	Disabled	Disabled	Disabled	Disabled	Disabled
AUTO_INSTALL_DEFAULT_TRUSTED_CERTS_TO_DEVICE	Enabled	Enabled	Enabled	Enabled	Enabled
USE_SINGLE_SSH_TO_NFX	Enabled	—	—	Enabled	—
ENC_ROOT_PASSWORD	juniper123	juniper123	juniper123	juniper123	juniper123
GWR_VSRX_IMAGE_CNAME_IN_CSO	vsrx-vmdisk-15.1.qcow2	vsrx-vmdisk-15.1.qcow2	vsrx-vmdisk-15.1.qcow2	vsrx-vmdisk-15.1.qcow2	vsrx-vmdisk-15.1.qcow2
ACTIVATION_CODE_ENABLED	Enabled	Enabled	Enabled	Enabled	Enabled

Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates (continued)

Field Name	NFX250 as Hybrid WAN CPE	NFX250 as Managed Internet CPE	NFX250 as Secure Internet CPE	NFX250 as SD-WAN CPE	Dual NFX250 as SD-WAN CPE
GWR_VSRX_IMAGE_LOCAL_FILE_PATH	—	—	—	—	—
INTERNAL_OAM_SUBNET	10.10.10.0/24	10.10.10.0/24	10.10.10.0/24	10.10.10.0/24	10.10.10.0/24
AUTO_DEPLOY_STAGE2_CONFIG	Disabled	Disabled	Disabled	Disabled	Disabled
OOB_MGMT_ENABLED	Enabled	Enabled	Enabled	Enabled	Enabled
S1_MODEL_HUGEPAGE_COUNT	9	9	9	9	9
CONTROL_LINK_PORT_NAME	—	—	—	—	xe-0/0/0
FAB_LINK_PORT_NAME	—	—	—	—	xe-0/0/0
MAX_DVPN_TUNNELS_ON_SITE	—	—	—	nfx250_s1e: 750 nfx250_10_t: 750 nfx250_ls1_10_t: 750 nfx250_att_s1_10_t: 300 nfx250_s2_10_t: 750 nfx250_att_ls1_10_t: 300 nfx250_att_s2_10_t: 300	nfx250_s1e: 750 nfx250_10_t: 750 nfx250_ls1_10_t: 750 nfx250_att_s1_10_t: 300 nfx250_s2_10_t: 750 nfx250_att_ls1_10_t: 300 nfx250_att_s2_10_t: 300

Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates (continued)

Field Name	NFX250 as Hybrid WAN CPE	NFX250 as Managed Internet CPE	NFX250 as Secure Internet CPE	NFX250 as SD-WAN CPE	Dual NFX250 as SD-WAN CPE
MIN_DVPN_TUNNELS _TO_START _DEACTIVATE				nfx250_s1e: 250 nfx250_10_t: 250 nfx250_ls1_10_t: 250 nfx250_att_s1_10_t: 100 nfx250_s2_10_t: 250 nfx250_att_ls1_10_t: 100 nfx250_att_s2_10_t: 100	nfx250_s1e: 250 nfx250_10_t: 250 nfx250_ls1_10_t: 250 nfx250_att_s1_10_t: 100 nfx250_s2_10_t: 250 nfx250_att_ls1_10_t: 100 nfx250_att_s2_10_t: 100
WAN_PORT_NAMES	WAN_0 ge-0/0/8  WAN_1 ge-0/0/9	WAN_0 ge-0/0/8	WAN_0 ge-0/0/8	WAN_0 ge-0/0/10  WAN_1 ge-0/0/11  WAN_2 xe-0/0/12  WAN_3 xe-0/0/13	WAN_0 ge-0/0/10  WAN_1 ge-0/0/11  WAN_2 ge-0/0/12  WAN_3 ge-0/0/13  WAN_4 ge-0/0/14

Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates *(continued)*

Field Name	NFX250 as Hybrid WAN CPE	NFX250 as Managed Internet CPE	NFX250 as Secure Internet CPE	NFX250 as SD-WAN CPE	Dual N SD-W
LAN_PORT_NAMES	—	—	—	LAN_0 ge-0/0/0	—
				LAN_1 ge-0/0/1	
				LAN_2 ge-0/0/2	
				LAN_3 ge-0/0/3	
				LAN_4 ge-0/0/4	
				LAN_5 ge-0/0/5	
				LAN_6 ge-0/0/6	
				LAN_7 ge-0/0/7	
				LAN_8 ge-0/0/8	
				LAN_9 ge-0/0/9	

Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates (continued)

[illegible]

Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates (continued)

Field Name	NFX250 as Hybrid WAN CPE	NFX250 as Managed Internet CPE	NFX250 as Secure Internet CPE	NFX250 as SD-WAN CPE	Dual NFX250 as SD-WAN CPE
GWR_CPU_PIN	nfx250_s2_10_t: 4, 10 nfx250_s1e: 4, 10 nfx250_10_t: 4,10 nfx250_ls1_10_t: 2,6 nfx250_att_s1_10_t: 4, 10 nfx250_att_ls1_10_t: 2,6 nfx250_att_s2_10_t: 4,10	nfx250_s2_10_t: 4, 10 nfx250_s1e: 4, 10 nfx250_10_t: 4,10 nfx250_ls1_10_t: 2,6 nfx250_att_s1_10_t: 4, 10 nfx250_att_ls1_10_t: 2,6 nfx250_att_s2_10_t: 4,10	nfx250_s2_10_t: 4, 10 nfx250_s1e: 4, 10 nfx250_10_t: 4,10 nfx250_ls1_10_t: 2,6 nfx250_att_s1_10_t: 4, 10 nfx250_att_ls1_10_t: 2,6 nfx250_att_s2_10_t: 4,10	nfx250_s2_10_t: 3, 4, 5 nfx250_s1e: 3, 4, 5 nfx250_10_t: 3, 4, 5 nfx250_ls1_10_t: 1, 2, 3 nfx250_att_s1_10_t: 3, 4, 5 nfx250_att_ls1_10_t: 1, 2, 3 nfx250_att_s2_10_t: 3, 4, 5	nfx250_s2_10_t: 3, 4, 5 nfx250_s1e: 3, 4, 5 nfx250_10_t: 3, 4, 5 nfx250_ls1_10_t: 1, 2, 3 nfx250_att_s1_10_t: 3, 4, 5 nfx250_att_ls1_10_t: 1, 2, 3 nfx250_att_s2_10_t: 3, 4, 5
AUX_Subnets	AUX_0 10.10.0.0/24 AUX_1 10.10.12.0/24 AUX_2 10.10.13.0/24	AUX_0 10.10.0.0/24 AUX_1 10.10.12.0/24 AUX_2 10.10.13.0/24	AUX_0 10.10.0.0/24 AUX_1 10.10.12.0/24 AUX_2 10.10.13.0/24	AUX_0 10.10.0.0/24 AUX_1 10.10.12.0/24 AUX_2 10.10.13.0/24	AUX_0 10.10.0.0/24 AUX_1 10.10.12.0/24 AUX_2 10.10.13.0/24
LAN_Subnets	LAN_0 10.10.1.0/24 LAN_1 10.10.2.0/24	LAN_0 10.10.1.0/24 LAN_1 10.10.2.0/24	LAN_0 10.10.1.0/24 LAN_1 10.10.2.0/24	LAN_0 10.10.1.0/24 LAN_1 10.10.2.0/24	LAN_0 10.10.1.0/24 LAN_1 10.10.2.0/24
<b>Login Security Settings</b>					
Login idle timeout (minutes)	—	—	—	10	10
Attempts before locking out	—	—	—	3	3
Lockout period in minutes	—	—	—	5	5



Table 64: Configurable Settings Supported (and Their Defaults) on NFX250 Device Templates (continued)

Field Name	NFX250 as Hybrid WAN CPE	NFX250 as Managed Internet CPE	NFX250 as Secure Internet CPE	NFX250 as SD-WAN CPE	Dual NFX250 as SD-WAN CPE
Backoff factor in seconds	—	—	—	5	5
Backoff threshold	—	—	—	2	2
Maximum time to enter password in seconds	—	—	—	20	20
Maintenance user account	—	—	—	juniper	juniper
Announcement	—	—	—	This system is private property.	This system is private property.
Banner Message	—	—	—	Unauthorized access will be reported.	Unauthorized access will be reported.

Table 65: Configurable Settings Supported on NFX150 Device Templates

Field Name	NFX150 as Hybrid WAN CPE	NFX150 as Managed Internet CPE	NFX150 as Secure Internet CPE	NFX150 as SD-WAN CPE
VNF_OAM_TRANSLATED_PORT_START	49152	49152	49152	49152
AUTO_INSTALL_LICENSE_TO_DEVICE	Disabled	Disabled	Disabled	Disabled
ZTP_ENABLED	Enabled	Enabled	Enabled	Enabled
INTERNAL_OAM_SUBNET	10.10.10.0/24	10.10.10.0/24	10.10.10.0/24	10.10.10.0/24
ENC_ROOT_PASSWORD	Specified	Specified	Specified	Specified
ACTIVATION_CODE_ENABLED	Enabled	Enabled	Enabled	Enabled
AUTO_DEPLOY_STAGE2_CONFIG	Disabled	Disabled	Disabled	Disabled
USE_SINGLE_SSH_TO_NFX	Enabled	—	—	Enabled

Table 65: Configurable Settings Supported on NFX150 Device Templates (continued)

Field Name	NFX150 as Hybrid WAN CPE	NFX150 as Managed Internet CPE	NFX150 as Secure Internet CPE	NFX150 as SD-WAN CPE
ADSL_VPI	—	—	—	8
ADSL_ENCAP	—	—	—	llcsnap-bridged-802.1q
ADSL_VCI	—	—	—	36
MAX_DVPN_TUNNELS_ON_SITE	—	—	—	300
MIN_DVPN_TUNNELS_TO_START_DEACTIVATE	—	—	—	100
WAN Port Names for SKU with single slot	WAN_0 ge-1/0/1 heth-0-4  WAN_1 ge-1/0/2 heth-0-5  WAN_2 ge-1/0/3 heth-0-2  WAN_3 ge-1/0/4 heth-0-3	WAN_0 ge-1/0/1 heth-0-4  WAN_1 ge-1/0/2 heth-0-5  WAN_2 ge-1/0/3 heth-0-2  WAN_3 ge-1/0/4 heth-0-3	WAN_0 ge-1/0/1 heth-0-4  WAN_1 ge-1/0/2 heth-0-5  WAN_2 ge-1/0/3 heth-0-2  WAN_3 ge-1/0/4 heth-0-3	WAN_0 ge-1/0/1 heth-0-4  WAN_1 ge-1/0/2 heth-0-5  WAN_2 ge-1/0/3 heth-0-2  WAN_3 ge-1/0/4 heth-0-3
WAN Port Names for SKU with EM-6T2SFP expansion module.	WAN_0 ge-1/0/1 heth-0-4  WAN_1 ge-1/0/2 heth-0-5  WAN_2 ge-1/0/3 heth-1-6  WAN_3 ge-1/0/4 heth-1-7	WAN_0 ge-1/0/1 heth-0-4  WAN_1 ge-1/0/2 heth-0-5  WAN_2 ge-1/0/3 heth-1-6  WAN_3 ge-1/0/4 heth-1-7	WAN_0 ge-1/0/1 heth-0-4  WAN_1 ge-1/0/2 heth-0-5  WAN_2 ge-1/0/3 heth-1-6  WAN_3 ge-1/0/4 heth-1-7	WAN_0 ge-1/0/1 heth-0-4  WAN_1 ge-1/0/2 heth-0-5  WAN_2 ge-1/0/3 heth-1-6  WAN_3 ge-1/0/4 heth-1-7

Table 66: Configurable Settings Supported on SRX Series Device Templates

Field Name	SRX as Managed Internet CPE	SRX as Hybrid WAN CPE	SRX as SD-WAN CPE	SRX as SD-WAN Hub	Dual SRX as SD-WAN CPEs	vSRX as SD-WAN spoke AV
AUTO_DEPLOY_STAGE2_CONFIG	Disabled	Disabled	Disabled	Disabled	Disabled	Dis
ZTP_ENABLED	Enabled	Disabled	Enabled	Enabled	Disabled	—
PRE-STAGED-CPE	Disabled	—	—	—	—	—
ACTIVATION_CODE_ENABLED	Disabled	Disabled	Enabled	Enabled	Disabled	—
OOB_OAM_Port	fxp0	fxp0	fxp0	fxp0	ge-0/0/0	—
ENC_ROOT_PASSWORD	Specified	Specified	Specified	Specified	Specified	Sp
AUTO_INSTALL_LICENSE_TO_DEVICE	Disabled	Disabled	Disabled	Disabled	Disabled	Dis
CLUSTER_OFFSET	—	—	—	—	5	—
MAX_DVPN_TUNNELS_ON_SITE	—	—	300	—	300	30
MIN_DVPN_TUNNELS_TO_START_DEACTIVATE	—	—	100	—	100	10
WAN Port Names	WAN_0 ge-0/0/0	WAN_0 ge-0/0/0  WAN_1 ge-0/0/1	WAN_0 ge-0/0/0  WAN_1 ge-0/0/1  WAN_2 ge-0/0/2  WAN_3 ge-0/0/3	WAN_0 ge-0/0/0  WAN_1 ge-0/0/1  WAN_2 ge-0/0/2  WAN_3 ge-0/0/3	WAN_0 ge-0/0/3  WAN_1 ge-{ {CLUSTER_ OFFSET.value}}/0/3  WAN_2 ge-0/0/4  WAN_3 ge-{ {CLUSTER_ OFFSET.value}}/0/4	W ge  W ge

Table 66: Configurable Settings Supported on SRX Series Device Templates (*continued*)

Field Name	SRX as Managed Internet CPE	SRX as Hybrid WAN CPE	SRX as SD-WAN CPE	SRX as SD-WAN Hub	Dual SRX as SD-WAN CPEs	vS SD sp AW
OAM CE Port Names	—	—	—	OAM_CE_0 ge-0/0/0  OAM_CE_1 ge-0/0/1  OAM_CE_2 ge-0/0/2  OAM_CE_3 ge-0/0/3	—	—
FAB Port Names	—	—	—	—	FAB_0 ge-0/0/2  FAB_1 ge-{ {CLUSTER_ OFFSET.value}}/0/2	—

Table 66: Configurable Settings Supported on SRX Series Device Templates (continued)

Field Name	SRX as Managed Internet CPE	SRX as Hybrid WAN CPE	SRX as SD-WAN CPE	SRX as SD-WAN Hub	Dual SRX as SD-WAN CPEs	vS SD sp AW
LAN Port Names	—	—	LAN_0 ge-0/0/0  LAN_1 ge-0/0/1  LAN_2 ge-0/0/2  LAN_3 ge-0/0/3  LAN_4 ge-0/0/4  LAN_5 ge-0/0/5  LAN_6 ge-0/0/6  LAN_7 ge-0/0/7  LAN_8 ge-0/0/8  LAN_9 ge-0/0/9  LAN_10 ge-0/0/10	—	LAN_0_0 ge-0/0/7  LAN_0_1 ge-0/0/8  LAN_0_2 ge-0/0/9  LAN_0_3 ge-0/0/10	LA ge  LA ge  LA ge  LA ge  LA ge  LA ge  LA ge  LA ge  LA ge  LA ge
RESERVED_MEMBER_PORT_NAMES	—	—	—	—	PORT_0_0 ge-0/0/5  PORT_0_1 ge-0/0/6	—
RESERVED_SUBNETS	—	—	—	—	NODE_0 10.10.12.0/24  NODE_1 10.10.13.0/24	—

Table 66: Configurable Settings Supported on SRX Series Device Templates (continued)

Field Name	SRX as Managed Internet CPE	SRX as Hybrid WAN CPE	SRX as SD-WAN CPE	SRX as SD-WAN Hub	Dual SRX as SD-WAN CPEs	vS SD sp AW
AUTO_INSTALL_DEFAULT _TRUSTED_CERTS_ TO_DEVICE	—	—	—	—	—	En
AMI_vSRX_BYOL	—	—	—	—	—	Sp

Table 67: Configurable Settings Supported on SRX4x00 Series Device Templates

Field Name	SRX-4x00 as SD-WAN CPE	Dual SRX4x00 as SD-WAN CPEs
<b>SSH Settings</b>		
Prevent root login via SSH?	Disabled	Disabled
Restrict SSH access to be from CSO only	Disabled	Disabled
Max number of SSH connections allowed at any time	50	50
Max number of SSH connections allowed per minute	50	50
Max number of sessions per SSH connection	50	50
<b>Policer Settings</b>		
Bandwidth limit for ICMP traffic towards the device	1m	1m
Burst-size limit for ICMP traffic towards the device	2k	2k
Bandwidth limit for trace-route traffic towards the device	1m	1m
Burst-size limit for trace-route traffic towards the device	15k	15k
Bandwidth limit for DHCP traffic towards the device	1m	1m
Burst-size limit for DHCP traffic towards the device	15k	15k

Table 67: Configurable Settings Supported on SRX4x00 Series Device Templates (continued)

Field Name	SRX-4x00 as SD-WAN CPE	Dual SRX4x00 as SD-WAN CPEs
Bandwidth limit for DNS traffic towards the device	1m	1m
Burst-size limit for DNS traffic towards the device	15k	15k
<b>Log Rotation Settings</b>		
Max size (MB) for log files	10	10
Max number of log files	10	10
<b>Feature Level Access Settings</b>		
Allow TACACS access	Disabled	Disabled
Allow SNMP Access	Disabled	Disabled
<b>Customer Parameters</b>		
AUTO_INSTALL_LICENSE_TO_DEVICE	Disabled	—
AUTO_INSTALL_DEFAULT_TRUSTED_CERTS_TO_DEVICE	Enabled	Enabled
ZTP_ENABLED	Disabled	Disabled
ENC_ROOT_PASSWORD	Specified	Specified
ACTIVATION_CODE_ENABLED	Disabled	Disabled
CLUSTER_OFFSET	—	7
AUTO_DEPLOY_STAGE2_CONFIG	Disabled	Disabled
OOB_OAM_PORT	fxp0	fxp0
<b>MAX_DVPN_TUNNELS_ON_SITE</b>		
default-value	1500	1500
<b>WAN_PORT_NAMES</b>		

Table 67: Configurable Settings Supported on SRX4x00 Series Device Templates (continued)

Field Name	SRX-4x00 as SD-WAN CPE	Dual SRX4x00 as SD-WAN CPEs
WAN_0	xe-0/0/0	xe-0/0/0
WAN_1	xe-0/0/1	xe-{{CLUSTER_OFFSET.value}}/0/0
WAN_2	xe-0/0/2	xe-0/0/1
WAN_3	xe-0/0/3	xe-{{CLUSTER_OFFSET.value}}/0/1
<b>MIN_DVPN_TUNNELS_TO_START_DEACTIVATE</b>		
default-value	500	500
<b>LAN_PORT_NAMES</b>		
LAN_0	xe-0/0/0	LAN_0_0— xe-0/0/2
LAN_1	xe-0/0/1	LAN_0_1— xe-0/0/3
LAN_2	xe-0/0/2	LAN_0_2— xe-0/0/4
LAN_3	xe-0/0/3	LAN_0_3— xe-0/0/5
LAN_4	xe-0/0/4	
LAN_5	xe-0/0/5	
LAN_6	xe-0/0/6	
LAN_7	xe-0/0/7	
<b>Login Security Settings</b>		
Idle timeout (minutes)	10	10
Attempts before locking out	3	3
Lockout period in minutes	5	5
Backoff factor in seconds	5	5
Backoff threshold	2	2



Table 67: Configurable Settings Supported on SRX4x00 Series Device Templates (continued)

Field Name	SRX-4x00 as SD-WAN CPE	Dual SRX4x00 as SD-WAN CPEs
Maximum time to enter password in seconds	20	20
Maintenance user account	juniper	juniper
Announcement	This system is private property.	This system is private property.
Message	Unauthorized access will be reported.	Unauthorized access will be reported.
<b>RESERVED_MEMBER_PORT_NAMES</b>		
PORT_0_1	—	xe-0/0/7
PORT_0_0	—	xe-0/0/6
<b>RESERVED_SUBNETS</b>		
NODE_1	—	10.10.13.0/24
NODE_0	—	10.10.12.0/24

Table 68: Fields on the Template Settings Page

Name	Description
Customer Parameters	
AUTO_DEPLOY_STAGE2_CONFIG	Specify whether to automatically deploy stage-2 configuration at the end of the Zero Touch Provisioning (ZTP) workflow.  Example: Enabled

Table 68: Fields on the Template Settings Page (continued)

Name	Description
ZTP_ENABLED	<p>Specify whether to enable ZTP for the device.</p> <p><b>NOTE:</b> This option is supported on SRX Series Services Gateways only.</p> <p>Example: Enabled</p>
PRE_STAGED_CPE	<p>Specify whether the CPE device is pre-staged with WAN configuration.</p> <p><b>NOTE:</b> This option is supported on SRX Series Services Gateways only.</p> <p>Example: Enabled</p>
ACTIVATION_CODE_ENABLED	<p>Specify whether the customer must use an activation code to activate the CPE device.</p> <p>Example: Enabled</p>
OOB_OAM_Port	<p>Specify the name of the port used for out-of-band Operation, Administration, and Maintenance (OAM) traffic. This port is used in deployments where OAM and data traffic are on separate physical ports.</p> <p><b>NOTE:</b> This option is supported on SRX Series Services Gateways only.</p> <p>Example: fxp0</p>
S2_MODEL_HUGEPAGE_COUNT	<p>Specify the number of 1-GB huge pages to be used by the VNFs on an NFX250-S2 device with a total memory of 32 GB.</p> <p>Example: 21</p>
USE_SINGLE_SSH_TO_NFX	<p>Specify whether to enable device-initiated connections (outbound SSH) with port-forwarding capability. Port forwarding enables Contrail Service Orchestration to manage an NFX250 device through a single IP address.</p> <p>Example: Enabled</p>

Table 68: Fields on the Template Settings Page (continued)

Name	Description
S1_MODEL_HUGEPAGE_COUNT	Specify the number of 1-GB huge pages to be used by the VNFs on an NFX250-S1 device with a total memory of 16 GB.  Example: 21
VNF_OAM_TRANSLATED_PORT_START	Specify the first port number that can be used to expose a port on the gateway router's OAM or WAN interface through port translation. Use this option in cases where the VNF does not have its own OAM IP address from the in-band OAM network.
ENC_ROOT_PASSWORD	Specify the Junos OS root password to be set on an NFX250 device.  Example: *****
WAN Port Names	Specify the mapping Junos OS interface descriptors for the hardware ports. The RJ-45 port is the default port for the NFX250 device. You can change the default port if you want to use a different type of connector, such as SFP.
GWR_LAN_PORT	Specify the mapping of the gateway router's LAN port names to the corresponding front panel physical port names on the NFX250 device. Currently, the logical ports are created on the ge-0/0/4 interface.
JCP_LAN_PORT_NAMES	Specify the port names from LAN_0 through LAN_9.
GWR_LAN_PORT_NAMES	Specify the port names from LAN_0 through LAN_9.
LAN_PORT_NAMES	Specify the port names from LAN_0 through LAN_10.
CONTROL_LINK_PORT_NAME	Enter the physical port name for control link connection.  Example: xe-0/0/12
FAB_LINK_PORT_NAME	Enter the physical port name for fabric link connection.  Example: xe-0/0/13

Table 68: Fields on the Template Settings Page (continued)

Name	Description
OOB_MGMT_ENABLED	Specify whether to use the out-of-band (OOB) management port of the device for management connectivity. If the field is enabled, a default route will be available through this interface. If the field is disabled, there is no connectivity through the OOB management port of the device and the stage-1 configuration that is generated will include a static default route.
AUTO_INSTALL_LICENSE_TO_DEVICE	Click the toggle button to enable automatic installation of the license on CPE device at the end of ZTP workflow.
GWR_VSRX_IMAGE_LOCAL_FILE_PATH	<p>Enter the local path of the vSRX image that is installed on the NFX250 device. The image file is required when the gateway router VM is created. If this parameter is not set, or if the file is not present on the NFX250 device, then a vSRX image is downloaded from the CSO file server to the NFX250 device.</p> <p>Example: <code>./var/third-party/images/*vsrx*-15.1X*.qcow2</code></p>
GWR_VSRX_IMAGE_CNAME_IN_CSO	Enter the name of the vSRX image uploaded into the Image Management Service in CSO. When creating the gateway VM, if the vSRX image file is not present locally, then the image with this name is downloaded to the NFX250 device.
INTERNAL_OAM_SUBNET	Enter the IP address for the subnet that is used for internal OAM.
ADSL_VPI	<p>Enter the Virtual Path Identifier (VPI) setting to connect to the ADSL service provider through PPPoE.</p> <p>Example: 8</p>
ADSL_ENCAP	<p>Enter the encapsulation that is used to connect to the ADSL service provider through PPPoE.</p> <p>Example: <code>llcsnap-bridged-802.1q</code></p>
ADSL_VCI	<p>Enter the VCI (Virtual Channel Identifier) setting to connect to the ADSL service provider through PPPoE.</p> <p>Example: 36</p>

Table 68: Fields on the Template Settings Page (*continued*)

Name	Description
DSL_VLAN	Enter the reserved internal VLAN ID to be used as the native-vlan-id on xDSL ports to ensure that untagged control frames are processed.  Example: 4087
CLUSTER_OFFSET	Enter the cluster slot number for designated secondary node.

Table 69: Fields on the Template Settings Page for SRX4100 and SRX4200 Device Templates

Field Name	Description
<b>SSH Settings</b>	
Prevent root login via SSH?	Click the toggle button to enable root login through SSH. Root login through SSH is disabled by default.
Restrict SSH access to be from CSO only	Click the toggle button to restrict SSH access only to connections from Contrail Service Orchestration (CSO).  Default: Disabled
Max number of SSH connections allowed at any time	Enter the maximum number of concurrent SSH connections to be allowed.  Range: 1 through 250  Default: 50
Max number of SSH connections allowed per minute	Enter the maximum number of SSH connections allowed per minute.  Range: 1 through 250  Default: 50
Max number of sessions per SSH connection	Enter the maximum number of sessions per SSH connection.  Range: 1 through 65535  Default: 50

Table 69: Fields on the Template Settings Page for SRX4100 and SRX4200 Device Templates (*continued*)

Field Name	Description
<b>Policer Settings</b>	
Bandwidth limit for ICMP traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for Internet Control Message Protocol (ICMP) traffic towards the device.  Default: 1m
Burst-size limit for ICMP traffic towards the device	Enter the burst-size limit, in bytes, for ICMP traffic towards the device.  Default: 2k
Bandwidth limit for trace-route traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for traceroute traffic towards the device.  Default: 1m
Burst-size limit for trace-route traffic towards the device	Enter the burst-size limit, in bytes, for traceroute traffic towards the device.  Default: 15k
Bandwidth limit for DHCP traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for Dynamic Host Configuration Protocol (DHCP) traffic towards the device.  Default: 1m
Burst-size limit for DHCP traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for DHCP traffic towards the device.  Default: 15k
Bandwidth limit for DNS traffic towards the device	Enter the bandwidth limit, in bits per second (bps), for Domain Name System (DNS) traffic towards the device.  Default: 1m
Burst-size limit for DNS traffic towards the device	Enter the burst-size limit, in bytes, for (DNS) traffic towards the device.  Default: 15k

Table 69: Fields on the Template Settings Page for SRX4100 and SRX4200 Device Templates (*continued*)

Field Name	Description
<b>Log Rotation Settings</b>	
Max size (MB) for log files	Enter the maximum size of the log file, in megabytes (MB).  Default: 10
Max number of log files	Enter the maximum number of log files.  Default: 10
<b>Feature Level Access Settings</b>	
Allow TACACS access	Click the toggle button to enable TACACS communication. By default, TACACS communication is disabled.
Allow SNMP access	Click the toggle button to enable SNMP communication. By default, SNMP communication is disabled.
<b>Customer Parameters</b>	
AUTO_INSTALL_LICENSE_TO_DEVICE	Click the toggle button to enable automatic installation of the license file on the CPE device when the ZTP workflow ends.  Default: Disabled
AUTO_INSTALL_DEFAULT_TRUSTED_CERTS_TO_DEVICE	Click the toggle button to disable automatic installation of default trusted certificates on the CPE device when the ZTP workflow ends.  Default: Enabled
ZTP_ENABLED	Specify whether to enable ZTP for the device.
ENC_ROOT_PASSWORD	Specify the Junos OS-encrypted root password to be set on the CPE device.
ACTIVATION_CODE_ENABLED	Click the toggle button to enable the tenant to use an activation code to activate the CPE device.  Default: Disabled

Table 69: Fields on the Template Settings Page for SRX4100 and SRX4200 Device Templates (*continued*)

Field Name	Description
CLUSTER_OFFSET	Enter the cluster slot number for designated secondary node.
AUTO_DEPLOY_STAGE2_CONFIG	Click the toggle button to enable automatic deployment of stage-2 configuration when the ZTP workflow ends.  Default: Disabled
OOB_OAM_PORT	Enter the port number for out-of-band Operation, Administration, and Maintenance (OAM) traffic. This port is used in deployments where OAM and data traffic are on separate physical ports.  <b>NOTE:</b> This option is supported only on SRX Series Services Gateways.  Default: fxp0
MAX_DVPN_TUNNELS_ON_SITE	Enter the maximum number of site to site Dynamic Virtual Private Network (DVPN) tunnels that can be created at a site, exceeding which the site to site tunnels are not created any more and traffic goes through the hub.
MIN_DVPN_TUNNELS_TO_START_DEACTIVATE	Enter the minimum number of site to site DVPN tunnels that must be present at a site to start deactivating the inactive site-to-site tunnels.
WAN_PORT_NAMES	Enter the name of the physical interfaces for the ports that are used for WAN side connectivity.  WAN_0  WAN_1  WAN_2  WAN_3



Table 69: Fields on the Template Settings Page for SRX4100 and SRX4200 Device Templates (*continued*)

Field Name	Description
<b>WAN_MEMBER_PORT_NAMES</b>	<p>In case of dual-CPE devices, enter the name of the physical interfaces for the ports that are used for WAN side connectivity.</p> <p>WAN_0</p> <p>WAN_1</p> <p>WAN_2</p> <p>WAN_3</p>
<b>LAN_PORT_NAMES</b>	<p>Enter the name of the physical interfaces for the ports that are used to connect to LAN side devices.</p> <p>LAN_0— xe-0/0/0</p> <p>LAN_1— xe-0/0/1</p> <p>LAN_2— xe-0/0/2</p> <p>LAN_3— xe-0/0/3</p> <p>LAN_4— xe-0/0/4</p> <p>LAN_5— xe-0/0/5</p> <p>LAN_6— xe-0/0/6</p> <p>LAN_7— xe-0/0/7</p>
<b>LAN_MEMBER_PORT_NAMES</b>	<p>In case of dual-CPE devices, enter the name of the physical interfaces for the ports that are used to connect to LAN side switch..</p> <p>LAN_0_0— xe-0/0/2</p> <p>LAN_0_1— xe-0/0/3</p> <p>LAN_0_2— xe-0/0/4</p> <p>LAN_0_3— xe-0/0/5</p>
<b>Login Security Settings</b>	
Idle timeout (minutes)	Enter the maximum time (in minutes) that a session can be idle before the user is logged out of the system.

Table 69: Fields on the Template Settings Page for SRX4100 and SRX4200 Device Templates (*continued*)

Field Name	Description
Attempts before locking out	<p>Enter the maximum number of unsuccessful login attempts allowed before the account is locked.</p> <p>Range: 3 to 10</p>
Lockout period in minutes	<p>Enter the number of minutes an account must remain locked after the maximum number of unsuccessful login attempts.</p> <p>Range: 1 to 43,200</p>
Backoff factor in seconds	<p>Enter the length of delay (in seconds) after each failed login attempt. The length of delay increases by this value for each subsequent login attempt after the value specified in the backoff-threshold option.</p> <p>Range: 5 to 10</p>
Backoff threshold	<p>Enter the threshold for the number of failed login attempts before the user experiences a delay when attempting to reenter a password.</p> <p>Range: 1 to 3</p>
Maximum time to enter password in seconds	<p>Enter the maximum time allowed (in seconds) to enter a password to log in to the device after entering your username.</p> <p>Range: 20 to 300.</p>
Maintenance user account	<p>Enter the name of a maintenance user account to be created on the device. The maintenance user account is used by maintenance personnel for troubleshooting when required.</p>
Announcement	<p>Enter the system login announcement, which is displayed after a user successfully logs in to the device.</p>
Message	<p>Enter the system login message, which is displayed when a user logs into the device.</p>

Table 69: Fields on the Template Settings Page for SRX4100 and SRX4200 Device Templates (*continued*)

Field Name	Description
<b>RESERVED_MEMBER_PORT_NAMES</b>	<p>Enter the port names of the two 1-Gigabit Ethernet/10-Gigabit Ethernet ports,( CTL (control port) and FAB (fabric port)) to be used for synchronizing data and maintaining state information in a chassis cluster setup.</p> <ul style="list-style-type: none"> <li>• PORT_0_0— xe-0/0/6</li> <li>• PORT_0_1— xe-0/0/7</li> </ul>
<b>RESERVED_SUBNETS</b>	<p>Enter the IP address of reserved subnets that is used for System logs.</p> <ul style="list-style-type: none"> <li>• NODE_0— 10.10.12.0/24</li> <li>• NODE_1— 10.10.13.0/24</li> </ul>

## RELATED DOCUMENTATION

[About the Device Template Page](#) | 137

## Updating Stage-2 Configuration Template in a Device Template

Each device template has a set of configuration templates that can be used to deploy additional configuration on to the CPE device after it is activated. These templates are known as stage-2 configuration templates. You can add or remove stage-2 configuration templates from a device template.

**NOTE:** By default, the CPE device configuration is not supported on the CPE device. If you need the CPE device configuration, then you must configure it through stage-2 configuration in the device templates.

To add a stage-2 configuration template:

1. Select **Resources > Device Template**.

The Device Templates page appears.

2. Select a device template for which you want to add the stage-2 configuration and select **Edit Device Template > Stage-2 Config Templates**.

The Stage-2 Configuration Templates page appears. [Table 70 on page 180](#) lists the fields (and their descriptions) on the Stage-2 Configuration Templates page.

3. Click the add icon (+) and complete the configuration settings according to the guidelines provided in [Table 71 on page 181](#).

4. Click **Save**.

The new stage-2 configuration template is included in the device template.

**Table 70: Fields on the Stage-2 Configuration Templates Page**

Name	Description
Name	View the name of the stage-2 configuration template.  Example: LAN side config

Table 70: Fields on the Stage-2 Configuration Templates Page (*continued*)

Name	Description
Component Name	<p>View the name of the component through which the settings are configured. The components that are currently supported are:</p> <ul style="list-style-type: none"> <li>• JUNOS—Supported only on SRX Series Services Gateway.</li> <li>• Juniper Device Manager (JDM)—Supported on NFX250 device. JDM is a Linux container that manages software components.</li> <li>• Juniper Control Plane (JCP)—Supported on NFX250 device. JCP is the Junos VM running on the hypervisor. Administrators can use JCP to configure the network ports of the NFX250 device. JCP is used to configure the switching and routing function on the NFX250 device.</li> <li>• Gateway Router (GWR)—Supported on NFX250 device. vSRX as a gateway provides the same capabilities as Juniper Networks SRX Series Services Gateways in a virtual form factor, providing perimeter security, IPsec connectivity, and filtering for malicious traffic without sacrificing reliability, visibility, or policy control. This virtual security and routing appliance ensures reliability and high availability for each application.</li> </ul> <p>Example: JUNOS</p>
Hide	<p>Displays whether the template is hidden on Customer Portal.</p> <ul style="list-style-type: none"> <li>• true—Template is not visible on Customer Portal.</li> <li>• false—Template is visible on Customer Portal.</li> </ul> <p>Example: false</p>
Copy input from	Displays the template from which you copied the settings.
Auto Deploy	Displays whether the stage-2 configuration is automatically pushed to the device during ZTP process.
Enable for	Displays whether the stage-2 configuration template is enabled for all tenants, no tenants, or specific tenants.

Table 71: Fields on the Add New Template Page

Name	Description
Template	<p>Select the configuration template from the drop-down list. The configuration templates are designed in the Configuration Designer tool.</p> <p>Example: srx-basic-sdwan-cpe-config</p>

Table 71: Fields on the Add New Template Page (*continued*)

Name	Description
Display Name	<p>Specify the name of the template that you want to display on the configuration interface.</p> <p>Example: SDWAN Config</p>
Component Name	<p>Specify the component name through which the settings are configured. The components that are currently supported are:</p> <ul style="list-style-type: none"> <li>• JUNOS—Supported on SRX Series Services Gateway.</li> <li>• Juniper Device Manager (JDM)— Supported on NFX250 device. JDM is a Linux container that manages software components.</li> <li>• Juniper Control Plane (JCP)—Supported on NFX250 device. JCP is the Junos VM running on the hypervisor. Administrators can use JCP to configure the network ports of the NFX250 device. JCP is used to configure the switching and routing function on the NFX250 device.</li> <li>• Gateway Router (GWR)—Supported on NFX250 device. vSRX as a gateway provides the same capabilities as Juniper Networks SRX Series Services Gateways in a virtual form factor, providing perimeter security, IPsec connectivity, and filtering for malicious traffic without sacrificing reliability, visibility, or policy control. This virtual security and routing appliance ensures reliability and high availability for each application.</li> </ul> <p>Example: JUNOS</p>
Hide	<p>Specify whether you want to hide the configuration template on Customer Portal. You might want to choose to hide the template if you are reusing the template for multiple components.</p> <ul style="list-style-type: none"> <li>• hide—White dot on right with blue background.</li> <li>• show—White dot on left with gray background.</li> </ul> <p>Example: hide</p>
Copy From Template	<p>If you have chosen to hide the configuration template on the user interface, then specify the template from which you want to copy the settings.</p> <p>Example: srx-mis-lan-to-wan-config</p>
Auto Deploy	<p>Specify whether the stage-2 configuration must be automatically pushed to the device during ZTP process. The available options are</p> <ul style="list-style-type: none"> <li>• Same as global settings</li> <li>• Yes</li> <li>• No</li> </ul>

Table 71: Fields on the Add New Template Page (*continued*)

Name	Description
Enabled for	<p>You can enable the stage-2 configuration template for all tenants, specific tenants, an SP administrator or an OpCo administrator.</p> <p><b>NOTE:</b> Only users with SP administrator or OpCo administrator role can enable stage-2 configuration templates.</p> <p>The available options are:</p> <ul style="list-style-type: none"> <li>• <b>All Tenants</b>—Select this option to enable stage-2 configuration template for all tenants. Both SP and OpCo administrators can view templates for all tenants by switching the scope to the specific tenant. By default, stage-2 configuration templates assigned to all tenants are automatically applied to any new tenant.</li> <li>• <b>No Tenants</b>—Select this option to enable stage-2 configuration template for an SP administrator or an OpCo administrator. An SP administrator can modify the stage-2 configuration template. An OpCo administrator cannot modify the stage-2 configuration template. However, an OpCo administrator can clone the stage-2 configuration template and then modify the template.</li> <li>• <b>Selective Tenants</b>—Select this option to enable stage-2 configuration template for specific tenants. A tenant administrator can view and manage stage-2 template for a specific tenant.</li> </ul> <p>When you select the <b>Selective Tenants</b> option, the <b>Tenants</b> section is displayed.</p> <p>Select one or more tenants. Click the greater-than icon (&gt;) to move the selected tenant or tenants from the <b>Available</b> column to the <b>Selected</b> column. You can use the search icon on the top right of each column to search for tenant names.</p> <p>The default option is All Tenants.</p>

To remove a stage-2 configuration template:

1. Select **Resources > Device Templates**.

The Device Templates page appears.

2. Select the device template for which you want to remove the stage-2 configuration and then select **Edit Device Template > Stage-2 Config Templates**.

The Stage-2 Config Templates page appears.

3. Select a configuration template and click the delete icon (X).

A page requesting confirmation for the deletion appears.

4. Click **Yes** to confirm that you want to delete the stage-2 configuration template.

The configuration template is deleted.

## Configuring Stage-2 Initial Configuration in a Device Template

In general, the tenant administrators initiate stage-2 configuration through Customer Portal. However, in certain cases, the same stage-2 configuration needs to be deployed to CPE devices in all sites that are activated using a specific device template. In such cases, you can attach an initial configuration to a stage-2 configuration template of a device template. When a new CPE device in the site is activated using the device template, the initial configuration is automatically deployed to the CPE device.

The list of initial configurations that are supported are:

- Policies configuration
- LAN configuration
- SD-WAN configuration
- Routing configuration
- APN configuration

To update an initial configuration for stage-2 configuration template:

1. Select **Resources > Device Templates**.

The Device Templates page appears.

2. Select the device template for which you want to configure the stage-2 configuration and then select **Edit Device Template > Stage-2 Initial Config**.

The Stage-2 Initial Configuration page appears, listing the existing settings.

3. Complete the configuration settings according to the guidelines provided in [Table 72 on page 184](#), [Table 73 on page 185](#), and [Table 74 on page 185](#) and [Table 75 on page 186](#).

4. Click **Ok**.

**Table 72: Fields for the VLAN Settings on the Stage-2 Initial Configuration Page**

Field	Description
VLAN ID	Specify the identifier for the Layer 2 VLAN for the CPE device.  Example: 230



Table 72: Fields for the VLAN Settings on the Stage-2 Initial Configuration Page (*continued*)

Field	Description
IRB IP Prefix	Specify the IP address, including the subnet prefix, and the integrated routing and bridging (IRB) interface on the CPE device.  Example: 192.0.2.15/24
LAN Ports	Specify the LAN ports on the CPE device.  Example: ge-0/0/0

Table 73: Fields for the LAN Settings on the Stage-2 Initial Configuration Page

Field	Description
LAN port	Specify the LAN ports on the CPE device.  Example: ge-0/0/0
IP Address	Specify the IP address on the CPE device.  Example: 192.0.2.255

Table 74: Fields for the SRX Basic SD-WAN Settings on the Stage-2 Initial Configuration Page

Field	Description
Manage App Group	Click to manage the application groups. The application group is predefined in the system for all SRX Series and vSRX configuration settings. The settings are preloaded and displayed on the portal. You can also create new application groups.
Manage App SLA Profile	Click to manage the application service-level agreements (SLA) profiles.
Rule Name	Specify the rule name.  Example: critical-apps
Application/Groups	Specify the applications or application groups for the rule.  Example: Oracle, SAP
Application SLA Profile	Specify the application SLA profile for the rule.  Example: critical-apps

Table 75: Fields for the APN Configuration Settings on the Stage-2 Initial Configuration Page

Field	Description
Use default APN settings	<p>Click the toggle button to change the default APN settings.</p> <ul style="list-style-type: none"> <li>• Enabled—Select this option to use the default APN setting that is shipped along with the CPE device. This is the default option.</li> <li>• Disabled—Select this option to configure the APN settings.</li> </ul>
<b>APN Settings</b>	
APN Name	Enter the access point name (APN) of the gateway router.
SIM Change Required	<p>Click the toggle button to change the SIM card. You change the SIM card either to use a different LTE service provider or to use a private APN with the current LTE service provider.</p> <ul style="list-style-type: none"> <li>• Enabled—Select this option to change the APN settings and to use a new SIM card. This is the default option.</li> <li>• Disabled—Select this option to change the APN settings without changing the SIM card.</li> </ul>
Authentication Method	<p>Select the authentication method for the APN configuration.</p> <ul style="list-style-type: none"> <li>• PAP— Select to use Password Authentication Protocol (PAP) authentication. This is the default option.</li> <li>• CHAP— Select to use Challenge Handshake Authentication Protocol (CHAP) authentication.</li> <li>• None—Select to indicate that there is no authentication method.</li> </ul>
<b>Authentication Information</b>	
SIP User ID	Enter the Session Initiation Protocol (SIP) user ID for authentication.
SIP Password	Enter the SIP password for authentication.

## RELATED DOCUMENTATION

[About the Device Template Page](#) | 137

## Modifying a Device Template Description

The device template description provides a brief overview about the supported platform, tenant, site, deployment model, and additional features supported through the template.

To modify the description of the device template:

1. Select the device template that you want to modify, and click the edit icon.

The Edit Device template page appears.

2. Enter a meaningful description for the device template. For example: NFX250 deployed as a CPE device with SD-WAN capability.

3. Click **Ok** to save the changes.

The description that you updated is listed in the device template table.

### RELATED DOCUMENTATION

[About the Device Template Page](#) | 137

## Deleting a Device Template

Before deleting a device template, ensure that the template is not associated with any tenant site or a CPE device.

To delete a device template file:

1. Select **Resources > Device Templates**.

The Device Template page appears.

2. Select the device template that you want to delete and click **Delete**.

A page requesting confirmation for the deletion appears.

3. Click **Yes** to confirm that you want to delete the device template.

The device template is deleted.

## RELATED DOCUMENTATION

[About the Device Template Page](#) | 137

## APN Overview

The access point name (APN) is the name of the gateway between a service provider's network and the Internet. The APN connects the CPE device to the Packet Data Network (PDN) such as Internet through the Packet Data Network Gateway (P-GW). A CPE device can access multiple APNs, which consists of domain names and its associated parameters. All CPE devices are shipped with default APN settings.

In the Long Term Evolution (LTE) architecture for the Evolved Packet Core (EPC), the APN determines the P-GW that the CPE device must use. The APN also defines the tunnel connecting the CPE device to a PDN such as the Internet. Each PDN that the user has subscribed to has an APN and an associated P-GW, often called a "PDN subscription context." An example for a context is the default APN, connecting to a PDN such as the Internet unless the user activates another APN.

The CPE device is shipped to the tenant site with the default APN settings. The APN is applicable for sites with an LTE WAN link. CSO supports LTE WAN link on NFX250 and NFX150 CPE devices only.

On NFX250 device, the LTE WAN link is supported through an USB dongle. The USB dongle is plugged into the USB port of the CPE device. The LTE-VM that is pre-installed on the NFX250 device has thousands of APN settings to enable the LTE modem to work with several service providers all over the world. The NFX150 device is also pre-configured with default APN settings.

In both the devices, the initial LTE connection is established with default APN settings. As long as an LTE connection is established with the default APN settings, the LTE WAN link is used to reach CSO and complete the device activation process. Once the CPE device is activated at the tenant site, the tenant can choose to change the SIM card on the device to use a different LTE service provider. This requires new APN settings to be applied to the CPE device. Also in some cases the APN settings may need to be changed even when there is no SIM change required; this is to choose a private APN with the current LTE service provider. The SP administrator, tenant administrator or an OpCo administrator can change the APN settings for specific tenant by logging into the Administration Portal.

**NOTE:** The LTE WAN links on NFX250 devices works only with the Vodafone K5160 dongle.

## Benefits of APN Configuration

When CPE devices are shipped to different regions around the world, APN configuration feature allows the administrators to change the default APN settings to support local network as opposed to remote network and consequently avoid the roaming charges.

### RELATED DOCUMENTATION

| [Configuring Stage-2 Initial Configuration in a Device Template](#) | 184

# Managing Software Images

## IN THIS CHAPTER

- [Device Images Overview | 190](#)
- [About the Device Images Page | 191](#)
- [Staging an Image | 193](#)
- [Deploying Device Images to Devices | 195](#)
- [Uploading a Device Image | 197](#)
- [Deleting Device Images | 199](#)

## Device Images Overview

An image management system provides full lifecycle management of images for all network devices, including CPE device and virtualized network function (VNF) images. A *device image* is a software installation package for the CPE device or an image for a virtual application that runs on the device. For example, for a NFX Series device platform, you require an NFX software image and a software image for the vSRX application that provides security functions and routing on the device. You install a VNF image on a CPE device or on a server in a service provider's cloud to deploy the VNF in that location.

Administration Portal enables you to upload both CPE device and VNF images from your local file system and deploy them on a single device or simultaneously on multiple devices of the same family. CPE device images include software images for the NFX Series, MX Series, and SRX Series. You can download software images from [Junos Platforms - Download Software](#).

After you upload a CPE device or VNF image, you can stage the image on a device, verify the checksum, and deploy the staged image using the **Deploy** option from the Images page. You can also schedule the staging, deployment, and validation of a device image. In addition, you can modify the platforms supported by the device image and the description of the device image.

You can store all the images in a central repository and use a file service to retrieve images from the file server when the image needs to be deployed to the devices.

## RELATED DOCUMENTATION

## About the Device Images Page

To access this page, click **Resources > Images**.

You can use the Images page to view uploaded device images for physical and virtual devices and to upload device images from the local file system. From the Images page, you can stage, deploy, or stage and deploy an image onto a single device or simultaneously onto multiple devices of the same family. For more information, see [“Device Images Overview” on page 190](#).

### Tasks You Can Perform

You can perform the following tasks from this page:

- Upload device images. See [“Uploading a Device Image” on page 197](#).
- Stage device images. See [“Staging an Image” on page 193](#)
- Deploy device images. See [“Deploying Device Images to Devices” on page 195](#).
- View details about a device image. Click the details icon that appears when you hover over the name of an image or click **More > Details**. See [“Viewing Object Details” on page 16](#).
- Show or hide columns that contain information about the device image. See [“Sorting Objects” on page 17](#).
- Search an object for a device image. See [“Searching for Text in an Object Data Table” on page 16](#).
- View the history of image upgrade. Click **Image Upgrade History > Upgrade History** at the top right corner of a page. See [Table 77 on page 192](#).

### Field Descriptions

[Table 76 on page 191](#) shows the fields on the Device Images page.

Table 76: Fields on the Images Page

Field	Description
Image Name	Displays the name of the device image.  Example: juniper_srx_v1.tgz
Type	Displays the type of the device image.  Example: VNF Image

Table 76: Fields on the Images Page (*continued*)

Field	Description
Version	Displays the version number of the device image.  Example: 1.1
Vendor	Displays the vendor name of the device.  Example: Juniper
Size	Displays the size of the device image.  Example: 14 KB

Table 77 on page 192 shows fields on the Upgrade History page.

Table 77: Fields on the Upgrade History Page

Field	Description
In progress	Displays the number of image upgrade tasks that are in progress.
Success	Displays the number of image upgrade tasks that are successful.
Failure	Displays the number of image upgrade tasks that have failed.
Name	Displays the name of the task.
Start Date	Displays the start date and time of the task.
End Date	Displays the end date and time of the task.
Status	Displays the status of the task to know whether the task succeeded or failed.
Log	Displays the import logs. Click a log to access more detailed information about the upgrade images.

## RELATED DOCUMENTATION

[Uploading a Device Image | 197](#)

[Deploying Device Images to Devices | 195](#)



# Staging an Image

From the **Resource > Images** page, you can select an image and click the **Stage** button to stage the image onto one or more physical or virtual devices or Virtual Network Functions (VNF). You can stage an image onto a single device or multiple devices on a per-site basis or across all sites of a tenant.

From the **Stage Image: Select Devices** page, you can choose to stage an image, and also to either run the staging immediately or at a scheduled time.

The **Stage** option is especially useful if you are using a low-bandwidth connection. On low-bandwidth connections, manually staging an image prior to deploying the image helps prevent the image deployment from timing out because of a slow connection. On high-bandwidth connections, you can choose to stage the image along with the image deployment.

To deploy a device image onto devices:

1. Select **Resource > Images**.

The **Images** page appears.

2. Select the device image to be staged on the device and click the **Stage** button.

The **Stage Image: Select Devices** page appears and a list of compatible devices (CPE and VNF) for the selected image is retrieved and displayed with their associated information in the page. See [Table 78 on page 193](#) for the details of the device.

**NOTE:** The **Deploy** button is enabled only for device images.

3. Select one or more devices onto which the device image needs to be staged and schedule a date and time for image staging.

**Table 78: Fields on the Deploy Image: Select Devices Page**

Field	Description
Device Name	Displays the name of the device configured in the point of presence (POP) or site.  Example: sunny-NFX-250
Tenant	Displays the name of the tenant.  Example: tenant-blue

Table 78: Fields on the Deploy Image: Select Devices Page (continued)

Field	Description
Site Name	Displays the name of the tenant site.  Example: site-blue-white
Location	Displays the name of the location.  Example: San Jose, CA
WAN Links	Displays the number of WAN links.  Example: 3
POP Name	Displays the name of the POP.  Example: pop_blue
Management Status	Displays the management status of the devices deployed in the cloud. <ul style="list-style-type: none"> <li>• EXPECTED—Regional server has activation details for the device, but the device has not yet established a connection with the server.</li> <li>• ACTIVE—Device has downloaded images, but is not yet configured.</li> <li>• PROVISIONED—IPsec tunnel on the NFX250, SRX, or vSRX device is operational.</li> <li>• PROVISION_FAILED—Device failed if the vSRX was not instantiated properly.</li> </ul>
Model	Displays the name of the device model.  Example: NFX250
Active Services	Displays the number of services that are activated for the device.  Example: 3
Stage Expiry Time	Specify the maximum number of seconds CSO must wait for an image staging to be complete. If staging is not complete in the specified time, the operation times out. You can use this setting to configure a longer timeout for image staging over low-bandwidth connections. The default is 7200 seconds.
<b>Choose Staging Time</b>	
Run now	Select this option if you want to stage the image onto the device immediately.
Schedule at a later time	Select this option to schedule the image staging for a later date and time, and specify the date and time when you want the image to be staged.

RELATED DOCUMENTATION

About the Device Images Page   191
Deploying Device Images to Devices   195

## Deploying Device Images to Devices

From the **Resource > Images** page, you can select an image and click the **Deploy** button to deploy the image onto one or more physical or virtual devices or Virtual Network Functions (VNF). You can deploy an image onto a single device or multiple devices on a per-site basis or across all sites of a tenant.

From the **Deploy Image: Select Devices** page, you can choose to stage an image and deploy it, and also to either run the deploy immediately or at a scheduled time.

To deploy a device image onto devices:

1. Select **Resource > Images**.

The **Images** page appears.

2. Select the device image to be deployed on the device and click the **Deploy** button.

The **Deploy Image: Select Devices** page appears and a list of compatible devices (CPE and VNF) for the selected image is retrieved and displayed with their associated information in the page. See [Table 78 on page 193](#) for the details of the device.

**NOTE:** The **Deploy** button is enabled only for device images.

3. Select one or more devices onto which the device image needs to be deployed and schedule a date and time for image deployment.

Table 79: Fields on the Deploy Image: Select Devices Page

Field	Description
Device Name	Displays the name of the device configured in the point of presence (POP) or site.  Example: sunny-NFX-250
Tenant	Displays the name of the tenant.  Example: tenant-blue

Table 79: Fields on the Deploy Image: Select Devices Page (*continued*)

Field	Description
Site Name	Displays the name of the tenant site.  Example: site-blue-white
Location	Displays the name of the location.  Example: San Jose, CA
WAN Links	Displays the number of WAN links.  Example: 3
POP Name	Displays the name of the POP.  Example: pop_blue
Management Status	Displays the management status of the devices deployed in the cloud. <ul style="list-style-type: none"> <li>● EXPECTED—Regional server has activation details for the device, but the device has not yet established a connection with the server.</li> <li>● ACTIVE—Device has downloaded images, but is not yet configured.</li> <li>● PROVISIONED—IPsec tunnel on the NFX250, SRX, or vSRX device is operational.</li> <li>● PROVISION_FAILED—Device failed if the vSRX was not instantiated properly.</li> </ul>
Model	Displays the name of the device model.  Example: NFX250
Active Services	Displays the number of services that are activated for the device.  Example: 3
Stage Image	Indicates whether the Stage Image option is enabled or not. The <b>Stage Image</b> option is enabled by default and ensures that the image is staged to the device before image deployment is attempted. Click the toggle button to disable staging of the image onto the device.  <b>NOTE:</b> We recommend that on low-bandwidth connections you disable the <b>Stage Image</b> option to prevent the deploy from timing out because of the delay in staging the image. On such connections, use the <b>Stage</b> option on the <b>Images</b> page to manually stage the image before you deploy the image.  If you disable the <b>Stage Image</b> option without manually staging the image onto the device, the deploy operation fails.

Table 79: Fields on the Deploy Image: Select Devices Page (*continued*)

Field	Description
Stage Expiry Time	Specify the maximum number of seconds CSO must wait for an image staging to be complete. If staging is not complete in the specified time, the operation times out. You can use this setting to configure a longer timeout for image staging over low-bandwidth connections. The default is 7200 seconds.
<b>Choose Deployment Type</b>	
Run now	Select this option if you want to deploy the image to the device immediately.
Schedule at a later time	Select this option to schedule the image deployment for a later date and time, and specify the date and time when you want the image to be deployed.

## RELATED DOCUMENTATION

[About the Device Images Page | 191](#)
[Staging an Image | 193](#)

## Uploading a Device Image

On the Images page, you can upload image files for CPE and VNF devices that you use in a distributed, centralized, or combined deployment from the Images page. You can also add some metadata about the device image file that you upload to the device.

**NOTE:** The image being uploaded must use the same image name as the published image. Image upgrade might fail if the image name and details are changed.

To upload a device image for the device:

1. Click **Resources > Images**.

The Images page appears.

2. Click the add icon (+).

The Upload Image page appears.

3. Enter the required details in the fields on the Upload Image page. See the field descriptions in [Table 80 on page 198](#).
4. Click **Upload**. If you want to discard the upload device image process, click **Abort** instead.  
 : The Upload Image page displays the progress of the image upload.
5. Click **OK** to save the changes.  
 You are returned to the Images page.

**Table 80: Fields on the Upload Device Image Page**

Field	Description
Name	<p>Specify the filename for the device image that you are uploading.</p> <p>Example: juniper_nfx_250_v1_img.tgz</p> <p>You must use the following filename format for device images of VNFs as listed below:</p> <ul style="list-style-type: none"> <li>• Riverbed—<b>riverbed-img</b></li> <li>• vSRX—<b>vsrx-vm disk-15.1.qcow2</b></li> <li>• NFX—<b>juniper_nfx_1.5_img.tgz</b></li> </ul>
Image Type	<p>Specify the type of device image.</p> <ul style="list-style-type: none"> <li>• <b>Device Image</b>—Software image for the physical device (CPE).</li> <li>• <b>VNF Image</b>—Software image for the virtual device (VNF).</li> <li>• <b>VNF Script</b>—Provision script for the VNF image.</li> <li>• <b>EMS Plugin Package</b>—EMS plugin package to support a new device family.</li> <li>• <b>Device Extension Package</b>—Extension software package that can be installed on the device.</li> <li>• <b>Boot Config Image</b>—Boot configuration ISO image that can be used to boot up the VNF or virtual device.</li> <li>• <b>Telemetry Agent Package</b>—Installable package containing telemetry agent to run on a device. For example, NFX.</li> </ul> <p>Yes</p> <ul style="list-style-type: none"> <li>• <b>VNFM Plugin Package</b>—Installable package containing VNF Manager (VNFM) plugin specific to a certain set of VNFs.</li> </ul>
Description	Enter a description of the device image.

Table 80: Fields on the Upload Device Image Page (*continued*)

Field	Description
File Location	Click <b>Browse</b> to navigate to the file location in your local system and select an image file to upload.
Vendor	Specify the vendor name of the device.  Example: Juniper Networks.
Family	Specify the name of the device family.  Example: NFX
Supported Platform	Specify the platform supported by the device image.  Example: NFX250
Major Version Number	Specify the major version of the device image.  Example: 12
Minor Version Number	Specify the minor version of the device image.  Example: 1
Build Number	Specify the build name of the device image.  Example: X53-D102.2

## RELATED DOCUMENTATION

[Device Images Overview](#) | 190

[About the Device Images Page](#) | 191

## Deleting Device Images

You can delete one or more device images from the Images page.

To delete a device image:

1. Select **Resources > Images**.

The Images page appears with a list of device images.

2. Select the device image that you want to delete and then click the X icon.

The Confirm Delete page appears.

3. Click **Yes** to confirm.

The device image is deleted.

#### RELATED DOCUMENTATION

| [About the Device Images Page](#) | **191**



# Configuring Network Services in a Centralized Deployment

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## Network Services Overview

A *network service* is a final product offered to end users with a full description of its functionality and specified performance.

Administrative users deploy network services between two locations in a virtual network, so that traffic traveling in a specific direction on that link is subject to action from that service. The term *network service* is defined in the ETSI Network Functions Virtualization (NFV) standard.

A network service consists of a *service chain* of one or more linked network functions, which are provided by specific virtualized network functions (VNFs), with a defined direction for traffic flow and defined ingress and egress points. The term *service chain* refers to the structure of a network service, and although

not defined in the ETSI NFV standard, this term is regularly used in NFV and software-defined networking (SDN).

A network service designer creates network services in Network Service Designer. When the designer publishes the service to the network service catalog from Network Service Designer, administrators can see the network service in Administration Portal.

## RELATED DOCUMENTATION

[About the Network Services Page](#) | 202

## About the Network Services Page

To access this page, click **Configuration > Network Services**.

You can use the Services page to view the complete list of network services that service designers have published to the network service catalog from Network Service Designer and to view information about the services. For an introduction to network services, see [“Network Services Overview” on page 201](#).

### Tasks You Can Perform

You can perform the following tasks from this page:

- Quickly view important data about services and about instances of those services deployed at customers' sites in the widgets that appear at the top of the page. See [Table 81 on page 203](#).
- Assign a service to one or more tenants. See [“Allocating a Service to Tenants” on page 209](#).
- Remove a service from one or more tenants. See [“Removing a Service from Tenants” on page 209](#).
- View full information about a service and about instances of a service at customer sites. Click the name of a service in the list. See [“About the Service Instances Page” on page 206](#).

### Field Descriptions

[Table 81 on page 203](#) shows the descriptions of the widgets that appear at the top of the Services page.

**Table 81: Widgets on the Services Page**

Widget	Description
Top Network Services Used	<p>View the numbers of instances of the three services that are most used by tenants in the network.</p> <p>This view might help you to identify trends for network services, especially when you introduce a new service.</p>
Services with Critical Alerts	View the top three network services that are receiving maximum number of critical alerts in the network.
Top Services by POP CPU Usage	View the top three network services that are using the largest percentage of CPU from the assigned cores in the network.

[Table 82 on page 203](#) shows the descriptions of the fields on the Network Services page.

**Table 82: Fields on the Services Page**

Field	Description
Name	<p>View the name of the network service.</p> <p>Click the name to view full information about a service.</p>
Tenants	<p>View the number of tenants and the names of the tenants that have access to this nnetwork service.</p> <ul style="list-style-type: none"> <li>• View the name of the first tenant that used the network service (left of the table cell).</li> <li>• View the additional number of tenants using this network service (right of the table cell).</li> <li>• Hover over the additional number of tenants to view a complete list of all the tenants using this network service.</li> </ul>
Sites	View the total number of sites at which the network service is deployed for the tenant.
Instances	View the total number of occurrences of the network service that administrative users have activated for the tenant.
Last Update	View the date on which the network service designer last modified the service.

[Table 83 on page 204](#) shows the descriptions of the fields on the Detail for *Service-Name* page.

Table 83: Fields on the Service Detail Page

Field	Description
<i>General Information</i>	
Type	View the category of service.
Configuration	View the settings that the network service designer or you have configured for this service.
Version	View the version number of the network service.
State	View the status of the network service.  Example: Published
Performance Goals	View performance of the network service which include bandwidth, number of sessions, and latency.

## RELATED DOCUMENTATION

[Network Services Overview | 201](#)

[About the Service Overview Page | 204](#)

[About the Service Instances Page | 206](#)

[Allocating a Service to Tenants | 209](#)

[Removing a Service from Tenants | 209](#)

[Viewing Object Details | 16](#)

## About the Service Overview Page

To access this page, click **Configuration > Network Services > Service Name > Overview**.

You can use the Service Overview page to view information about a service that the service designer has published to the network service catalog from Network Service Designer.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View administrative details about the service. See *General Information* in [Table 84 on page 205](#).
- View resources required for the service and its performance specification. See *Service Requirements* and *Service Performance* in [Table 84 on page 205](#).
- View the service chain, with its constituent VNFs. See *Service Configuration* in [Table 84 on page 205](#).

## Field Descriptions

[Table 84 on page 205](#) provides guidelines on using the fields on the Service Overview page.

**Table 84: Fields on the Service Overview Page**

Field	Description
<i>General Information</i>	
Description	View a summary about the service's capabilities.  The network service designer provides this summary.
State	View the state of the network service: <ul style="list-style-type: none"> <li>• Discontinued—Service is no longer available for customers.</li> <li>• Published—Service designer has published service to network catalog, and it is available for customers.</li> </ul>
Tenants	View the number of tenants using this service.
<i>Service Requirements</i>	
CPU	View the number of CPUs that the service needs (cores).
Memory	View the amount of RAM that the service needs in gigabytes (GB).
<i>Service Performance</i>	
Sessions	View the number of sessions concurrently supported by one instance of the service.
Bandwidth	View the data rate for the service in megabytes per second (Mbps) or gigabytes per second (Gbps).
Latency	View the time a packet takes to traverse the service in milliseconds (ms) or nanoseconds (ns).
License cost	Specify the license cost for the network service in USD.

Table 84: Fields on the Service Overview Page (continued)

Field	Description
<i>Service Configuration (graphic of the service chain)</i>	
I	View the ingress point—the point at which packets enter the service.
E	View the egress point—the point at which packets exit the service.
One or more VNFs	<p>Click to view settings for the VNF. See “<a href="#">vSRX VNF Configuration Settings</a>” on page 211.</p> <p>The service designer can configure the VNF settings in Network Service Designer and the administrative user can configure the VNF settings in Customer Portal.</p> <p><b>BEST PRACTICE:</b> The network service designer configures settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and the administrative user configures settings for the service, such as policies. The service designer can also configure a few example settings for the service. These example settings should be generic and not network-specific.</p>

RELATED DOCUMENTATION

<a href="#">About the Network Services Page   202</a>
<a href="#">vSRX VNF Configuration Settings   211</a>
<a href="#">LxCIPtable VNF Configuration Settings   220</a>
<a href="#">Cisco CSR-1000v VNF Configuration Settings   223</a>

About the Service Instances Page

To access this page, click **Configuration > Network Services > Service Name > Instances**

You can use the Service Instances page to view information about occurrences of the service at specific customer sites.

Tasks You Can Perform

You can perform the following tasks from this page:

- View details about a service instance. Click the details icon that appears when you hover over the name of a service. See [Table 86 on page 207](#).

- Enable or disable a network service or virtualized network function (VNF) recovery. Select a service instance and click **Enable Auto Healing** to enable automatic recovery of a network service or VNF in a centralized deployment. By default, automatic recovery of a network service or VNFs is enabled. See [“Configuring VNF Properties” on page 208](#).

## Field Descriptions

[Table 85 on page 207](#) shows the descriptions of the fields on the Service Instances page.

**Table 85: Fields on the Service Instances Page**

Field	Description
Name	View the name of the occurrence of a service at a specific tenant site.
Tenant	View the name of the tenant.
Status	View the state of the service at the customer site: <ul style="list-style-type: none"> <li>• Created—Administrative user for the tenant has enabled this service instance, which is active.</li> <li>• Blank—Administrative user for the tenant has disabled this service instance.</li> </ul>
Site	View the name of the site at which service occurrence is available.
POP	View the POP in which the site is located.
Functions	View network functions that the service offers; for example, Network Address Translation (NAT) or firewall.

[Table 86 on page 207](#) shows the descriptions of the fields on the Detail for *Service-Instance-Name* page.

**Table 86: Fields on the Service Instance Details Page**

Field	Description
<i>General</i>	
Description	View information about this service instance.  This information is generated from data in Customer Portal.

## RELATED DOCUMENTATION

## Configuring VNF Properties

You can specify whether to enable automatic recovery of a network service or virtualized network function (VNF) for a network service instance in a centralized deployment. Enabling automatic recovery of a network service or VNF improves reliability of the implementation.

Conversely, disabling automatic recovery of a network service or VNF allows you to quickly investigate a problem with a network service or VNF itself.

To enable or disable automatic recovery of a network service or VNF:

1. Select **Configuration > Network Services > Services Name > Instances**.

The Services Instances page appears.

2. Select a service instance for which you want to enable or disable automatic recovery.

3. Click **Enable Auto Healing**.

The Service Properties page appears.

4. Select whether you want to enable or disable automatic recovery.

**NOTE:** By default, automatic recovery of a network service or VNF is enabled.

5. Click **Save**.

### RELATED DOCUMENTATION



## Allocating a Service to Tenants

For a tenant to have access to a service, you must assign the service to the tenant. You can assign a service to multiple tenants simultaneously; however, you can assign only one service at a time.

To assign a service to tenants:

1. Select **Configuration > Network Services**.

The Network Services page appears.

2. Select the service that you want to assign to the tenants.

3. Click **Allocate Services**.

The Tenants: Select Tenant(s) to allocate the Service page appears.

4. Select the tenants to which you want to assign the service.

5. Click **OK** to save the changes.

### RELATED DOCUMENTATION

[About the Network Services Page | 202](#)

[Removing a Service from Tenants | 209](#)

## Removing a Service from Tenants

You can remove a service from one or more tenants simultaneously. You can only remove one service at a time, however.

To remove a service from tenants:

1. Click **Configuration > Network Services**.

The Network Services page appears.

2. Select the service that you want to remove from the tenants.

3. Click **Detach Services**.

The Detach Service from Tenants page appears.

4. Select the tenants from which you want to remove the service.
5. Click **Ok**.

## RELATED DOCUMENTATION

[About the Network Services Page | 202](#)

[Allocating a Service to Tenants | 209](#)

## Viewing a Service Configuration

The following personnel can configure network services.

- The network service designer can configure a service in Network Service Designer.
- The administrative user for the tenant can configure a service in Customer Portal.

Settings that the administrative user configures override any settings that the network service designer or administrator configure.

**BEST PRACTICE:** The network service designer configures settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and the administrative user configures settings for the service, such as policies. The service designer can also configure a few example settings for the service. These example settings should be generic and not network-specific.

To configure a service:

1. Select **Configuration > Network Services > Service Name > Overview**.

The Services Overview page for the service that you selected appears.

2. In the service chain graphic, click the first VNF.

The Service page appears.

3. Click each tab to review the settings.

The Base Configure tab shows the settings for the virtual machine (VM) that contains the VNF, and the other tabs show the settings for specific functions in the VNF.

Refer to the related topics for the specific VNF settings for details on the configuration settings.

4. (Optional) Click the next VNF in the service chain graphic to view settings for that VNF.
5. Click **Ok**.

## RELATED DOCUMENTATION

[vSRX VNF Configuration Settings | 211](#)

[LxCIPtable VNF Configuration Settings | 220](#)

[Cisco CSR-1000v VNF Configuration Settings | 223](#)

## vSRX VNF Configuration Settings

You can configure the vSRX VNF from **Configuration > Network Services > Service Name > Overview > Service Configuration**. Your service provider usually configures base settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and you configure settings for the service, such as policies.

**NOTE:** A vSRX firewall virtualized network function (VNF) is always part of a service chain for a network service on a CPE device.

**NOTE:** vSRX is the GWR for an on-premise CPE device.

Use the information in the following tables to provide values for the available settings:

- [Table 87 on page 212](#) shows the settings you can configure for the virtual machine (VM) that contains the VNF.

**NOTE:** Your service provider usually configures the base settings and you should not need to change them.

- [Table 88 on page 213](#) shows the firewall settings you can configure.
- [Table 89 on page 216](#) shows the network address translation (NAT) settings you can configure.
- [Table 90 on page 217](#) shows the unified threat management (UTM) settings you can configure.

Table 87: Fields for the vSRX Base Settings

Field	Description
Host Name	<p>For a cloud site, specify the hostname of the VM that contains the vSRX VNF. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: vm-vsrx</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
Loopback Address	<p>Specify an IPv4 loopback address for the management interface of the VM.</p> <p>Example: 192.0.2.25</p>
DNS Servers	<p>Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers.</p> <p>Example: 192.0.2.35</p>
NTP Servers	<p>Specify the FQDNs or IP addresses of one or more NTP servers.</p> <p>Example: 192.0.2.45</p>
Syslog Servers	<p>Specify the FQDNs or IP addresses of one or more system log servers.</p> <p>Example: 192.0.2.55</p>
Enable Re-filter	<p>Select <b>True</b> to enable a stateless firewall filter that protects the Routing Engine from denial-of-service (DoS) attacks or <b>False</b> to allow DoS attacks.</p> <p>Example: True</p>
Enable Default Screens	<p>For a cloud site, select <b>True</b> to enable the default screens security profile for the destination zone or <b>False</b> to disable default screening.</p> <p>Example: False</p> <p>You cannot configure this setting for an on-premise site.</p>
Time Zone	<p>Specify the time zone for the VM.</p> <p>Example: UTC</p>

Table 87: Fields for the vSRX Base Settings (*continued*)

Field	Description
Right Interface	<p>Specify the identifier of the VM interface that transmits data.</p> <p>Example: ge-0/0/1</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
Left Interface	<p>Specify the identifier of the VM interface that receives data.</p> <p>Example: ge-0/0/0</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
SNMP Prefix List	<p>If you set the Enable Re-filter field to <b>True</b>, specify the routes that the Junos Space Virtual Appliance uses for SNMP operations when it discovers the vSRX VNF.</p> <p>Example: 10.0.2.0/24</p>
Ping Prefix List	<p>If you set the Enable Re-filter field to <b>True</b>, specify the routes that the Junos Space Virtual Appliance uses for ping operations when it discovers the vSRX VNF.</p> <p>Example: 10.0.2.1/24</p>
Space Servers	<p>If you set the Enable Re-filter field to <b>True</b>, specify the IP addresses of the VMs that contain the Junos Space Virtual Appliances.</p> <p>Example: 10.0.2.50</p>

Table 88: Fields for the vSRX Firewall Settings

Field	Description
Policy Name	<p>Specify the name of the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: policy-1</p>

Table 88: Fields for the vSRX Firewall Settings (*continued*)

Field	Description
Source Zone	<p>Select the security zone from which packets originate.</p> <ul style="list-style-type: none"> <li>• <b>left</b>—Interface that transmits data to the host</li> <li>• <b>right</b>—Interface that receives data transmitted from the host</li> </ul> <p>Zone policies are applied to traffic traveling from one security zone (source zone) to another security zone (destination zone). This combination of a source zone and a destination zone is called a <i>context</i>.</p> <p>Example: left</p>
Destination Zone	<p>Select the security zone to which packets are delivered.</p> <ul style="list-style-type: none"> <li>• <b>left</b>—Interface that transmits data to the host</li> <li>• <b>right</b>—Interface that receives data transmitted from the host</li> </ul> <p>Zone policies are applied to traffic traveling from one security zone (source zone) to another security zone (destination zone). This combination of a source zone and a destination zone is called a <i>context</i>.</p> <p>Example: right</p>
Source Address	<p>Specify the source IP address prefixes that the network service uses as match criteria for incoming traffic.</p> <p>To add source addresses:</p> <ol style="list-style-type: none"> <li>1. Click the <b>Source Address</b> column. The source-address page appears.</li> <li>2. Select <b>any</b> to match any source IP address of packets or <b>ipp</b> to match a specific prefix in the source IP address for which the application enforces the policy.</li> <li>3. If you select <b>ipp</b>, specify a prefix.</li> <li>4. Click <b>OK</b>.</li> </ol> <p>Example: 10.0.2.30</p>

Table 88: Fields for the vSRX Firewall Settings (continued)

Field	Description
Destination Address	<p>Specify the destination IP address prefixes that the network service uses as match criteria for outgoing traffic.</p> <p>To add a destination address:</p> <ol style="list-style-type: none"><li>1. Click the <b>Destination Address</b> column. The destination-address page appears.</li><li>2. Select <b>any</b> to match any source IP address of packets or <b>ipp</b> to match a specific prefix in the source IP address for which the application enforces the policy.</li><li>3. If you select <b>ipp</b>, specify a prefix.</li><li>4. Click <b>OK</b>.</li></ol> <p>Example: 192.0.2.0/24</p>
Action	<p>Select <b>permit</b> to transmit packets that match the rule or <b>deny</b> to drop packets that match the rule.</p> <p>Example: permit</p>

Table 88: Fields for the vSRX Firewall Settings (*continued*)

Field	Description
Application	<p>Specify the applications to which the policy applies. The applications are based on protocols and ports.</p> <p>To specify applications:</p> <ol style="list-style-type: none"> <li>1. Click the <b>Application</b> column. The application page appears.</li> <li>2. In the allowed_apps field, select <b>any</b> to match any application or <b>app</b> to choose specific applications. If you select <b>app</b>, press and hold the Ctrl key and click the required applications from the drop-down list. <ul style="list-style-type: none"> <li>• junos-tcp-any</li> <li>• junos-udp-any</li> <li>• junos-ftp</li> <li>• junos-http</li> <li>• junos-https</li> <li>• junos-icmp-all</li> <li>• junos-icmp-ping</li> <li>• junos-telnet</li> <li>• junos-tftp</li> </ul> </li> <li>3. Click <b>OK</b>.</li> </ol> <p>Example:</p> <ul style="list-style-type: none"> <li>• junos-tcp-any</li> <li>• junos-udp-any</li> </ul>

Table 89: Fields for the vSRX NAT Settings

Field	Guidelines
NAT Source Name	<p>Specify the source IP address of packets that the policy rules match.</p> <p>Example: 10.0.2.2/24</p>
NAT Destination Name	<p>Specify the destination IP address of packets that the policy rules match.</p> <p>Example: 10.0.2.3/24</p>



Table 89: Fields for the vSRX NAT Settings (*continued*)

Field	Guidelines
NAT policy settings—For information about the following policy settings, see the firewall policy settings in Table 2.	
<ul style="list-style-type: none"> <li>• Policy Name</li> <li>• Source Zone</li> <li>• Destination Zone</li> <li>• Source Address</li> <li>• Destination Address</li> <li>• Action</li> <li>• Application</li> </ul>	

Table 90: Fields for the vSRX UTM Settings

Field	Description
<b>Antivirus</b>	<p>Select <b>True</b> to check for viruses in application layer traffic against a virus signature database. Select <b>False</b> to disable checking for viruses.</p> <p>Example: True</p>
<b>Antispam</b>	<p>Select <b>True</b> to block spam e-mails or <b>False</b> to allow spam e-mails.</p> <p>Example: True</p>
<b>Antispam Black List</b>	<p>Specify an address blocklist for local spam filtering.</p> <p>Blocklists contain e-mail addresses from which you do not want to receive messages.</p> <p><b>NOTE:</b> When both the allowlist and blocklist are in use, the allowlist is checked first. If there is no match, then the blocklist is checked.</p> <p>Example: john@example.net</p>
<b>Antispam White List</b>	<p>Specify an address allowlist for local spam filtering.</p> <p>Allowlists contain e-mail addresses from which you want to receive messages.</p> <p><b>NOTE:</b> When both the allowlist and blocklist are in use, the allowlist is checked first. If there is no match, then the blocklist is checked.</p> <p>Example: user@example.net</p>

Table 90: Fields for the vSRX UTM Settings (*continued*)

Field	Description
<b>Antispam Action</b>	<p>Select the antispam action that you want the device to take when it detects spam:</p> <ul style="list-style-type: none"> <li>• <b>block</b>—Blocks the message</li> <li>• <b>tag-subject</b>—Tags the subject field with a preprogrammed string</li> <li>• <b>tag-header</b>—Tags the message header with a preprogrammed string</li> </ul> <p>Example: block</p>
<b>Content Filter</b>	<p>Select <b>True</b> to block different types of traffic based on the MIME type, file extension, protocol command, and embedded object type or <b>False</b> to permit these types of traffic.</p> <p>Example: True</p>
<b>Content Filter Extensions</b>	<p>Specify one or more file extensions to block over HTTP, FTP, SMTP, IMAP, and POP3 connections.</p> <p>Example: exe, pdf, js</p>
<b>Content Filter Mime</b>	<p>Specify the MIME types to be blocked or permitted over HTTP, FTP, SMTP, IMAP, and POP3 connections.</p> <p>Example: application, exe</p>
<b>Content Filter Protocol Commands</b>	<p>Specify commands for HTTP, FTP, SMTP, IMAP, and POP3 protocols to block traffic based on these commands.</p> <p>Example: put, mput</p>
<b>Content Filter Content Type</b>	<p>Press and hold the Ctrl key and click one or more of the following types of content to specify filtering of traffic that is supported only for HTTP and is not covered by file extensions or MIME types:</p> <ul style="list-style-type: none"> <li>• Active X</li> <li>• Windows executable files (.exe)</li> <li>• HTTP cookie</li> <li>• Java applet</li> <li>• Zip files</li> </ul> <p>Example: activex, exe</p>

Table 90: Fields for the vSRX UTM Settings (*continued*)

Field	Description
<b>Content Filter Apply To</b>	<p>Press and hold the Ctrl key and click one or more of the following protocols in the drop-down list to specify filtering of traffic associated with these protocols:</p> <ul style="list-style-type: none"> <li>• HTTP</li> <li>• FTP</li> <li>• POP3</li> <li>• IMAP</li> <li>• SMTP</li> </ul> <p>Example: http, ftp</p>
<b>Web filter</b>	<p>Select <b>True</b> to prevent access to specific websites and embedded object types or <b>False</b> to permit access to all websites.</p> <p>Example: True</p>
<b>Web Filter Black List</b>	<p>Specify URLs to create a blocklist of websites to block.</p> <p><b>NOTE:</b> A Web filtering profile can contain one allowlist or one blocklist with multiple user-defined categories, each with a permit or block action.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• www.example1.com</li> <li>• www.example2.com</li> </ul>
<b>Web Filter White List</b>	<p>Specify URLs to create an allowlist of websites that users can always access.</p> <p>With local Web filtering, the firewall intercepts every HTTP request in a TCP connection and extracts the URL. The network service then looks up the URL to determine whether it is in the allowlist or blocklist based on its user-defined category.</p> <p><b>NOTE:</b> A Web filtering profile can contain one allowlist or one blocklist with multiple user-defined categories, each with a permit or block action.</p> <p>Example: www.example3.net</p>

Table 90: Fields for the vSRX UTM Settings (continued)

Field	Description
Policy settings—For information about the following policy settings, see the firewall policy settings in Table 2.	
<ul style="list-style-type: none"><li>• Source Zone</li><li>• Destination Zone</li><li>• Source Address</li><li>• Destination Address</li><li>• Action</li><li>• Application</li></ul>	

RELATED DOCUMENTATION

<a href="#">About the Network Services Page   202</a>
<a href="#">About the Service Overview Page   204</a>
<a href="#">Viewing a Service Configuration   210</a>
<a href="#">LxCIPtable VNF Configuration Settings   220</a>
<a href="#">Cisco CSR-1000v VNF Configuration Settings   223</a>

LxCIPtable VNF Configuration Settings

You can configure the LxCIPtable virtualized network function (VNF) from **Configuration > Network Services > Service Name > Overview > Service Configuration**.

Your service provider usually configures base settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and you configure settings for the service, such as policies.

Use the information in the following tables to provide values for the available settings:

- [Table 91 on page 221](#) shows the base settings you can configure for the Linux container.

**NOTE:** Your service provider usually configures the base settings and you should not need to change them.

- [Table 92 on page 221](#) shows the firewall settings you can configure.
- [Table 93 on page 223](#) shows the Network Address Translation (NAT) settings you can configure.

Table 91: Fields for the LxCIP Base Settings

Field	Description
Loopback Address	Specify a loopback IP address.  Example: 192.0.2.10
Operation	Select <b>add</b> to apply the policies to a specific route or <b>del</b> to prevent use of the policies on specific routes.  Example: add
Route	Specify the IP prefix of the route to which the policies should apply.  Example: 192.0.2.20/24
Next Hop	Specify the IP address of a Contrail gateway network to which the VM connects.  Example: 192.0.2.20

Table 92: Fields for the LxCIP Firewall Policy Settings

Field	Description
<i>Firewall Policies</i>	
Prevent SSH Brute	Select <b>True</b> to prevent SSH brute attacks or <b>False</b> to allow SSH brute attacks.  Example: False
Prevent Ping Flood	Select <b>True</b> to prevent ping flood attacks or <b>False</b> to allow ping flood attacks.  Example: False
<i>Forwarding Rule Settings</i>	
Destination Address	Specify the destination IP address prefix that the network service uses as a match criterion for outgoing traffic.  Example: 192.0.2.25/24

Table 92: Fields for the LxCIP Firewall Policy Settings (*continued*)

Field	Description
Operation	<p>Select the operation, which applies to a chain of rules of the same type, from the drop-down list. The following options are available:</p> <ul style="list-style-type: none"> <li>• <b>append</b>—Append the rule to a rule chain.</li> <li>• <b>insert-before</b>—Insert the rule before a rule with the same name.</li> <li>• <b>delete</b>—Replace an existing rule with this name.</li> </ul> <p>Example: append</p>
Source Address	<p>Specify the source IP address prefix that the network service uses as a match criterion for outgoing traffic.</p> <p>Example: 192.0.2.20/24</p>
Name	<p>Specify the name for the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: vsrx-fw-policy</p>
Action	<p>Select the action for the rule, which applies to all traffic that matches the specified criteria.</p> <ul style="list-style-type: none"> <li>• <b>accept</b>—Transmit packets that match the policy parameters.</li> <li>• <b>drop</b>—Drop packets that match the policy parameters.</li> <li>• <b>reject</b>—Reject packets that match the policy parameters.</li> </ul> <p>Example: accept</p>
Service	<p>Specify the service that you want the rule to match.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• http</li> <li>• smtp</li> </ul>
Type	<p>Select the type of packet that the rule matches.</p> <ul style="list-style-type: none"> <li>• <b>input</b>—Packets that the network service receives that are addressed to this VM</li> <li>• <b>forward</b>—Packets that the network service receives that are addressed to other VMs</li> <li>• <b>output</b>—Packets that the network service transmits</li> </ul> <p>The application creates a chain of all rules with a particular type.</p> <p>Example: input</p>

Table 93: Fields for the LxCIP NAT Policy Settings

Field	Description
Left Interface	Specify the name of the interface on which the network service enforces NAT for incoming traffic.  Example: Eth1
Right Interface	Specify the name of the interface on which the network service enforces NAT for outgoing traffic.  Example: Eth2

## RELATED DOCUMENTATION

[About the Network Services Page | 202](#)
[About the Service Overview Page | 204](#)
[Viewing a Service Configuration | 210](#)
[vSRX VNF Configuration Settings | 211](#)
[Cisco CSR-1000v VNF Configuration Settings | 223](#)

## Cisco CSR-1000v VNF Configuration Settings

You can configure the Cisco CSR-1000v virtualized network function (VNF) from **Configuration > Network Services > Service Name > Overview > Service Configuration**. Your service provider usually configures base settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and you configure settings for the service, such as policies. Use the information in the following tables to provide values for the available settings:

- [Table 94 on page 224](#) shows the base settings you can configure for the virtual machine (VM) that contains the VNF.

**NOTE:** Your service provider usually configures the base settings and you should not need to change them.

- [Table 95 on page 224](#) shows the firewall settings you can configure.

Table 94: Fields for the CSR-1000v Base Settings

Field	Description
Host Name	Specify the hostname of the VM.  Example: host1
Loopback Address	Specify the IPv4 loopback IP address.  Example: 10.0.2.50
Name Servers	Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers.  Example: 10.0.2.15
NTP Servers	Specify the FQDNs or IP addresses of one or more NTP servers.  Example: ntp.example.net

Table 95: Fields for the CSR-1000v Firewall Settings

Field	Description
Left Interface	Specify the identifier of the interface that transmits data to the host.  Example: GigabitEthernet2
Right Interface	Specify the identifier of the interface receiving data transmitted by the host.  Example: GigabitEthernet3
Left to Right Allowed Apps	Select the applications from the drop-down list for which the policy is enforced in outgoing packets. The following applications are available: <ul style="list-style-type: none"> <li>• http</li> <li>• https</li> <li>• telnet</li> <li>• ftp</li> <li>• tcp</li> <li>• udp</li> <li>• icmp</li> </ul> Example: http, https



Table 95: Fields for the CSR-1000v Firewall Settings (*continued*)

Field	Description
Right to Left Allowed Apps	<p>Select the application from the drop-down list for which the policy is enforced for incoming packets. The following applications are available:</p> <ul style="list-style-type: none"> <li>• http</li> <li>• https</li> <li>• telnet</li> <li>• ftp</li> <li>• tcp</li> <li>• udp</li> <li>• icmp</li> </ul> <p>Example: ftp, udp</p>

## RELATED DOCUMENTATION

[About the Network Services Page | 202](#)
[About the Service Overview Page | 204](#)
[Viewing a Service Configuration | 210](#)
[vSRX VNF Configuration Settings | 211](#)
[Cisco CSR-1000v VNF Configuration Settings | 223](#)

## Riverbed Steelhead VNF Configuration Settings

You configure the Riverbed Steelhead VNF through its own software. See the Riverbed Steelhead documentation for information about how to configure the application. You can view the following setting:

Management IP—IP address of the sxe0 interface on JDM for the NFX250. For example: 192.0.2.25.

## RELATED DOCUMENTATION

[Viewing a Service Configuration | 210](#)

## Managing a Single Service

Use the tabs on this page to view and manage information about services and service instances.

- [About the Service Overview Page on page 204](#)
- [About the Service Instances Page on page 206](#)

### RELATED DOCUMENTATION

[About the Network Services Page | 202](#)

[Viewing a Service Configuration | 210](#)

# Configuring Application SLA Profiles

## IN THIS CHAPTER

- [Application Quality of Experience \(AppQoE\) Overview | 227](#)
- [About the Application Traffic Type Profiles Page | 229](#)
- [Creating Traffic Type Profiles | 232](#)
- [Editing and Deleting Traffic Type Profiles | 236](#)
- [SLA Profiles and SD-WAN Policies Overview | 238](#)
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- [About the Application SLA Profiles Page | 242](#)
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## Application Quality of Experience (AppQoE) Overview

### IN THIS SECTION

- [Workflow | 228](#)

Application Quality of Experience (AppQoE) aims to improve the user experience at the application level by constantly monitoring the class-of-service parameters and SLA compliance of application traffic and ensuring that the application data is sent over the most SLA-compliant link available. AppQoE is supported on both hub-and-spoke and full mesh topologies when the SD-WAN mode is set to Real Time-Optimized. AppQoE is implemented as a book-ended solution, where both the ends have SRX series devices or vSRX instances that run the same version of Junos OS with the same configuration.

AppQoE is enabled only when the SD-WAN mode for the tenant is set to Real Time-Optimized. In the default mode, which is Bandwidth-Optimized, CSO uses RPM probes to monitor link-level traffic.

On SD-WANs in the real time-optimized mode, CSO monitors the application traffic for SLA compliance. The CPE device uses this data to move the application traffic from links that fail to meet the SLA requirements to links that meet SLA.

To monitor the SLA compliance of the link on which the application traffic is sent, CSO sends inline probes, called as passive probes, along with the application traffic. To identify the best available link for an application in case the active link fails to meet the SLA criteria, CSO constantly monitors and collects SLA compliance data for other available links. The probes that CSO sends over the other links to check the SLA compliance are called as active probes. The active probes are carried out based on the probe parameters that you configure.

Link switching is done at the application level by the CPE device. That is, only the traffic corresponding to the application that reported the SLA violation is moved to a link that meets the specified SLA. The remaining traffic remains on the same link until those applications report an SLA violation.

You can configure traffic type profiles to specify the class-of-service parameters and the probe parameters for each traffic type. When you create an application SLA profile, you can link that with a traffic type profile and specify the SLA parameters and SLA sampling criteria for the SLA profile.. The Application SLA profile is then linked to an SD-WAN policy intent, which can be deployed to implement AppQoE.

From the **Application SLA Performance** page, you can view the application-level SLA performance information and whether AppQoE is enabled. You can also view applications-level SLA performance details such as packet loss, RTT, jitter, and the number of probes.

The following sections describe the prerequisites, limitations, and workflow for configuring AppQoE.

## Workflow

This section provides a sequential list of tasks that you need to perform to configure and monitor AppQoE:

1. Service provider administrators review the [“Default Traffic Type Profiles” on page 229](#), enable the required profiles, [“modify the default profiles” on page 236](#), or [“create new profiles” on page 232](#).
2. Add a tenant with the SD-WAN mode set to real time-optimized. For information about adding a tenant, see [“Adding a Single Tenant” on page 259](#).
3. Service provide administrator or tenant administrator can create an application SLA profile and associate a traffic type profile with that. For more information about creating an application SLA profile, see [“Creating SLA Profiles” on page 243](#).
4. Service provide administrator or tenant administrator can associate the SLA profile with an SD-WAN Policy and deploy the policy. For more information see [“Creating SD-WAN Policy Intents” on page 620](#) and [“Deploying Policies” on page 746](#).
5. Service provider administrator or tenant administrator can view application-level SLA performance details from the Application SLA Performance page. For more information, see [“Monitoring Application-Level SLA Performance for real time-optimized SD-WAN” on page 39](#).

# About the Application Traffic Type Profiles Page

## IN THIS SECTION

- [Default Traffic Type Profiles | 229](#)
- [Tasks You Can Perform | 231](#)
- [Field Descriptions | 231](#)

To access this page from the Administration portal, select **Configuration > Application Traffic Type Profiles**.

You can use the **Traffic Type Profiles** page to configure class-of-service parameters for various types of traffic. Traffic type profiles enable you to configure class-of-service parameters based on your specific business requirements. Traffic type profiles enable you to assign priority and service level criteria for traffic types. This topic contains the following sections:

## Default Traffic Type Profiles

By default, CSO provides the following traffic type profiles:

- High-Priority-Video
- Premium-Internet
- Internet
- Hosted-AV
- Voice-Video

**NOTE:** By default, these traffic type profiles are disabled. CSP administrators can review and enable the profiles on a need-basis.

Table describes the default parameters for each of these traffic types.

Table 96: Default Traffic Type Profiles and Parameters

Traffic Type	Priority	Buffer Allocation	Bandwidth Allocation	Probe Parameters		DSCP Value
High Priority Video	Low	20%	Minimum of 20% and Maximum of 25%	Data size (bytes)	64	af31
				Probe interval (seconds)	10	
				Probe count	100	
				Burst size	10	
Premium-Internet	Low	10%	Minimum of 12% and Maximum of 15%	Data size (bytes)	64	af12
				Probe interval (seconds)	10	
				Probe count	100	
				Burst size	10	
Internet	Low	5%	Minimum of 15% and Maximum of 20%	Data size (bytes)	64	af11
				Probe interval (seconds)	10	
				Probe count	100	
				Burst size	10	
Hosted-AV	Low	10%	Minimum of 16% and Maximum of 20%	Data size (bytes)	64	af32
				Probe interval (seconds)	10	
				Probe count	100	
				Burst size	10	

Table 96: Default Traffic Type Profiles and Parameters (*continued*)

Traffic Type	Priority	Buffer Allocation	Bandwidth Allocation	Probe Parameters		DSCP Value
Voice-Video	Low	5%	Minimum of 20% and Maximum of 20%	Data size (bytes)	64	af41
				Probe interval (seconds)	10	
				Probe count	100	
				Burst size	10	

CSP administrators can use the default traffic type profiles as is or modify the parameters based on your specific requirements. CSP administrators can also create additional traffic type profiles. However, note that you can only have a maximum of six traffic type profiles enabled at a time. The total buffer allocation of the enabled traffic type profiles must not exceed 100%.

## Tasks You Can Perform

You can perform the following tasks from this page:

- View details of the traffic type profiles configured for the tenant.
- Create a traffic type profile. See [“Creating Traffic Type Profiles” on page 232](#).
- Edit or delete a traffic type profile. See [“Editing and Deleting Traffic Type Profiles” on page 236](#).
- Show or hide columns that contain information about traffic type profiles. See [“Sorting Objects” on page 17](#).
- Search for traffic type profiles using keywords. Click the search icon. Enter partial text or full text of the keyword in the search bar and press Enter. The search results are displayed.

## Field Descriptions

[Table 97 on page 231](#) shows the descriptions of the fields on the Application Traffic Type Profiles page.

Table 97: Fields on the Application Traffic Type Profiles Page

Field	Description
Name	Displays the traffic type profile name.
Priority	Displays the traffic type profile priority.

Table 97: Fields on the Application Traffic Type Profiles Page (*continued*)

Field	Description
Status	Displays whether the traffic type profile is enabled or disabled.
DSCP Value	Shows the DSCP value assigned to the traffic type profile. Differentiated Services Code Point (DSCP) values define the forwarding properties of the packet within the Differentiated Services framework.
Bandwidth	Shows the minimum and maximum bandwidth allocation for the traffic type profile.
Buffer	Shows the buffer allocation for the traffic type profile.
Probe Parameters	Shows the following probe parameters configured for the traffic type profile: <ul style="list-style-type: none"> <li>• Data Size (in bytes)</li> <li>• Probe Interval (in seconds)</li> <li>• Probe Count</li> <li>• Burst Size</li> </ul>
Created by	Shows the user that created the SLA profile.

## RELATED DOCUMENTATION

[Creating Traffic Type Profiles | 232](#)

[Editing and Deleting Traffic Type Profiles | 236](#)

## Creating Traffic Type Profiles

You can use Traffic Type Profiles to configure class-of-service parameters for various types of traffic. Traffic type profiles enable you to configure class-of-service parameters based on your specific business requirements. Traffic type profiles enable you to assign priority and service level criteria for traffic types. You can link an application traffic type profile with an application SLA profile, which can be linked to an SD-WAN policy intent.



To create an “[Application Traffic Type](#)” on [page 229](#) profile:

1. Select **Configuration > SD-WAN > Application Traffic Type Profiles**.

The **Application Traffic Type Profiles** page appears.

2. Click the Add (+) icon to create a new traffic type profile.

The **Create New Traffic Type Profile** page appears.

3. Configure the traffic type profile parameters as per the guidelines provide in [Table 98 on page 233](#).

4. Click **OK** to save the traffic type profile configuration. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, the traffic type profiles that you configured appear on the **Application Traffic Type Profiles** page.

**Table 98: Fields on the Create Traffic Type Profiles page**

Field	Description
<b>General</b>	
Name	Enter the name of the traffic type profile that you want to create. Can be a unique string of not more than 15 characters that contains alphanumeric characters and hyphen (-).
Priority	<p>Select the priority value that you want to assign to the traffic type profile. Traffic type profiles with higher priority values takes precedence over the ones with lower values when network congestions occur.</p> <p><b>NOTE:</b> You cannot create two traffic type profiles with S-High or High priority.</p> <p>The following list is arranged in the decreasing order of priority, where the first item indicates the highest priority and the fifth item, the lowest priority.</p> <ol style="list-style-type: none"> <li>1. <b>S-High</b>, which denotes strict high or the highest priority.</li> <li>2. <b>M-High</b>, which denotes medium high.</li> <li>3. <b>High</b></li> <li>4. <b>M-Low</b>, which denotes medium low.</li> <li>5. <b>Low</b></li> </ol>

Table 98: Fields on the Create Traffic Type Profiles page (*continued*)

Field	Description
Status	<p>Click the toggle button to enable the traffic type profile. You can only have a maximum of six traffic profiles enabled at a time. You can assign only those traffic type profiles that are marked as enabled to application SLA profiles.</p> <p><b>NOTE:</b> If there are more than six traffic type profiles enabled when you deploy a policy, the policy deployment fails.</p>

#### Probe Parameters

**TIP:** You can select one of the already configured traffic type profiles from the **Copy probe parameters from** list to populate the values in the probe parameters fields. When you select a traffic type profile, the probe parameter values associated with that profile are populated to the fields. You can edit the values if required. .

Data Size	Specify the size of the data packets, in bytes, to be used for active probes. The range is 4 through 256.
Probe Interval	Specify the interval, in seconds, between two probes. The range is 1 through 10.
Probe Count	Specify the number of probes that form a test. The range from 10 through 1000.
Burst Size	Specify the maximum number of probes that can be sent in one go. The range is from 10 through 100. The value for this parameter must not exceed the value you configured for Probe Count.

#### Bandwidth

Table 98: Fields on the Create Traffic Type Profiles page (*continued*)

Field	Description
DSCP Value	<p>Choose the DSCP value that you want to assign to the traffic type profile. Differentiated Services Code Point (DSCP) values define the forwarding properties of the packet within the Differentiated Services framework. You can assign an Expedited Forwarding (ef), an Assured Forwarding (af), the Best Effort (be), or a Class Selector (CS) value. Class Selector value provides backward compatibility with IP Precedence. You can choose one of the following DSCP values:</p> <p><b>NOTE:</b> You can assign a DSCP value to only one traffic type profile.</p> <ul style="list-style-type: none"> <li>• ef</li> <li>• af11</li> <li>• af21</li> <li>• af22</li> <li>• af23</li> <li>• af31</li> <li>• af32</li> <li>• af33</li> <li>• af41</li> <li>• af42</li> <li>• af43</li> <li>• be</li> <li>• cs1</li> <li>• cs2</li> <li>• cs3</li> <li>• cs4</li> <li>• cs5</li> <li>• nc2/cs7</li> </ul>
Minimum Bandwidth	(Optional) Move the slider button to choose the minimum bandwidth, as percentage of the total available bandwidth, that you want to allocate to the traffic type profile. The minimum bandwidth value denotes the guaranteed bandwidth allocation for the traffic type.
Maximum Bandwidth	(Optional) Move the slider button to choose the maximum bandwidth, as percentage of the total available bandwidth, that you want to allocate to the traffic type profile. The bandwidth allocation for the traffic type never exceeds the maximum bandwidth configured for the traffic type.

Table 98: Fields on the Create Traffic Type Profiles page (*continued*)

Field	Description
<b>Buffer</b>	
Allocation	<p>Move the slider button to choose the bandwidth buffer that you want to allocate to the traffic type profile.</p> <p><b>NOTE:</b> The total buffer allocation of all the traffic type profiles that are in enabled state must not exceed 100%.</p>

## RELATED DOCUMENTATION

[About the Application Traffic Type Profiles Page | 229](#)

[Editing and Deleting Traffic Type Profiles | 236](#)

## Editing and Deleting Traffic Type Profiles

### IN THIS SECTION

- [Editing Traffic Type Profiles | 236](#)
- [Deleting Traffic Type Profiles | 237](#)

You can edit and delete traffic type profile configuration.

The following sections explain the procedure for editing and deleting traffic type profiles:

### Editing Traffic Type Profiles

To edit a traffic type profile:

1. Select **Configuration > SD-WAN > Application Traffic Type Profiles**.

The **Application Traffic Type Profiles** page appears.

2. Select the check box that corresponds to the traffic type profile that you want to modify and click the edit icon.

The **Edit Traffic Type Profile** page appears. Modify the configuration as required. For information about the parameters, see [Table 98 on page 233](#).

3. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

## Deleting Traffic Type Profiles

To delete a traffic type profile:

**NOTE:** You cannot delete a traffic type profile if the profile is associated with an application SLA profile. You must first edit the application SLA profile and remove the association with the traffic type profile or delete the associated application SLA profile.

1. Select **Configuration > SD-WAN > Application Traffic Type Profiles**.

The **Application Traffic Type Profiles** page appears.

2. Select the check box that corresponds to the traffic type profile that you want to delete and click the delete icon.

The **Confirm Delete** page appears.

3. Click **OK** to delete the selected profile.

If you do not want to delete the traffic type profile, click **Cancel** instead.

4. If the selected traffic type profile is associated with any application SLA profile, the following error message appears:

The Traffic Type Profile is associated with 1 SLA Profile(s). It cannot be deleted.

Click **OK** and either edit the SLA profile and delete the association or delete the SLA profile. Try deleting the traffic type profile after you modify the SLA profile association or delete the SLA profile.

SEE ALSO

[Creating SLA Profiles | 243](#)

[Editing and Deleting SLA Profiles | 246](#)

# SLA Profiles and SD-WAN Policies Overview

IN THIS SECTION

- [SLA Profiles | 238](#)
- [SD-WAN Policies | 239](#)

Contrail Service Orchestration (CSO) enables you to create service-level agreement (SLA) profiles and map them to software-defined WAN (SD-WAN) policies for traffic management.

## SLA Profiles

SLA profiles are created for applications or groups of applications for all tenants. An SLA profile consists of a set of configurable constraints that can be defined in the unified portal for both the Administration and Customer Portals. [Table 99 on page 238](#) lists the categories of configurable constraints that are defined in an SLA profile.

Table 99: SLA Profile Categories

Category	Description
Path preference and priority	<p>Paths are the WAN links to be used for the SLA profile. You can select an MPLS or Internet link as the preferred path. For SLA profiles you must select a path preference or configure at least one SLA parameter. MPLS is more latency-sensitive than Internet.</p> <p>You can define priority or precedence for the SLA profile. A value of one (1) indicates highest priority. SLA profiles with higher priorities are given precedence over SLA profiles with lower priorities. Priority is used when SLA requirements are not met on a WAN link and the site switches WAN links to meet the SLA requirements.</p>

Table 99: SLA Profile Categories (*continued*)

SLA parameters	<p>You can also define one or more than one of the following SLA parameters:</p> <ul style="list-style-type: none"> <li>• Throughput—Amount of data (in Mbps) that is sent upstream and received downstream by the site during the selected time period</li> <li>• Latency—Amount of time (in ms) that a packet of data takes to travel from one designated point to another</li> <li>• Packet loss—Percentage of data packets dropped by the network to manage congestion</li> <li>• Jitter—Difference between the maximum and minimum round-trip times (in ms) of a packet of data</li> </ul> <p>SLA parameters have precedence over path preference. Even if one SLA parameter is defined, then it is given a higher priority and will override the path preference. SD-WAN policies mapped to an SLA profile with defined SLA parameters are called dynamic policies. Dynamic policies applied to sites enable the site to override the path preference and switch WAN links when the preferred WAN link is not meeting SLA requirements as defined in the SLA parameters.</p>
Class of service	<p>Class of service (CoS) provides different levels of service assurances to various forms of traffic. CoS enables you to divide traffic into classes and offer an assured service level for each class. The classes of service listed in increasing order of priority and sensitivity to latency are best effort, voice, interactive video, streaming audio or video, control, and business essential. The default CoS is voice.</p>
Rate limiters	<p>Rate limiters are defined for traffic shaping and efficient bandwidth utilization. You can define the following rate limiters:</p> <ul style="list-style-type: none"> <li>• Maximum upstream and downstream rates—The maximum upstream and downstream rate for all applications associated with the SLA profile.</li> <li>• Maximum upstream and downstream burst sizes—The maximum size of a steady stream of traffic sent at average rates that exceed the upstream and downstream rate limits for short periods.</li> </ul>

**NOTE:** You must define at least one of the SLA parameters or path preference. You cannot leave both path preference and SLA parameters fields blank at the same time.

## SD-WAN Policies

SD-WAN policy intents help in optimum utilization of the WAN links and efficient load distribution of traffic. SD-WAN policy intents are applied to source endpoints (such as sites and departments) and destination endpoints (applications or application groups) and can be defined for site-to-site traffic (by using SLA profiles) or for breakout traffic (by using breakout profiles).

Applications are classified into the following categories:

- Cacheable applications, which refer to applications or application groups that are stored in the application cache when they are recognized by the device. After they are stored in the application cache, subsequent sessions are routed directly through the correct WAN link.
- Non-cacheable applications, which refer to applications or application groups that are not stored in the application cache and all sessions are first routed through the default path, and then routed to the correct WAN link based on the SD-WAN policy.

Policy intents consist of the following parameters:

- **Source**—A source endpoint that you can choose from a list of sites, site groups, and departments or a combination of all of these. The SD-WAN policy intent is applied to the selected source endpoint.
- **Destination**—A destination endpoint that you can choose from a list of applications and predefined or custom application groups. You can select a maximum of 32 applications or application groups as destination endpoints. The SD-WAN policy intent is applied to the selected destination endpoint.
- **SLA profile or breakout profile**—Depending on whether you want to apply the policy intent to site-to-site traffic or breakout traffic, you can associate an SLA profile or a breakout profile with the policy intent.
- **Intent name**—A unique name for the SD-WAN policy intent.

SD-WAN supports advanced policy-based routing (APBR). APBR enables you to dynamically define the routing behavior of the SD-WAN network based on applications. Dynamic application-based routing makes it possible to define policies and to switch WAN links on the fly based on the application's defined SLA parameters. The APBR mechanism classifies sessions based on applications and application signatures and uses policy intents to identify the best possible route for the application. When the best possible route does not meet the application's defined SLA requirements, the SD-WAN network finds the next best possible route to meet SLA requirements.

For example, consider an application in a site. If you want the application group to use custom throughput, latency, or jitter, you can create an SLA profile with these custom values. You can then create an intent and configure the intent with the application and apply the custom SLA profile. When the intent is deployed, CSO determines the best suited WAN link to route traffic based in the application. If the WAN link fails to meet SLA requirements in runtime, the SD-WAN network switches WAN links to the next best suited path.

On the basis of the configured SLA profile constraints, you can categorize SD-WAN policies into two types:

- **Static policy**—If only the path preference is defined and none of the SLA parameters are defined in the SLA profile, then the policy is called a static policy. In static policies, if the defined WAN link under path preference is unable to meet the SLA requirements, link switching cannot occur and SLA performance deteriorates.
- **Dynamic policy**—If one or more SLA parameters in the SLA profile are defined, then the policy is called a dynamic policy.

In dynamic policies, because SLA parameters override the path preference, the SD-WAN network chooses the best possible WAN link for traffic management. When an intent is deployed on a site, if the WAN



link chosen by the SD-WAN network does not meet the SLA requirements and the network performance deteriorates, then the site switches WAN links to meet the SLA requirements. The link switching is recorded as an SD-WAN event and displayed in the SD-WAN Events page in the customer portal and the *Tenant\_name* SLA Performance pages in the administration and customer portals. Link switching occurs only when the SD-WAN policy is dynamic because SLA parameters override the path preference and the site is able to switch WAN links.

## RELATED DOCUMENTATION

[About the Application SLA Profiles Page](#) | 242

## Cost-Based Link Switching

In bandwidth-optimized SD-WAN deployments, CSO chooses the least expensive link to route the traffic when two or more links meet the SLA profile parameters. CSO uses the cost parameter (**Cost/Month**) that was specified for the WAN link during the site creation to identify the most cost-effective link to route traffic.

If a less-expensive link comes online and meets the specified SLA parameters, the traffic is switched to the less-expensive link.

This is the default behavior for bandwidth-optimized SD-WAN and does not require any user configuration other than the link cost information (**Cost/Month**) specified while creating a site.

### NOTE:

CSO does not consider the link cost factor while making link switch choices in real time-optimized (AppQoE-enabled) networks.

### Benefit

Preference for the least-expensive link enables CSO to optimize the network operations cost.

# About the Application SLA Profiles Page

To access this page, select **Configuration > Application SLA Profiles** in the Administration Portal.

You can use the Application SLA Profiles page to view information about service-level agreement (SLA) profiles for all tenants.

## Tasks You Can Perform

You can perform the following tasks from this page:

- View details of SLA profiles for all tenants.
- Create an SLA profile for a tenant. See [“Creating SLA Profiles” on page 243](#).
- Edit or delete an SLA profile. See [“Editing and Deleting SLA Profiles” on page 246](#).
- Show or hide columns that contain information about SLA profiles. See [“Sorting Objects” on page 17](#).
- Search for SLA profiles using keywords. Click the search icon. Enter partial text or full text of the keyword in the search bar and press Enter. The search results are displayed.

## Field Descriptions

[Table 100 on page 242](#) shows the descriptions of the fields on the Application SLA Profiles page.

**Table 100: Fields on the Application SLA Profiles Page**

Field	Description
Priority	Displays the SLA profile priority.
Name	Displays the SLA profile name.
Traffic Type Profile	Displays the traffic type profile associated with the SLA profile.
Path Preference	Displays whether there is a preferred path for the SLA profile.
Failover	Indicates whether failover is enabled for the SLA profile.
Packet Loss (%)	Displays the target packet loss for the SLA profile.
Jitter (ms)	Displays the target jitter for the SLA profile.
RTT	Displays the target round-trip time (RTT) for the SLA profile.

Table 100: Fields on the Application SLA Profiles Page (continued)

Field	Description
Throughput (Mbps)	Displays the target throughput for the SLA profile.
SLA Probe Match	Displays whether the profile requires the SLA probe to match all SLA criteria (All) or not (Any) .
Created by	Displays the name of the user that created the SLA profile.

RELATED DOCUMENTATION

<a href="#">SLA Profiles and SD-WAN Policies Overview   238</a>
<a href="#">Creating SLA Profiles   243</a>
<a href="#">Editing and Deleting SLA Profiles   246</a>

Creating SLA Profiles

You can use the Create SLA Profile page to create a new service-level agreement (SLA) profile, configure target metrics, and associate tenants with the SLA profile.

To add an SLA profile to a tenant:

1. Click the add icon (+) on the **Configuration > Application SLA Profiles** page in the Administration Portal.  
The Create SLA Profile page appears.
2. Enter the SLA profile information according to the guidelines provided in [Table 101 on page 243](#).
3. Click **OK** to create the SLA profile. The Application SLA Profile page appears with the new SLA profile information.  
Alternatively, if you want to discard your updates, click **Cancel** instead.

Table 101: Fields on the Create SLA Profile page

Field	Guidelines
<i>General</i>	

Table 101: Fields on the Create SLA Profile page (continued)

Field	Guidelines
Name	<p>Enter a name for the SLA profile.</p> <p>Can be a unique string of not more than 15 characters that contains alphanumeric characters and hyphen (-).</p>
SLA Configuration	
Traffic Type Profile	Choose a traffic type profile to apply the class-of-service configuration and priority to the SLA profile. You can select a traffic type profile only when it is in the <b>Enabled</b> state.
Path Preference	Select the preferred WAN link type to associate with the SLA profile. The options are Any, MPLS, and Internet. Any is the default value. You must select a path preference or configure at least one SLA parameter.
Failover	<p>Enable failover to switch links when the active links fail to meet the SLA criteria. In such cases, the traffic is routed to links that meet SLA criteria. Failover is supported only for MPLS or Internet links.</p> <p><b>NOTE:</b> The Failover option is supported only for bandwidth-optimized SD-WAN networks.</p>
Path Failover Criteria	<p>Choose one of the following options:</p> <ul style="list-style-type: none"> <li>• <b>Does not meet one or more SLA parameters</b>—This triggers the path failover if any of the SLA parameters is violated.</li> <li>• <b>Does not meet all SLA parameters</b>—This triggers the path failover only when all the SLA parameters are violated.</li> </ul>
SLA Parameters	
Throughput	Enter the target throughput (in Mbps) for the SLA profile. Throughput is the amount of data that is sent upstream and received downstream by the site during the selected time period.
Latency	Enter the target latency (in ms) for the SLA profile. Latency is the amount of time that a packet of data takes to travel from one designated point to another. Target delay is calculated as two times the target latency.
Packet Loss	Enter the target packet loss (in %) for the SLA profile. Packet loss is the percentage of data packets dropped by the network to manage congestion.
Jitter	Enter the target jitter (in ms) for the SLA profile. Jitter is the difference between the maximum and minimum round-trip times of a packet of data.

Table 101: Fields on the Create SLA Profile page (continued)

Field	Guidelines
<i>Advanced Configuration-SLA Sampling</i>	
Session-sampling %	Specify the matching percentage of sessions for which you want to run the passive probes.
SLA-violation-count	Specify the number of SLA violations after which you want CSO to switch paths. The range is 1 through 32.
Sampling-period	Specify the sampling period, in milliseconds, for which the SLA violations are counted. The range is 2000 through 60000.
Switch-cool-off-period	Specify the waiting period, in milliseconds, only after which you want the link switch to happen if an active link comes back online. This parameter helps prevent frequent switching of traffic between active and backup links. The range is 5 through 300.
<i>Advanced Configuration-Rate Limiting</i>	
Maximum Upstream Rate	Enter the maximum upstream rate (in Kbps) for all applications associated with the SLA profile. The rate is in the range 64 through 10,485,760 Kbps.
Maximum Upstream Burst Size	Enter the maximum burst size (in bytes). The burst size is in the range 1 through 1,342,177,280 bytes.
Maximum Downstream Rate	Enter the maximum downstream rate (in Kbps) for all applications associated with the SLA profile. The rate is in the range 64 through 10,485,760 Kbps.
Maximum Downstream Burst Size	Enter the maximum burst size (in bytes). The burst size is in the range 1 through 1,342,177,280 bytes.
Loss Priority	Select a loss priority based on which packets can be dropped or retained when network congestion occurs. The chances of a packet getting dropped is the highest when the loss priority is set to <b>High</b> . Other available values are <b>Medium High</b> , <b>Medium Low</b> , and <b>Low</b> .

## RELATED DOCUMENTATION

[SLA Profiles and SD-WAN Policies Overview | 238](#)
[About the Application SLA Profiles Page | 242](#)
[Editing and Deleting SLA Profiles | 246](#)

## Editing and Deleting SLA Profiles

### IN THIS SECTION

- [Editing an SLA Profile | 246](#)
- [Deleting SLA Profiles | 246](#)

You can use the Applications SLA Profiles page to edit and delete SLA profiles.

### Editing an SLA Profile

To edit an SLA Profile:

1. Select the check box for the SLA profile that you want to edit, and click the Edit icon on the **Configuration > Application SLA Profiles** page in the Administration Portal.

The Edit Application SLA Profile page appears.

2. Update the general SLA profile information as needed according to the guidelines provided in [“Creating SLA Profiles” on page 243](#). You cannot edit the SLA profile name.

3. Click **Next**.

The Configuration tab appears.

4. Update the configuration parameters as needed according to the guidelines provided in [“Creating SLA Profiles” on page 243](#).

5. Click **OK** to save the updated SLA profile configuration.

The SLA profile information that you updated appears on the Application SLA Profiles page.

### Deleting SLA Profiles

You can delete the SLA profile if it is no longer needed. To delete an SLA profile:

1. Select the check box for the SLA profile that you want to delete and click the delete icon (X) on the **Configuration > Application SLA Profiles** page in the Administration Portal. You can also select multiple SLA profiles.

A page requesting confirmation for the deletion appears.

2. Click **Yes** to confirm that you want to delete the SLA profile.

The SLA profile is deleted.

#### RELATED DOCUMENTATION

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[SLA Profiles and SD-WAN Policies Overview | 238](#)

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[About the Application SLA Profiles Page | 242](#)

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[Creating SLA Profiles | 243](#)

# Configuring Application Signatures

## IN THIS CHAPTER

- [Application Signatures Overview | 248](#)
- [About the Application Signatures Page | 249](#)
- [Creating Application Signature Groups | 250](#)
- [Editing, Cloning, and Deleting Application Signature Groups | 251](#)

## Application Signatures Overview

Juniper Networks regularly updates the predefined application signature database, making it available to subscribers on the Juniper Networks website. This database includes signature definitions of known application objects that can be used to identify applications for tracking, firewall policies, and quality-of-service prioritization.

Use the **Application Signatures** page to get an overall, high-level view of your application signature settings. You can filter and sort this information to get a better understanding of what you want to configure.

## RELATED DOCUMENTATION

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[About the Application Signatures Page | 249](#)

---

[Creating Application Signature Groups | 250](#)

---

[Editing, Cloning, and Deleting Application Signature Groups | 251](#)



## About the Application Signatures Page

To access this page, select **Configuration > Shared Objects > Application Signatures**.

Use the **Application Signatures** page to view application signatures that are already downloaded and to create, modify, clone, and delete custom application signature groups. The **Application Signatures** page displays the name, object type, category and subcategory, risk associated with, and characteristics of the signature. You can create custom application signature groups with a set of similar signatures for consistent reuse when defining policies.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create an application signature group. See [“Creating Application Signature Groups” on page 250](#).
- Modify, clone, or delete an application signature group. See [“Editing, Cloning, and Deleting Application Signature Groups” on page 251](#).
- View the configured parameters of an application signature or application signature group. Click the details icon that appears when you hover over the name of an image or click **More > Details**. See [“Viewing Object Details” on page 16](#).
- Show or hide columns in the **Application Signatures**. See [“Sorting Objects” on page 17](#).
- Search for a specific application signature or application signature group. See [“Searching for Text in an Object Data Table” on page 16](#).
- Filter the application signature information based on select criteria. To do this, select the filter icon at the top right-hand corner of the table. The columns in the grid change to accept filter options. Select the filter options; the table displays only the data that fits the filtering criteria.

### Field Descriptions

[Table 102 on page 249](#) provides guidelines on using the fields on the **Application Signatures** page.

**Table 102: Fields on the Application Signatures Page**

Field	Description
Name	Name of the application signature or application signature group.
Object Type	Signature type—either application signature or application signature group.
Category	UTM category of the application signature. For example, the value of <b>Category</b> can be Messaging, Web, Infrastructure, Remote-Access, Multimedia, and so on.

Table 102: Fields on the Application Signatures Page (*continued*)

Field	Description
Subcategory	UTM subcategory of the application signature. For example, the value of <b>Subcategory</b> can be Wiki, File-Sharing, Multimedia, Social-Networking, News, and so on.
Risk	Level of risk associated with the application signature. For example, the value of <b>Risk</b> can be Low, High, unsafe, and so on.
Characteristic	One or more characteristics of the application signature.
Predefined or Custom	A list of predefined application signatures and application signature groups, and a list of custom application signature groups that you created.

## RELATED DOCUMENTATION

[Application Signatures Overview | 248](#)

[Creating Application Signature Groups | 250](#)

[Editing, Cloning, and Deleting Application Signature Groups | 251](#)

## Creating Application Signature Groups

Application identification supports custom application signatures to detect applications as they pass through the device. When you create custom signature groups, make sure that your signature groups are unique, by providing a unique and relevant name.

To create an application signature group:

1. Select **Configure > Shared Objects > Application Signatures**.
2. Click the add icon (+).
3. Complete the configuration according to the guidelines provided in [Table 103 on page 251](#).
4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

A new application signature group with your configurations is created. You can use this application signature group in firewall, NAT, and SD-WAN policies.

Table 103 on page 251 provides guidelines on using the fields on the **Create Application Signature Group** page.

Table 103: Fields on the Create Application Signature Group Page

Field	Description
Name	Enter a unique name that is a string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 63 characters.
Group Members	Click the add icon (+) to add signatures to your application group. On the <b>Add Application Signatures</b> page, select the check boxes next to the signatures you want to add to the group.

RELATED DOCUMENTATION

<a href="#">Application Signatures Overview   248</a>
<a href="#">About the Application Signatures Page   249</a>
<a href="#">Editing, Cloning, and Deleting Application Signature Groups   251</a>

## Editing, Cloning, and Deleting Application Signature Groups

IN THIS SECTION

- [Editing Application Signature Groups | 252](#)
- [Cloning Application Signature Groups | 252](#)
- [Deleting Application Signature Groups | 253](#)

You can edit, clone, and delete application signature groups from the **Application Signatures** page.

## Editing Application Signature Groups

To modify the parameters configured for an application signature group:

1. Select **Configuration > Shared Objects > Application Signatures**.

The **Application Signatures** page appears.

2. Select the application signature group that you want to edit, and then select **More > Edit**, or click on the edit icon (pencil symbol), on the top right corner of the table, or right-click and select **Edit**.

The **Edit** page appears, showing the same options as those displayed when you create a new application signature group.

3. Modify the parameters according to the guidelines provided in [“Creating Application Signature Groups” on page 250](#).
4. Click **Save** to save the changes. If you want to discard your changes, click **Cancel** instead.

The modified application signature group appears in the **Application Signatures** page.

## Cloning Application Signature Groups

You can clone an application signature group when you want to reuse an existing application signature group, but with a few minor changes. This way, you can save time recreating the application signature group from the start.

To clone an application signature group:

1. Select **Configuration > Shared Objects > Application Signatures**.

The **Application Signatures** page appears.

2. Right-click the application signature group that you want to clone and then select **Clone**, or select **More > Clone**.

The **Clone** page appears with editable fields.

3. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

The cloned application signature group is displayed on the **Application Signatures** page.

## Deleting Application Signature Groups

To delete an application signature group:

1. Select **Configuration > Shared Objects > Application Signatures**.

The **Application Signatures** page appears.

2. Select the application signature group you want to delete and then click the delete icon (X).

An alert message appears, verifying that you want to delete the selected item.

3. Click **Yes** to delete the selected application signature group. If you do not want to delete, click **Cancel** instead.

### RELATED DOCUMENTATION

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[Application Signatures Overview | 248](#)

---

[About the Application Signatures Page | 249](#)

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[Creating Application Signature Groups | 250](#)

# Managing Tenants

## IN THIS CHAPTER

- [Tenants Overview | 254](#)
- [Full Mesh Topology Overview | 255](#)
- [About the Tenants Page | 257](#)
- [Adding a Single Tenant | 259](#)
- [Editing Tenant Information | 272](#)
- [Importing Data for Multiple Tenants | 274](#)
- [Allocating Network Services to a Tenant | 279](#)
- [Viewing the History of Imported Tenant Data | 279](#)
- [Viewing the History of Deleted Tenant Data | 281](#)

## Tenants Overview

A tenant in a Contrail Service Orchestration (CSO) represents a customer who accesses virtualized network functions (VNFs) in a service provider's cloud through a Layer 3 VPN. You assign administrative users and sites to tenants in the Administration Portal to represent the staff in the tenant's organization and the geographical locations in the tenant's network. You also use Administration Portal to allocate network service profiles to tenants.

Using RBAC and other means such as virtual routing and forwarding (VRF) instances within the network, CSO keeps all tenant and OpCos walled within their own space. This ultimately includes the traffic that traverses the SP and customer networks. No individual tenant, its administrators, operators or customers can see or interact with the objects of another tenant or customer.

In earlier versions of CSO, when a tenant user logs in to Customer Portal for the first time, the user is assigned the Tenant Administrator role by default. With the introduction of object-based custom roles, the tenant user that logs in to Customer Portal for the first time might have customized roles and the role is not restricted to Tenant Administrator.

The information listed on the Tenants page changes depending on the authentication mode configured:

- **Local Authentication**—You can add the administrative user information as the first step from the Tenants page.
- **Authentication and Authorization with SSO Server**—The **Admin User** information is not displayed on the Tenants page because users are not created in CSO and they are managed in the SAML identity provider. In addition, users are dynamically authorized to the CSO role based on the mapping rules configured in the SAML authentication.
- **Authentication with SSO Server**—When you create the administrative user, the login page does not require you to configure a password because the user is created in the SSO without the password and you can enter only the username.

## RELATED DOCUMENTATION

[Administration Portal Overview | 4](#)

[About the Tenants Page | 257](#)

[Editing Tenant Information | 272](#)

[Adding a Single Tenant | 259](#)

[Importing Data for Multiple Tenants | 274](#)

## Full Mesh Topology Overview

Contrail Service Orchestration (CSO) supports the full mesh topology on tenants in a software-defined WAN (SD-WAN) implementation. In a full mesh topology, all sites of a tenant are connected to one another. The sites are connected to one another through GRE and GRE\_IPsec overlay tunnels. The default overlay tunnel encapsulation is GRE\_IPsec.

In the full mesh topology, a WAN interface of one type is connected to a WAN interface of a different type if these WAN interfaces are associated with same mesh tags. A mesh tag is a label that you associate with a WAN link of a site. Mesh tags provide you the flexibility to establish overlay tunnels between WAN links of two different sites

**NOTE:** With mesh tags, you can connect two WAN links even if the link types (MPLS and Internet) are different.

The following requirements must be satisfied for connections between WAN interfaces:

- IP addresses of Internet WAN interfaces must be reachable on the Internet. Also, IP addresses must be preserved and change in IP addresses is not supported.
- WAN links that are associated with same mesh tags must be reachable on the Internet.

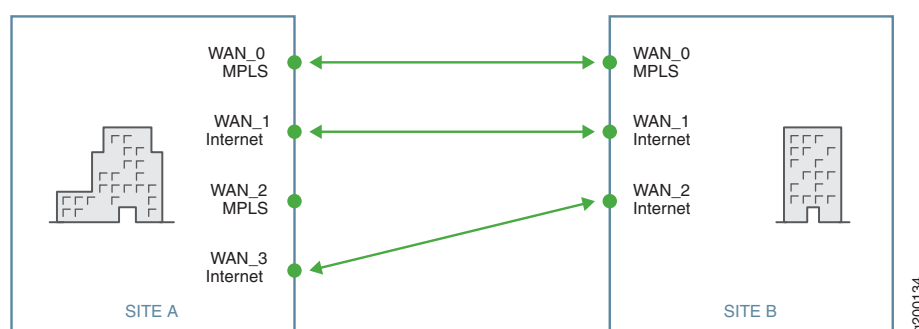
For more information about mesh tags, see [“Mesh Tags Overview” on page 845](#).

The full mesh topology supports the following:

- Static policies and Application Quality of Experience (AppQoE)
- Dynamic VPNs
- Mesh tags
- LAN segmentation
- Departments
- Multiple VPNs

Contrail Service Orchestration supports only sparse mode connections in full mesh topology. In sparse mode, a WAN interface of a specific type in a site is connected to only one other interface of the same type (see [Figure 9 on page 256](#)). This configuration reduces the number of overlay tunnels formed and is easy to maintain. However, sparse mode is susceptible to SD-WAN network performance deterioration due to connectivity disruptions because if connectivity on one tunnel is lost, then the respective connected WAN interfaces become unreachable.

**Figure 9: Sparse Mode**



## Local Breakout in Full Mesh Topology

Local breakout is supported on all sites in the full mesh topology. Local breakout is the ability of a site to route Internet traffic directly from the site. A site can have multiple WAN interfaces, but only the WAN interfaces (up to a maximum of three) that are *not* enabled exclusively for local breakout traffic are chosen for connecting to the full mesh network. For instance, consider a site that has four WAN interfaces enabled.



If WAN\_1 on the site is enabled exclusively for local breakout traffic, then only WAN\_0, WAN\_2, and WAN\_3 can be chosen for forming a full mesh.

WAN interfaces that are enabled exclusively for local breakout traffic cannot be used for non-Internet traffic and this makes those WAN interfaces essentially unusable in the full mesh topology. For WAN interfaces that are chosen to connect to the full mesh network, you do not need to provide overlay tunnel information while configuring the site; the overlay tunnel information is computed automatically.

## RELATED DOCUMENTATION

[SLA Profiles and SD-WAN Policies Overview | 238](#)

[About the Tenants Page | 257](#)

[Breakout and Breakout Profiles Overview | 635](#)

## About the Tenants Page

To access this page, click **Tenants**.

You can use the Tenants page to add tenants, view tenant details, and delete tenants. You can add tenants by importing tenant-related data through a JavaScript Object Notation (JSON) file and view the history of imported tenant data and deleted tenant data. See [“Tenants Overview” on page 254](#).

### Tasks You Can Perform

You can perform the following tasks from this page:

- Quickly view important data about the tenants in the widgets that appear at the top of the page. For information about the widgets, see [Table 104 on page 258](#).
- View details about a tenant. Click the details icon for the tenant, or you can select a tenant and click **More > Detail View**. See [“Viewing Object Details” on page 16](#).
- Add a single tenant. See [“Adding a Single Tenant” on page 259](#).
- Edit tenant information. See [“Editing Tenant Information” on page 272](#).
- Delete a tenant. Select the tenant that you want to delete and click the delete icon.
- Import multiple tenants. See [“Importing Data for Multiple Tenants” on page 274](#).
- Assign Network Services. See [“Allocating Network Services to a Tenant” on page 279](#).
- View tenant import history. See [“Viewing the History of Imported Tenant Data” on page 279](#).
- View tenant delete history. See [“Viewing the History of Deleted Tenant Data” on page 281](#).

## Field Descriptions

Table 104 on page 258 shows the description of the widget that appears at the top of the Tenants page.

Table 104: Widget on the Tenants Page

Widget	Description
Tenants by Topology	Displays the total number of tenants and the percentage of different types of tenants.
Tenants with Alerts	Displays the tenants with alerts defined on them.

Table 105 on page 258 provides guidelines on using the fields on the Tenants page.

Table 105: Fields on the Tenants Page

Field	Description
Name	<p>Name of the tenant.</p> <p>Click the name of the tenant to switch to the tenant scope.</p>
Deployment Type	Displays the SD-WAN mode (real-time optimized or bandwidth-optimized) of the tenant. If the site type is Hybrid WAN, a hyphen (-) is displayed.
Site Types	Displays types of sites (SD-WAN, or Hybrid WAN, or both) that the tenant can add.
Sites	Total number of sites that are available for the tenant.
Assigned Services	<p>Number of services that are assigned to the tenant.</p> <p>To assign services to the tenant:</p> <ol style="list-style-type: none"> <li>1. Click the Allocate Network Services link in Assigned Service column. The Allocate Network Services to <i>Tenant-Name</i> page appears. All network services that are available for the customer are listed.</li> <li>2. Select the network services and click <b>Ok</b>. The network services are assigned to the tenant.</li> </ol>
Activated Service Instances	Number of services that have been deployed by the administrator on a connection in the network.
Certificate Renewal	Displays the certificate renewal type (Automatic or Manual).

Table 105: Fields on the Tenants Page (*continued*)

Field	Description
Administrator	Administrative user for the tenant.
Last Modified	Date and time when the tenant was last modified.

## RELATED DOCUMENTATION

[Allocating a Service to Tenants | 209](#)
[Importing Data for Multiple Tenants | 274](#)

## Adding a Single Tenant

You can use the Add Tenant page to add tenant data and other objects associated with a tenant, such as tenant user, network details, deployment scenario, service profiles, and custom properties. A single tenant supports SD-WAN deployment and hybrid WAN deployment scenarios.

**TIP:** A single tenant supports both full mesh or hub-and-spoke topologies.

To connect sites in hub-and-spoke topology,

- Select the SD-WAN mode as bandwidth-optimized in the Add Tenant page, or
- Select the SD-WAN mode as real-time optimized, and do not enable the **Enable Meshing** toggle button in the Configure Site page.

To connect sites in full mesh topology,

- Select the SD-WAN mode as real-time optimized (or you must have selected both real-time optimized and bandwidth-optimized) in the Add Tenant page, and
- Select the **Enable Meshing** toggle button for at least one WAN link in the Configure Site page.

Before you create a tenant you must create all the resources required for the network point of presence (POP).

To add a tenant:

- 1. Select **Tenants > All Tenants > +**.

The Add Tenant page appears.

- 2. Update the tenant information. Complete the configuration according to the guidelines provided in [Table 106 on page 260](#).

- 3. Click **OK** to add a tenant. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, the tenant that you configured appears on the Tenants page.

- 4. If you use the tenant for a hybrid WAN centralized deployment, access Contrail and add the following rule to the default security group in the Contrail project.

```
Ingress IPv4 network 0.0.0.0/0 protocol any ports any
```

This rule allows the network to accept traffic from all subnets.

Table 106: Fields on the Add Tenant Page

Field	Description
<i>Tenant Info</i>	
Name	<p>Enter the name of the tenant. You can use an unlimited number of alphanumeric characters, including special characters.</p> <p>The tenant name that you set must be between 6 and 21 characters long, and it must include at least one lowercase letter, one uppercase letter, one special character, and one number.</p> <p>Example: test-tenant</p>
<i>Admin user</i>	
First Name	Enter the first name of the user.
Last Name	Enter the last name of the user.

Table 106: Fields on the Add Tenant Page (continued)

Field	Description
Username (Email)	<p>Enter the e-mail ID of the user. The e-mail ID is also the username for the user. This field is automatically populated after you enter the tenant name.</p> <p>Example: test-tenant_admin@test-tenant.com</p>
Roles	<p>Select one or more roles (both predefined and custom roles) that you want to assign to the tenant user.</p> <p><b>NOTE:</b> In the <b>Available</b> column, all tenant scope roles are listed.</p> <p>Click the right arrow(&gt;) to move the selected role or roles from the <b>Available</b> column to the <b>Selected</b> column. Note that you can use the search icon on the top right of each column to search for role names.</p> <p>To preview the access privileges assigned to a role, click the role name.</p>
<i>Password Policy</i>	
User Password Expires	<p>Select one of the following options:</p> <ul style="list-style-type: none"> <li>• <b>Never</b>—If you select this option, the password never expires.</li> <li>• <b>After specified number of days</b>—If you select this option, you must specify a duration in the <b>Password Expiration Days</b> field.</li> </ul>
Password Expiration Days	<p>Specify the duration (in days) after which the password expires and must be changed.</p> <p>The range is from 1 through 365. The default value is 180 days.</p>
Deployment Info	

Table 106: Fields on the Add Tenant Page (continued)

Field	Description
Deployment Type	<p>Select at least one deployment type for the tenant.</p> <ul style="list-style-type: none"> <li>• <b>SD-WAN sites</b>—Select this check box if you want the tenant to create SD-WAN sites only. SD-WAN sites can have up to 4 WAN links, and the tenant can define intent policies to intelligently route different applications through different WAN links.</li> <li>• <b>Hybrid WAN sites</b>—Select this check box if you want the tenant to create Hybrid WAN sites only. The Hybrid WAN sites can have a maximum of two WAN links. You cannot apply intent policies for Hybrid WAN sites.</li> </ul> <p>Select both check boxes if you want the tenant to create both SD-WAN site and Hybrid WAN site.</p> <p><b>NOTE:</b> The options listed in <b>Customer Portal &gt; Sites &gt; Add</b> are filtered based on the deployment type that you have selected for a tenant. For example, if you have selected Hybrid WAN sites for a tenant, in <b>Customer portal &gt; Sites &gt; Add</b>, only the following options are listed:</p> <ul style="list-style-type: none"> <li>• Spoke Site</li> <li>• Local Service Edge</li> <li>• Regional Service Edge</li> </ul>

Table 106: Fields on the Add Tenant Page (*continued*)

Field	Description
SD-WAN Mode	<p><b>NOTE:</b> This field appears only if you selected the <b>SD-WAN sites</b> check box in the Deployment Type field.</p> <p>Select the SD-WAN mode:</p> <ul style="list-style-type: none"> <li>• <b>Bandwidth-optimized</b>—CSO uses link-level probes to switch traffic from links that do not meet SLA criteria to links that meet SLA. This is selected by default. If you select the bandwidth-optimized option, all sites in the tenant are connected to the hub (hub-and-spoke topology).</li> <li>• <b>Real time-optimized</b>—CSO monitors application-level traffic and delegates the application-level probes and link switching to CPE. Select this mode if you want to implement AppQoE. If you select the real time-optimized option, all sites in the tenant are connected in full mesh or hub-and-spoke topology.</li> </ul> <p><b>NOTE:</b> The Dynamic VPN page and Mesh Tags page appears in the Customer Portal only if you have selected the <b>Real time-optimized</b> option.</p>
<b>Tenant Properties</b>	
<i>SSL Settings</i>	
<b>NOTE:</b> This setting is applicable only to the SD-WAN deployment scenario.	

Table 106: Fields on the Add Tenant Page (continued)

Field	Description
Default SSL Forward Proxy Profile	<p>Click the toggle button to enable a default SSL proxy profile for the tenant.</p> <p>If you enable this option, the following items are created when a tenant is added:</p> <ul style="list-style-type: none"><li>• A default root certificate with the certificate content specified (in the <b>Root Certificate</b> field)</li><li>• A default SSL proxy profile</li><li>• A default SSL proxy profile intent that references the default profile</li></ul> <p>This option is disabled by default.</p> <p><b>NOTE:</b> You use this option to create a tenant-wide default profile; enabling or disabling this option does <i>not</i> mean that SSL is enabled or disabled.</p> <p>If you enable this option, you must add a root certificate.</p>



Table 106: Fields on the Add Tenant Page (*continued*)

Field	Description
Root Certificate	<p>You can add a root certificate (X.509 ASCII format) by importing the certificate content from a file or by pasting the certificate content:</p> <ul style="list-style-type: none"> <li>To import the certificate content directly from a file: <ol style="list-style-type: none"> <li>Click <b>Browse</b>. The <b>File Upload</b> dialog box appears.</li> <li>Select a file and click <b>Open</b>. The content of the certificate file is displayed in the <b>Root Certificate</b> field.</li> </ol> </li> <li>Copy the certificate content from a file and paste it in the text box.</li> </ul> <p>After the tenant is successfully added, a default root certificate, a default SSL proxy profile, and a default SSL proxy profile intent are created.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>The root certificate must contain both the certificate content and the private key.</li> <li>For full-fledged certificate operations, such as certificates that need a passphrase, or that have RSA private keys, you must use the Certificates page (<b>Administration &gt; Certificates</b>) to import the certificates and install on one or more sites.</li> </ul>

## VPN Authentication

**NOTE:** This setting is applicable only to the SD-WAN deployment scenario.

Table 106: Fields on the Add Tenant Page (*continued*)

Field	Description
Authentication Type	

Table 106: Fields on the Add Tenant Page (continued)

Field	Description
	<p>Select the VPN authentication method to establish a secure IPsec tunnel:</p> <ul style="list-style-type: none"> <li>• <b>Preshared Key</b>—Select this option if you want CSO to establish IPsec tunnels using keys.</li> </ul> <p><b>NOTE:</b> Preshared Key is the default VPN authentication method.</p> <ul style="list-style-type: none"> <li>• <b>PKI Certificate</b>—Select this option if you want CSO to establish IPsec tunnels using public key infrastructure (PKI) certificates. Specify the following: <ul style="list-style-type: none"> <li>• <b>CA Server URL</b>—Specify the Certificate Authority (CA) Server URL. For example, <code>http://CA-Server-IP-Address/certsrv/mscep/mscep.dll/pkiclient.exe</code>. The CA server manages the life cycle of a certificate. The CA server also publishes revoked certificates to the certification revocation list (CRL) server. To obtain trusted CA certificates, CSO communicates with the CA server using the Simple Certificate Enrollment Protocol (SCEP).</li> <li>• <b>Password</b>—Specify the password for the CA server. This field is optional.</li> <li>• <b>Revocation List Server URL</b>—Specify the CRL server URL. For example, <code>http://Revocation-List-Server-IP-Address/certservices/abc.crl</code>. CSO retrieves the list of revoked certificates from the CRL server.</li> <li>• <b>Auto Renew</b>—Click the toggle button to enable automatic renewal of certificates. If you enable the Auto Renew toggle button, certificates are automatically renewed for all sites in the tenant.  By default, the Auto Renew toggle button is disabled. If you disable the Auto Renew toggle button, certificates must be manually renewed.</li> </ul> <p><b>NOTE:</b> If the certificate is expired before the renewal, CSO might not be able to reach the device.</p> <li>• <b>Renew before expiry</b>—This field appears only if you have enabled the Auto Renew toggle button.</li> </li></ul>

Table 106: Fields on the Add Tenant Page (continued)

Field	Description
	<p>Select the number of days, weeks, or months before the expiration date when the certificates get automatically renewed.</p> <p>Select one of the following:</p> <ul style="list-style-type: none"> <li>• 3 Days</li> <li>• 1 Week</li> <li>• 2 Weeks</li> <li>• 1 Month</li> </ul> <p><b>NOTE:</b> The default value is 2 weeks. You can also change the duration value in the Customer Portal &gt; Administration &gt; Certificate Management &gt; VPN Authentication page.</p>
Overlay Tunnel Encryption	
<b>NOTE:</b> This is applicable only to the SD-WAN deployment scenario.	
Encryption Type	<p>For security reasons, all data that passes through the VPN tunnel must be encrypted. Select the encryption type:</p> <ul style="list-style-type: none"> <li>• 3DES-CBC—Triple Data Encryption Standard with Cipher-Block Chaining (CBC) algorithm.</li> <li>• AES-128-CBC—128-bit Advanced Encryption Standard with CBC algorithm.</li> <li>• AES-128-GCM—128-bit Advanced Encryption Standard with Galois/Counter Mode (GCM) algorithm.</li> <li>• AES-256-CBC—256-bit Advanced Encryption Standard with CBC algorithm.</li> <li>• AES-256-GCM—256-bit Advanced Encryption Standard with GCM algorithm.</li> </ul> <p>The default encryption type is AES-256-GCM.</p> <p><b>NOTE:</b> The MX Series routers do not support encryption types, AES-128-GCM and AES-256-GCM. The default encryption type for MX Series routers is, AES-256-CBC.</p>
Network Segmentation	
Network Segmentation	Enable network segmentation on the tenant.

Table 106: Fields on the Add Tenant Page (*continued*)

Field	Description
Dynamic VPN Threshold	
Note: This is applicable only to the SD-WAN deployment scenario in real-time optimized mode.	
Threshold	<p>Select this check box to customize the dynamic VPN threshold value that will override the tenant-level default threshold values.</p> <p>For more informations about dynamic VPN, see <a href="#">"Dynamic VPN Tunnels Overview"</a> on page 337.</p>
Threshold for Creating a Tunnel	
Set a threshold value, above which a tunnel is created between two sites.	
Sessions closed	<p>Specify the maximum number of sessions closed (for a time duration of 2 minutes) between two spoke sites.</p> <p>The dynamic VPN tunnel is created between two spoke sites if the number of sessions closed (for a time duration of 2 minutes) is greater than or equal to the value that you specified.</p> <p>The default threshold value (the number of sessions for 2 minutes) is 5.</p> <p>For example, if you specify the number of sessions as 5, dynamic VPN tunnels are created if the number of sessions closed between two spoke sites in 2 minutes exceeds 5.</p>
Threshold for Deleting a Tunnel	
Set a threshold value, below which a tunnel is deleted between two sites.	

Table 106: Fields on the Add Tenant Page (*continued*)

Field	Description
Sessions closed	<p>Specify the minimum number of sessions closed (for a time duration of 15 minutes) between two spoke sites.</p> <p>The dynamic VPN tunnel is deleted between two spoke sites if the number of sessions closed (for a time duration of 15 minutes) is lesser than or equal to the value that you specified.</p> <p>The default threshold value (the number of sessions for 15 minutes) is 2.</p> <p>For example, if you specify the number of sessions as 2, the dynamic VPN tunnels are deleted if the number of sessions closed is lesser than or equal to 2.</p>
Maximum DVPN Tunnels	
Max tunnels allowed per CSO	<p>Displays the maximum number of DVPN tunnels that can be created in CSO. The total number of DVPN tunnels that can be created by all tenants in CSO is limited to 125000.</p> <p>A major alarm is raised if the number of DVPN tunnels created by all tenants reaches seventy percent of the maximum value.</p> <p>A critical alarm is raised if the number of DVPN tunnels created by all tenants reaches ninety percent of the maximum value.</p> <p>To view alarms, see Monitor &gt; Alerts &amp; Alarms &gt; Alarms in the Administration Portal.</p> <p>For more information about alarms, see <a href="#">“About the Alarms Page” on page 29</a>.</p>

Table 106: Fields on the Add Tenant Page (continued)

Field	Description
Max tunnels allowed per tenant	<p>Specify the maximum number of DVPN tunnels that the tenant can create.</p> <p>Range: 0 through 125000.</p> <p>A major alarm is raised if the number of DVPN tunnels created by all sites in a tenant reaches seventy percent of the maximum value.</p> <p>A critical alarm is raised if the number of DVPN tunnels created by all sites in a tenant reaches ninety percent of the maximum value.</p> <p>To view alarms, see Monitor &gt; Alerts &amp; Alarms &gt; Alarms in the Customer Portal.</p> <p>For more information about alarms, see <a href="#">“About the Alarms Page” on page 396</a>.</p>
<i>Service Profiles</i>	
VIM Name	<p>If you use a dedicated OpenStack Keystone for Contrail Service Orchestration in a centralized deployment, then select the virtualized infrastructure manager (VIM) for the tenant. A tenant can be associated with multiple VIMs.</p> <p>Example: test-vim</p>
Service Profile Name	<p>If you use a dedicated OpenStack Keystone for Contrail Service Orchestration in a centralized deployment, then select the service profile that specifies the authentication information for the tenant. You configure the service profile when you create the VIM.</p> <p>Example: service-profile-for-test-vim</p>
<i>Custom Properties</i>	<p>If you have set up a third-party provider edge (PE) device by using software other than Contrail Service Orchestration, then configure settings on that router by specifying custom parameters and its corresponding values.</p>

Table 106: Fields on the Add Tenant Page (continued)

Field	Description
Name	<p>Specify any information about the site that you want to pass to a third-party router.</p> <p>Example: Location</p>
Value	<p>Specify a value for the information about the site that you want to pass to a third-party device.</p> <p>Example: Boston</p>

RELATED DOCUMENTATION

<a href="#">Tenants Overview   254</a>
<a href="#">Editing Tenant Information   272</a>

Editing Tenant Information

You can edit a tenant configuration to modify service profiles and custom properties.

To edit a tenant:

1. Click **Tenants**.  
The Tenants page appears.
2. Select the tenant for which you want to modify service profiles or custom properties, and click the edit icon.  
The Edit Tenant page appears.
3. Click **Next** twice to go to the Tenant Properties section. Note that you cannot edit the settings in the Tenant Info and Topology Info sections.  
The Tenant Properties section appears.



- Click > next to Service Profiles to add, edit, or delete service profiles information if you use a dedicated OpenStack Keystone for Contrail Service Orchestration in a centralized deployment.

VIM Name	<p>Select the virtualized infrastructure manager (VIM) for the tenant. A tenant can be associated with multiple VIMs.</p> <p>Example: test-vim</p>
Service Profile Name	<p>Select the service profile that specifies the authentication information for the tenant. You configure the service profile when you create the VIM.</p> <p>Example: service-profile-for-test-vim</p>

- Click > next to Custom Properties to add or delete custom properties information if you have set up a third-party provider edge (PE) device by using software other than Contrail Service Orchestration.

Name	<p>Specify the type of information that you want to pass to a third-party router.</p> <p>Example: Location</p>
Value	<p>Specify the information that you want to pass to a third-party device.</p> <p>Example: Boston</p>

- After you make the changes, click **Next** to view the changes in the Summary section.  
The Summary section appears.
- Review the changes and click **OK** to save the changes. To discard the changes, click **Cancel**.

## RELATED DOCUMENTATION

[Tenants Overview | 254](#)

[Adding a Single Tenant | 259](#)

## Importing Data for Multiple Tenants

### IN THIS SECTION

- [Creating a Tenant Data File | 274](#)
- [Importing Tenant Data | 278](#)

You can use the Import Tenants page to import tenant data and other objects associated with the tenant, such as administrative users, sites, and topology. You can start by downloading a JSON template and using it to customize the data file that you want to import.

### Creating a Tenant Data File

To create a tenant data file:

1. On the Tenants page, click **Import Tenants > Import**.

The Import Tenants page appears.

2. Click **Download Sample JSON** to download a sample JavaScript Object Notation (JSON) template.

The sample tenant template file is downloaded to your system.

3. On the Import Tenants page, click **Cancel**.

4. Open the template file.

5. Save the template file to your computer with an appropriate name.

6. Customize the file with your tenant data, using [Table 107 on page 275](#) as a reference.

7. Save the customized tenant data file.

You can add tenants using the customized tenant data file.

Table 107: Tenant Configuration Fields

Field	Description
tenant_name	Specify the name of the tenant. You can use an unlimited number of alphanumeric characters, including symbols.  Example: tenant-a
password_expiration_radio	Specify the duration (in days) after which the password expires and must be changed.
tenant_admin	
admin_user_name	Specify a unique name for the tenant administrator.  Example: admin-tenant-a
first_name	Enter the first name of the tenant.
last_name	Enter the second name of the tenant.
password_expiration_interval	Specify the duration (in days) after which the password expires and must be changed.  The range is from 1 through 365.
topology_type	Specify the topology type (SD-WAN, or Hybrid WAN, or both)
default_ssl_proxy_profile	Specify whether you want to enable or disable SSL proxy profile for the tenant
properties	If you have set up a third-party provider edge (PE) device by using software other than Contrail Service Orchestration, then configure settings on that router by specifying custom parameters and its corresponding values.  Specify information (name and value) about the site that you want to pass to a third-party router.
vpn	Specify the VPN authentication method to establish a secure IPsec tunnel.
departments	Specify if you want to enable network segmentation on the tenant.
managed_wan_topology	

Table 107: Tenant Configuration Fields (*continued*)

Field	Description
network_name	Specify a unique name for the customer Layer 3 VPN network. You can use an unlimited number of alphanumeric characters, including symbols.  Example: vcpe-tenant-a-l3vpn
<i>router_info (cloud_site_info)</i>	
router_name	Specify the router name that connects to the tenant site. This value matches the interface that you configure for the MX Series router physical network element (PNE).  Example: PNE-MX10
route_target	Specify the route target of the transit network for the tenant.  Example: 8888:889
right_network_name	Specify the name of the transit network for the tenant.  Example: internet, corp-vpn-right
subnet	Specify the subnet of the transit network for the tenant.  Example: 10.154.0.0/24
route_target (internet-info)	Specify the route target of the site virtual network.  Example: 8888:887
subnet (internet-info)	Specify the IP address of the subnet that connects the site to the Internet.  Example: 10.155.0.0/24
<i>pop_info (cloud_site_info)</i>	
pop_name	Specify the name of the POP that manages the site. You can use an unlimited number of alphanumeric characters, including symbols.  Example: pne-pop10
route_target	Specify the route target of the transit network for the tenant.  Example: 8828:889

Table 107: Tenant Configuration Fields (*continued*)

Field	Description
right_network_name	Specify the name of the transit network for the tenant.  Example: corp-vpn-right
subnet	Specify the subnet of the transit network for the tenant.  Example: 10.151.0.0/24
route_target (internet-info)	Specify the route target of the site virtual network.  Example: 8888:887
subnet (internet-info)	Specify the IP address of the subnet that connects the site to the Internet.  Example: 10.155.0.0/24
<i>pop_info (data_center_site_info)</i>	
pop_name	Specify the name of the POP. You can use an unlimited number of alphanumeric characters, including symbols.  Example: pne-pop10
route_target	Specify the route target for the corporate data center network.  Example: 65412:772
subnet	Specify the subnet of the corporate data center network.  Example: 10.155.0.0/24
route_target (internet-info)	Specify the route target for the Internet network.  Example: 8888:887
subnet (internet-info)	Specify the subnet IPv4 address for the Internet network.  Example: 10.155.0.0/24

## Importing Tenant Data

To import tenant data:

1. On the Tenants page, click **Import Tenants**.

The Import Tenants page is displayed.

2. Click **Browse** and navigate to the directory where the customized tenant data file is located.

3. Select the tenant file and click **Open**.

4. Click **Import**.

The status of the import operation is displayed. You can click **View Details** for more information about the import operation. If the import operation state is successful, then proceed to Step 4 or verify the tenant file format.

5. Click **OK**.

The new tenants are displayed on the Tenants page. You can click any tenant to view more information about the tenant.

**NOTE:** If you use the tenants for a hybrid WAN centralized deployment, access Contrail and add the following rule to the default security group in the Contrail project.

```
Ingress IPv4 network 0.0.0.0/0 protocol any ports any
```

This rule allows the network to accept traffic from all subnets.

## RELATED DOCUMENTATION

| [Viewing the History of Imported Tenant Data](#) | 279

## Allocating Network Services to a Tenant

Use the Tenants page to assign the network services to a tenant. Network services are created and saved in Network Service Designer. When setting up a tenant with Administration Portal, you must import the network services and assign them to customers. After the allocation, tenants can see and activate the network services in Customer Portal.

### Before You Begin

- Create network services in Network Service Designer. See [“Configuring Network Services” on page 1018](#) topic.

To assign network services:

1. Click **Tenants**.

The Tenants page appears.

2. Select a customer and click **Allocate Network Services**.

The Allocate Network Services to *Tenant-Name* page appears. All network services that are available for the customer are listed.

3. Select the network services and click **Ok**.

The network services are assigned to the tenant.

### RELATED DOCUMENTATION

| [About the Tenants Page](#) | 257

## Viewing the History of Imported Tenant Data

You can use the Import History page to view the imported tenant data, status of the import operation, and log details.

To view the history of imported tenant data:

1. Click **Tenants > Import Tenants > Import History**.

The Import History page is displayed. [Table 108 on page 280](#) describes the fields on the Import History page.

2. Click the task name.

The Import Tenants Task page appears. [Table 109 on page 280](#) describes the fields on the Import Tenants Task page.

3. Click the task ID on the Job Status page to view the job details, such as whether this job succeeded or failed.

[Table 110 on page 281](#) describes the fields on the Job Status page for imported tenant data.

**Table 108: Fields on the Import History Page**

Field	Description
In progress	View the number of import tasks that are in progress.
Success	View the number of import tasks that succeeded.
Failure	View the number of import tasks that have failed.
Name	View the name of the task.
Start Date	View the start date and time of the task.
End Date	View the end date and time of the task.
Status	View the status of the task to know whether the task succeeded or failed.
Log	View the import logs.  Click a log to access more detailed information about the imported log.

**Table 109: Fields on the Import Tenants Task Page**

Field	Description
Success	View the number of times the import operations succeeded for a tenant.
Failure	View the number of times the import operations failed for a tenant.
Task ID	View the ID created for the task.  Click the task ID to view the import log details corresponding to a tenant.
Status	View the status of the task to know whether the task succeeded or failed.



Table 110: Fields on the Job Status Page for Imported Tenant Data

Field	Description
Name	View the name of the task.
User	View the name of the user who imported the task.
State	View the status of the task to know whether the task succeeded or failed.
Actual Start Time	View the start date and time of the task.
End Time	View the end date and time of the task.

## RELATED DOCUMENTATION

| [Importing Data for Multiple Tenants](#) | 274

## Viewing the History of Deleted Tenant Data

You can use the Delete History page to view the deleted tenant data, status of the delete operation, and log details.

To view the history of deleted tenant data:

1. Click **Tenants > Import Tenants > Delete History**.

The Delete History page is displayed. [Table 111 on page 282](#) describes the fields on the Delete History page.

2. Click the task name.

The Delete Tenants Tasks page appears. [Table 112 on page 282](#) describes the fields on the Delete Tenants Tasks page.

3. Click the task ID in the Job Status page to view the job details, such as whether this job succeeded or failed.

[Table 113 on page 282](#) describes the fields on the Job Status page for deleted tenant data.

Table 111: Fields on the Delete History Page

Field	Description
In progress	View the number of delete tasks that are in progress.
Success	View the number of delete tasks that succeeded.
Failure	View the number of delete tasks that failed.
Name	View the name of the task.
Start Date	View the start date and time of the task.
End Date	View the end date and time of the task.
Status	View the status of the task to know whether the task succeeded or failed.
Log	View the delete logs.  Click a log to access more detailed information about deleted logs.

Table 112: Fields on the Delete Tenants Tasks Page

Field	Description
Success	View the number of delete operations that succeeded for a tenant.
Failure	View the number delete operations that failed for a tenant.
Task ID	View the ID created for the task.  Click the task ID to view the delete log details corresponding to a tenant.
Status	View the status of the task to know whether the task succeeded or failed.

Table 113: Fields on the Job Status Page for Deleted Tenant Data

Field	Description
Name	View the name of the task.
User	View the name of the user who deleted the task.
State	View the status of the task to know whether the task succeeded or failed.

Table 113: Fields on the Job Status Page for Deleted Tenant Data *(continued)*

Field	Description
Actual Start Time	View the start date and time of the task.
End Time	View the end date and time of the task.

RELATED DOCUMENTATION

<a href="#">Importing Data for Multiple Tenants   274</a>
<a href="#">Viewing the History of Imported Tenant Data   279</a>

# Managing Operating Companies

## IN THIS CHAPTER

- [Operating Companies Overview | 284](#)
- [About the Operating Companies Page | 292](#)
- [Creating Operating Companies | 293](#)
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## Operating Companies Overview

## IN THIS SECTION

- [OpCo Hierarchy Management | 285](#)
- [OpCo Authentication and Authorization | 286](#)
- [Access Privileges for Global SP, OpCo, and Tenant Users | 286](#)
- [Benefits of Operating Companies | 292](#)

Contrail Service Orchestration (CSO) supports operating companies in a service provider environment. An operating company (OpCo) is a region-specific service provider that can create and manage its own tenants and provide services to them—thus an OpCo is a subset of the global service provider and functions as a service provider for its own tenants.

A global service provider can create one or more operating companies and share resources (cloud hub devices, device templates, and so on) with the operating companies. The global service provider manages its own tenants as well as the operating companies.

For example, the Global SP administrator can create operating companies such as OpCo\_Spain, OpCo\_Italy, and OpCo\_France under the global service provider V1\_Global and share the resources with these operating companies.

Tenants managed by one OpCo are isolated from tenants of another OpCo—that is, resources from one OpCo cannot be shared with other operating companies.

**NOTE:** When an SP administrator creates one or more operating companies under the service provider, the service provider is called a global service provider and the SP administrator is called the Global SP administrator.

This topic contains the following sections:

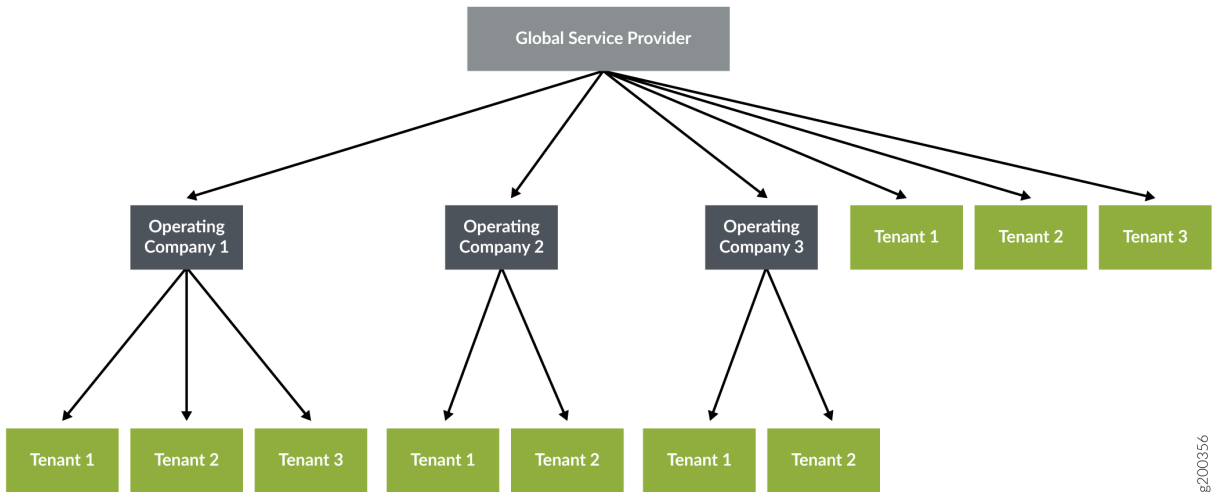
## OpCo Hierarchy Management

The CSO multitenant hierarchy has the following levels:

- **Global service provider**—Contains one or more operating companies and its tenants, manages resources at the service provider level, and shares common resources with operating companies and tenants. The Global SP administrator has the required access privileges to view and access resources across operating companies.
- **Operating company**—A region-specific service provider that can manage its tenants and provide services to them. Tenants managed by one OpCo are isolated from tenants of another OpCo. A global service provider share resources (cloud hub devices, device templates, and so on) with the operating companies and their tenants.
- **Tenant**—A tenant uses the resources that the global service provider or the tenant's OpCo shares with it.

Figure 10 on page 286 shows the relationship between the global service provider, operating companies, and tenants. A global service provider can have one or more operating companies and tenants, and each OpCo can be assigned one or more tenants.

Figure 10: OpCo Hierarchy Management



## OpCo Authentication and Authorization

A newly created OpCo can use either the same authentication method used by the global service provider or its own SSO server to authenticate its users. If the OpCo uses its own SSO server, the SSO server details need to be added in the Authentication (**Administration > Authentication**) page. For more information about configuring a SSO server, see [“Configuring a Single Sign-On Server” on page 346](#).

The following authentication methods are available for OpCo users:

- Local authentication
- Authentication using an SSO server
- Authentication and authorization using an SSO server

For more information about authentication methods, see [“Authentication Methods Overview” on page 341](#).

## Access Privileges for Global SP, OpCo, and Tenant Users

Global SP, OpCo, and tenant users can perform tasks based on the access privileges assigned to these roles.

- An OpCo administrator, Global SP administrator, tenant administrator, or users with administrator role privileges can perform an administrator's tasks.
- Global SP users cannot access operating companies and tenants automatically. An OpCo administrator, a tenant administrator, or users with administrator role privileges need to provide the required access privileges to the Global SP users. Therefore, global users can view and access operating companies and tenants.

- An OpCo administrator, tenant administrator, or users with the administrator role privileges can add global SP users to the OpCo or to the tenant. Therefore, global SP users can perform tasks specific to an OpCo or a tenant by switching the scope to a specific OpCo or tenant.

For more information about roles, see [“Role-Based Access Control Overview” on page 298](#).

[Table 114 on page 287](#) shows the access privileges of Global SP, OpCo, and Tenant Users.

**Table 114: Access Privileges for Global SP, OpCo, and Tenant Users.**

Main Menu	Submenu	Access Privileges
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**Dashboard**—Display widgets for both global SP and an OpCo users when they log in to CSO. However, for OpCo users, the following information is filtered based on OpCo tenants.

	Tenant Sites – Total Alerts	Global SP users can view alerts across all tenants. OpCo users can view alerts across their tenants.
	POPs – Capacity Used	Global SP users can create and manage all POPs and share the POPs with operating companies. Global SP and OpCo users can view POPs usage (CPU, Memory, and Storage).
	Cloud Services: POP Resources Used	Global SP and OpCo users can view POPs usage (CPU, Memory, and Storage).
	Top 5 POPs with Alerts	Global SP and OpCo users can view POPs alerts. However, OpCo users can only view POP alerts across their tenants.
	Top 5 Tenants with Alerts	Global SP users can view alerts across all tenants. OpCo users can only view alerts across their tenants.
	Top 5 Sites with Alerts	Global SP users can view alerts across their tenant sites. OpCo users can only view alerts across their tenant sites.

**Monitor**—Displays a geographical map of all POPs and alerts associated with each POP. Global SP users can create and manage all POPs and share the POPs with operating companies. Both Global SP and OpCo users can view POPs and their associated alerts. However, tenants can view only the alerts of their sites.

Table 114: Access Privileges for Global SP, OpCo, and Tenant Users. *(continued)*

Main Menu	Submenu	Access Privileges
	Alerts	Alerts are generated for a tenant's site or device and the alerts are shared with its tenant's OpCo and global service provider. The tenant user can only view tenant-specific alerts and the OpCo users can view alerts of the OpCo's tenants. Global SP users can view all alerts across all tenants.
	Alert Definition – SD-WAN Alert	Global SP users can create SD-WAN alert definitions. OpCo users and tenants can view SD-WAN alert definitions.
	Alert Definition – Security Alert	Tenants can create security alert definitions. OpCo and Global SP users can view security alert definitions.
	Alarms	Alarms are generated for a specific tenant and shared with an OpCo's tenant and Global SP users. Global SP users can view alarms across all tenants and the OpCo users can view alarms specific to their tenants.  Global SP users can view alarms specific to global devices (for example, cloud hub devices).
	Tenants SLA Performance	SLA performance is measured for each tenant. Global SP users can view the SLA performance of all tenants. OpCo users can view the SLA performance of their tenants.
	Jobs – All	Global SP users can view and edit the scheduled jobs across all tenants. OpCo users can view and edit scheduled jobs of the OpCo's tenants. Tenants can view and edit their scheduled jobs.
	Jobs – Scheduled	Global SP users can view scheduled jobs across all tenants. OpCo users can view scheduled jobs specific to their tenants.

**Resources**—Global SP and OpCo users can create and manage POPs, tenant devices, cloud hub devices, device profiles, and device images. POPs and cloud hub devices are shared globally. Both Global SP and OpCo users can view all POPs and cloud hub devices.



Table 114: Access Privileges for Global SP, OpCo, and Tenant Users. (continued)

Main Menu	Submenu	Access Privileges
	POP	Global SP users can create POPs and share the POPs with all operating companies and their tenants. Operating companies and tenants of global service provider have read-only access to POPs.
	Tenant Devices	Tenants own tenant devices and share the devices with the tenant's OpCo and global service provider.
	Cloud Hub Devices	Global SP users can create and manage all cloud hub devices and share the devices with operating companies and tenants. Operating companies and tenants have read-only access to cloud hub devices.
	Virtual Route Reflector (VRR)	<p>The VRR is created during CSO deployment and is available to all operating companies and tenants.</p> <p>A virtual route reflector (VRR) resides on a virtual machine (VM) on each regional microservices server. During the CSO installation, a VRR is installed on the regional servers. The VRR has a fixed configuration that you cannot modify. Use of a VRR enhances scaling of the BGP network with low cost and removes the need for hardware-based route reflectors that require space in a data center and ongoing maintenance.</p> <p><b>NOTE:</b> VRR is not a UI element.</p>
	Device Profiles	<p>Device profiles can be managed by:</p> <ul style="list-style-type: none"> <li>• Global SP—Global SP users can create, modify, and share device profiles with operating companies and tenants. Operating companies and tenants have read-only access to the global service provider's device profiles.</li> <li>• Operating companies—OpCo users can create, modify, and share device profiles with the OpCo's tenants. The global SP users have read-only access to the OpCo's device profiles.</li> </ul>
	Images	Global SP users can upload all device images, and the images are available to all operating companies and tenants associated with global service provider and operating companies.

**Configuration**—Global SP and OpCo users can create and manage application traffic types, application SLA profiles, shared objects, and network services and share them with other operating companies.

Table 114: Access Privileges for Global SP, OpCo, and Tenant Users. (continued)

Main Menu	Submenu	Access Privileges
	Application Traffic Type Profiles	Global SP users can create and manage application traffic type profiles. Operating companies and tenants have read-only access to application traffic type profiles.
	Application SLA Profiles	Application SLA profiles can be managed by: <ul style="list-style-type: none"> <li>• Global SP—Global SP users can create application SLA profiles. Operating companies and tenants have read-only access to application SLA profiles.</li> <li>• Operating companies—OpCo users can create SLA application profiles. Global SP users and OpCo tenants have read-only access to SLA application profiles.</li> <li>• Tenants—Both global service provider and OpCo tenants can create SLA application profiles. Global SP and operating companies have read-only access to their tenants SLA application profiles.</li> </ul>
	Shared Objects	Global SP users can create and manage shared objects. Operating companies and tenants have read-only access to the shared objects of the global service provider.
	Network Services (VNF and NSD)	Global SP users can create and manage network services and share them with operating companies and tenants.

**Tenants**—Global SP and OpCo users can create and manage tenants for the global service provider and operating companies.

	Global Tenants	Global SP users can create and manage their tenants. However, if the global service provider user has privilege to access an OpCo, then the user can switch to OpCo scope and manage OpCo tenants.
	Operating companies	Operating companies can be managed only by the Global SP users. OpCo users are not allowed to create operating companies.
	OpCo Tenants	OpCo users can create and manage their tenants. The Global SP user has read-only access to the OpCo's tenants.

**Administration**—Global SP and OpCo users can create and manage users, and manage application databases, licenses, and preferences. Both Global SP and OpCo users can configure authentication methods and SMTP settings, and customize e-mail templates for their tenants.

Table 114: Access Privileges for Global SP, OpCo, and Tenant Users. (continued)

Main Menu	Submenu	Access Privileges
	Users	<p>Users can be managed by:</p> <ul style="list-style-type: none"> <li>• Global SP—Global SP users can create and manage users for their scope (service provider, tenant, and OpCo).</li> <li>• OpCo—OpCo users are created with appropriate access privileges by switching the scope to an OpCo.</li> </ul>
	Authentication	<p>Authentication methods can be configured at:</p> <ul style="list-style-type: none"> <li>• Global SP—Global SP users can configure an authentication method for service provider and tenant users.</li> <li>• Operating companies—OpCo users can use the same authentication method used by the global service provider or use their SSO server for their tenant users.</li> </ul>
	Licenses	Global SP users can upload and manage licenses. OpCo and tenant users can upload their licenses.
	Signature Database	Global SP users can manage and share application signature database with all operating companies and tenants.
	SMTP	<p>SMTP settings can be configured for:</p> <ul style="list-style-type: none"> <li>• Global SP—Global SP users can configure SMTP settings to send e-mails to their users (service provider, tenant, and OpCo) and tenants.</li> <li>• Operating companies—OpCo users can configure their SMTP settings to send e-mails to their users (both service provider and tenant) and tenants.</li> </ul>
	Preferences (Portal Customization)	Global SP users can create and manage themes for all operating companies and tenants. Operating companies can use the same theme used by the global service provider. Only the Global SP users can view and modify the theme settings.
	E-mail Templates	Global SP users can customize e-mail messages. OpCo users can create their e-mail templates for their tenants.

Benefits of Operating Companies

- An OpCo relieves the global service provider of the responsibility of tenant management for a specified region. For example, the OpCo can look after a country-specific regulatory, billing, or operational need for the global service provider.
- With the creation and configuration of operating companies, the Global SP administrator needs to define only a single solution across various regions and countries, and yet enable the operating companies to manage their assigned sets of tenants.
- Each OpCo can use a shared CSO cloud-hosted solution instead of using its own CSO installation. OpCo administrators can access a centrally deployed CSO instance, and local resources, and offer SD-WAN services to their tenants.

RELATED DOCUMENTATION

<a href="#">About the Operating Companies Page   292</a>
<a href="#">Creating Operating Companies   293</a>

About the Operating Companies Page

To access this page, click **Tenants > Operating Companies (OpCos)** in Administration Portal.

Use this page to view and manage operating companies of a Global SP. You can add, edit, and delete operating companies. Each operating company can have its own set of tenants.

Tasks You Can Perform

- You can perform the following tasks from this page:
- Create an operating company. See [“Creating Operating Companies” on page 293](#).
  - Edit or delete an operating company. See [“Editing and Deleting Operating Companies” on page 295](#).

Field Descriptions

[Table 115 on page 293](#) describes fields on the Operating Companies page.

Table 115: Fields on the Operating Companies Page

Field	Description
OpCo Name	Name of the operating company.
Authentication Method: OpCo users	A authentication method that the operating company uses to authenticate its users.
Authentication Method: OpCo Tenant users	A authentication method that the operating company uses to authenticate its OpCo tenant users.
Administrator	Name of the administrator that created the operating company.

## RELATED DOCUMENTATION

[Operating Companies Overview | 284](#)
[Creating Operating Companies | 293](#)
[Editing and Deleting Operating Companies | 295](#)

## Creating Operating Companies

Use the Operating Companies (OpCos) page to create operating companies. The Global SP administrator or users with Create OpCo privilege can create one or more operating companies.

**NOTE:** Only users with the OpCo administrator role can create its tenants. However, they cannot create further operating companies.

To create an operating company:

1. Select **Tenants > Operating Companies**.

The Operating Companies (OpCos) page appears, displaying the details of the available operating companies.

2. Click the add icon (+) to create a new operating company.

The Create Operating Companies (OpCos) page appears.

3. Complete the configuration according to the guidelines provided in [Table 116 on page 294](#).
4. Click **OK**.

A new operating company is created and listed on the Operating Companies (OpCos) page.

**Table 116: Fields on the Create Operating Company Page**

Field	Description
Name	Enter a unique name for the operating company. The name can contain alphanumeric characters, underscore, period, and space. The maximum length is 15 characters.
<b>Portal URLs</b>	
Admin Portal	Enter the URL of the Administration portal. End users can use this URL to access the administration portal.
Tenant Portal	Enter the URL of the Customer Portal. End users can use this URL to access the customer portal.
<b>Authentication Method</b>	
OpCo Users	<p>Select the authentication method to authenticate OpCo users. The default method is local authentication.</p> <ul style="list-style-type: none"> <li>• <b>Same as Global</b>—Select this option to use the authentication method which is used by the Global SP.</li> <li>• <b>Allow OpCo to decide</b>—Select this option to use OpCo's own authentication method.</li> </ul>
OpCo Tenant Users	<p>Select the authentication method to authenticate OpCo's tenant users. The default method is local authentication.</p> <ul style="list-style-type: none"> <li>• <b>Same as Global</b>—Select this option to use the authentication method which is used by the Global SP.</li> <li>• <b>Allow OpCo to decide</b>—Select this option to use OpCo's own authentication method.</li> </ul>
<b>Admin User</b>	
First Name	Enter the first name of the administrative user.
Last Name	Enter the last name of the administrative user.
Username (Email)	Enter the e-mail ID of the administrative user. The e-mail ID is the username for the administrative user.

Table 116: Fields on the Create Operating Company Page *(continued)*

Field	Description
Role	<p>Select one or more roles (both predefined and custom roles) that you want to assign to the OpCo user. You can assign both service provider and tenant roles to OpCo users.</p> <p>Click the greater-than icon (&gt;) to move the selected role or roles from the <b>Available</b> column to the <b>Selected</b> column. You can use the search icon on the top right of each column to search for role names.</p> <p>The following are the predefined roles for OpCo users:</p> <ul style="list-style-type: none"><li>• <b>OpCo Admin</b>—Users with the OpCo Admin role have full access to the OpCo's Administration Portal UI or API capabilities. They can use the UI or APIs to add one or more users with OpCo Admin, OpCo Operator, and custom roles. They can onboard tenants and add the first tenant user during the OpCo's tenant onboarding process. They can also add tenant administrators or operators by switching the scope to a specific tenant.</li><li>• <b>OpCo Operator</b>—Users with the OpCo Operator role have read-only access to the OpCo's Customer Portal UI and APIs.</li></ul>

RELATED DOCUMENTATION

<a href="#">Operating Companies Overview   284</a>
<a href="#">About the Operating Companies Page   292</a>
<a href="#">Editing and Deleting Operating Companies   295</a>

Editing and Deleting Operating Companies

IN THIS SECTION

- [Editing Operating Companies | 296](#)
- [Deleting Operating Companies | 296](#)

You can edit and delete operating companies from the Operating Companies (OpCos) page. This topic has the following sections:

## Editing Operating Companies

To modify the parameters of an operating company.

**NOTE:** You cannot modify the operating company name.

1. Select **Tenants > Operating Companies**.

The Operating Companies (OpCos) page appears, displaying the details of the available operating companies.

2. Select the operating company name that you want to edit and click the edit icon (represented by the pencil graphic on the page).

The Edit Operating Company(OpCo) page appears.

3. Modify the admin and tenant portal URLs as needed.

4. Click **OK** to save your changes.

A confirmation message appears, indicating the status of the edit operation.

## Deleting Operating Companies

To delete an operating company:

**NOTE:** You cannot delete an OpCo if any tenant is associated with an OpCo.

1. Select **Tenants > Operating Companies**.

The Operating Companies (OpCos) page appears, displaying the details of the available operating companies.

2. Select the operating company that you want to delete and then click the delete icon (X) from the top right corner of the page.

An alert message appears, asking you to confirm the delete operation.



3. Click **Yes** to delete the selected operating company.

A confirmation message appears, indicating the status of the delete operation. If you do want to delete, click **Cancel** instead.

#### RELATED DOCUMENTATION

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[About the Operating Companies Page | 292](#)

[Creating Operating Companies | 293](#)

# Configuring SP Users

## IN THIS CHAPTER

- [Role-Based Access Control Overview | 298](#)
- [About the Users Page in Administration Portal | 299](#)
- [Adding Service Provider and OpCo Users | 301](#)
- [Editing and Deleting Service Provider and OpCo Users | 305](#)
- [Resetting the Password for Service Provider and Tenant Users | 306](#)

## Role-Based Access Control Overview

Contrail Service Orchestration supports the authentication and authorization of users. Both service provider and tenant users access the pages within the unified Administration and Customer Portal based on their role and access permissions.

In addition to predefined roles, CSO enables you to add object-based custom roles. You can create custom roles and assign access privileges (read, create, update, delete, and other actions) to each role.

[Table 117 on page 298](#) shows predefined service provider, tenant, and OpCo roles and their access privileges.

**Table 117: Roles and Access Privileges**

Role	Role Scope	Access Privileges
SP Admin	Service Provider	<p>Users with the SP Admin role have full access to the Administration Portal UI or API capabilities. They can use the UI or APIs to add one or more users with SP Admin, SP Operator, and custom roles. They can onboard tenants, and add the first tenant user during the tenant onboarding process. They can also add tenant administrators or operators by switching the scope to a specific tenant.</p> <p><b>NOTE:</b> When the SP administrator creates one or more operating companies under the service provider, the service provider is called a global service provider and the SP administrator is called the global SP administrator.</p>
SP Operator	Service Provider	<p>Users with the SP Operator role have read-only access to the Administration Portal UI and APIs.</p>

Table 117: Roles and Access Privileges (*continued*)

Role	Role Scope	Access Privileges
Tenant Admin	Tenant	Users with the Tenant Admin role have full access to the Customer Portal UI and APIs. They can add one or more users with the Tenant Administrator or Tenant Operator roles.
Tenant Operator	Tenant	Users with the Tenant Operator role have read-only access to the Customer Portal UI and APIs.
OpCo Admin	Operating Company	Users with the OpCo Admin role have full access to the OpCo's Administration Portal UI or API capabilities. They can use the UI or APIs to add one or more users with OpCo Admin, OpCo Operator, and custom roles. They can onboard tenants, and add the first tenant user during the OpCo's tenant onboarding process. They can also add tenant administrators or operators by switching the scope to a specific tenant.
OpCo Operator	Operating Company	Users with the OpCo Operator role have read-only access to the OpCo's Customer Portal UI and APIs.
Configure Site	Tenant	Only users with SP Admin role can configure a site by switching the scope to a specific tenant. By default, a tenant administrator cannot configure a site.

## RELATED DOCUMENTATION

[Authentication Methods Overview](#) | 341

## About the Users Page in Administration Portal

To access the Users page, click **Administration** > **Users** in the Administration Portal.

Use this page to manage users in the Service Provider and Operating Company (OpCo) scopes.

For information about service provider and OpCo user roles and access permissions, see [“Role-Based Access Control Overview”](#) on page 298.

The information listed on the Users page changes depending on the authentication method configured:

- **Local** —The Users page lists all local users that you can add, edit, and delete.
- **Authentication and Authorization with SSO Server**—The Users page is not displayed because users are externally managed in the single sign-on (SSO) server.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Add a service provider user, or an OpCo user. See [“Adding Service Provider and OpCo Users” on page 301](#).
- Edit and delete a service provider user or an OpCo user. See [“Editing and Deleting Service Provider and OpCo Users” on page 305](#).

**NOTE:** You can edit or delete the information for a tenant user or an OpCo tenant user from the Customer Portal.

- View details of the users in the Service Provider and OpCo scopes. See [Table 118 on page 300](#).
- Show or hide columns about users. See [“Sorting Objects” on page 17](#).
- Reset password for a user. See [“Resetting the Password for Service Provider and Tenant Users” on page 306](#).
- Search for a user. See [“Searching for Text in an Object Data Table” on page 16](#).

### Field Descriptions

[Table 118 on page 300](#) displays the fields on the Users page in the Service Provider and OpCo scopes.

Table 118: Fields on the Users Page

Field	Description
Username	Username of the user.  Example: xyz@example.com
First Name	First name of the user.
Last Name	Last name of the user.
Status	Indicates whether the user is enabled (can log in to CSO) or disabled (cannot log in to CSO).

Table 118: Fields on the Users Page (*continued*)

Field	Description
Role	<p>Depending on the scope selected, indicates the roles assigned to the service provider user or the OpCo user.</p> <p>By default, this column lists only one role assigned to the user. When a user is assigned more than one role, a +&lt;integer&gt;icon (for example: +2) appears to the right of the role. The integer indicates the number of additional roles assigned to the user. Click on the integer to view the additional roles.</p>
Last Login	<p>Date and time when the user last logged into the Administrationportal. The format is MM/DD/YYYY HH:MM.</p> <p>Example: 07/22/2017 20:07</p> <p>A date and time is not displayed when a user has not logged in to the Administration Portal.</p>

## RELATED DOCUMENTATION

[Adding Tenant and OpCo Tenant Users | 888](#)
[Editing and Deleting Tenant and OpCo Tenant Users | 890](#)

## Adding Service Provider and OpCo Users

Use the Add User page or Add OpCo User page in the Administration portal to add service provider or Operating Company (OpCo) users respectively. After you add a user, the user receives an e-mail with the initial login credentials.

In the service provider scope, you can create a user and assign the following roles or a combination of roles to the user:

- Service provider roles
- Service provider and OpCo roles.

- Service provider and tenant roles. If a user is assigned both service provider and tenant roles, then the user is a service provider user. The user can view all tenants and access tenant objects based on the access privileges assigned in the tenant roles.
- Service provider, OpCo, and tenant roles. If a user is assigned service provider, OpCo, and tenant roles, then the user is a service provider user. The user can view all tenants and OpCos, and access tenant and OpCo objects, based on the access privileges assigned in the tenant and OpCo roles.

**NOTE:** To add users, you should be assigned a role, such as SP Admin, that allows you to add users.

In the OpCo scope, you can create a user and assign the following roles or combination of roles to the user:

- OpCo roles
- OpCo and OpCo tenant roles

To add a service provider user or an OpCo user:

1. Click **Administration > Users**.

The Users page appears.

2. Click the add icon (+) or click the **Add User** button. The Add User button appears when there are no users configured in the scope you have logged in.

In the Service Provider scope, the Add User page appears. In the OpCo scope, the Add OpCo User page appears.

3. Complete the configuration as described in [Table 119 on page 303](#).

4. Click **OK** to save the changes or click **Cancel** to discard the changes.

If you click OK, a confirmation message indicating that the user account is created appears and the user account is listed on the Users page.

To enhance the security related to your login credentials, an automatically generated password is sent to the e-mail address that you have specified for the user. You are prompted to change the password after you log in with the automatically generated password. For more information about changing the password on first login, see [“Changing the Password on First Login” on page 7](#).

Table 119: Fields on the Add User and Add OpCo User Pages

Field	Description
<b>First Name</b>	Enter the first name as a string of alphanumeric characters, some special characters [underscore (_) and period(.)] and spaces. The maximum length allowed is 32 characters.
<b>Last Name</b>	Enter the last name as a string of alphanumeric characters, some special characters [underscore (_) and period(.)] and spaces. The maximum length allowed is 32 characters.
<b>Username (Email)</b>	Enter a valid e-mail address in the <i>user@domain</i> format.
<b>Status</b>	<p>Click the toggle button to enable or disable the user.</p> <p>By default, the status is enabled. A user can login to CSO only when the status is enabled.</p>

Table 119: Fields on the Add User and Add OpCo User Pages (*continued*)

Field	Description
Role	<p>In the Service Provider scope, specify whether you want to assign specific roles to the user or make the user a Global Administrator:</p> <ul style="list-style-type: none"> <li> <b>Select specific roles</b>—Select this option to assign specific roles to the user in the SP, OpCo, and tenant scopes, and assign one or more roles in the different scopes.           <p>To assign roles:</p> <ol style="list-style-type: none"> <li>Click the scope in which you want to assign one or more roles to the user.               <p>The available roles are listed under the <b>Available</b> column.</p> </li> <li>Select one or more roles that you want to assign to the user and click the right-arrow icon to move the selected roles from the <b>Available</b> column to the <b>Selected</b> column.               <p>You can use the search icon on the top right of each column to search for role names.</p> </li> </ol> </li> <li> <b>Make Global Administrator</b>—Select this option to make the user a Global Administrator. As a Global Administrator, the user has permissions to perform all administration tasks in the SP, OpCo, and tenant scopes.           <p>In the OpCo scope, you can only assign OpCo and OpCo tenant roles to a user.</p> <p>To assign roles:</p> <ol style="list-style-type: none"> <li>Click the scope in which you want to assign one or more roles to the user.               <p>The available roles are listed under the <b>Available</b> column.</p> </li> <li>Select one or more roles that you want to assign to the user and click the right-arrow icon to move the selected roles from the <b>Available</b> column to the <b>Selected</b> column.               <p>You can use the search icon on the top right of each column to search for role names.</p> </li> </ol> <p>To know more about the predefined roles for service provider, OpCo, and tenant users, see <a href="#">“Role-Based Access Control Overview”</a> on page 298.</p> </li> </ul>

## RELATED DOCUMENTATION

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[About the Users Page in Customer Portal | 886](#)


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[Adding Tenant and OpCo Tenant Users | 888](#)


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[Editing and Deleting Tenant and OpCo Tenant Users | 890](#)



## Editing and Deleting Service Provider and OpCo Users

### IN THIS SECTION

- [Editing Service Provider and OpCo Users | 305](#)
- [Deleting Service Provider and OpCo Users | 306](#)

You can edit the information about a service provider or an Operating Company (OpCo) user, and also delete users from Contrail Service Orchestration (CSO).

**NOTE:** To edit and delete users, you should be assigned a role, such as SP Admin, that allows you to edit and delete users.

### Editing Service Provider and OpCo Users

To modify the information about a service provider user or an OpCo user:

1. Select **Administration > Users**.

The Users page appears.

2. Select the user that you want to modify, and click the edit icon.

In the Service Provider scope, the Edit User page appears. In the OpCo scope, the Edit OpCo User page appears.

3. Modify the parameters by following the guidelines provided in [Table 119 on page 303](#).

**NOTE:** You cannot modify the **Username (E-mail)** field.

4. Click **OK** to save the changes or click **Cancel** to discard the changes.

If you click OK, a confirmation message indicating that the user information is successfully updated appears on top of the Users page.

## Deleting Service Provider and OpCo Users

To delete one or more service provider users or OpCo users:

1. Select **Administration > Users**.

The Users page appears.

2. Select the users that you want to delete and click the delete icon.

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected users or **No** to cancel the deletion.

If you click **Yes**, a confirmation message indicating that the user account is deleted from CSO appears on top of the Users page.

### RELATED DOCUMENTATION

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[About the Users Page in Customer Portal | 886](#)

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[Adding Tenant and OpCo Tenant Users | 888](#)

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[Editing and Deleting Tenant and OpCo Tenant Users | 890.](#)

## Resetting the Password for Service Provider and Tenant Users

Users with the SP Administrator role can reset the password for service provider and tenant users. Also, users with the Update capability for Users objects can reset the password for both service provider and tenant users.

To reset the password:

1. Select **Administration > Users** in Administration Portal.

The Users page appears, displaying a list of service provider and tenant users.

2. Select the username for which you want to reset the password, and then select **More > Reset Password**.

An alert message appears, asking you to confirm the reset password operation.

3. Click **Yes** to confirm the reset password operation.

A confirmation message appears, indicating that the password has been successfully reset, and an e-mail with a new system-generated password is sent to the user.

The user can use the new system-generated password to log in to CSO.

#### RELATED DOCUMENTATION

| [About the Users Page in Administration Portal](#) | 299

# Managing Audit Logs

## IN THIS CHAPTER

- [Audit Logs Overview | 308](#)
- [About the Audit Logs Page | 309](#)
- [Viewing the Details of an Audit Log | 310](#)
- [Exporting Audit Logs | 313](#)
- [Purging Audit Logs \(After Archiving or Without Archiving\) | 314](#)

## Audit Logs Overview

An audit log is a record of a sequence of activities that have affected a specific operation or procedure. Audit logs are useful for tracing events and for maintaining historical data.

Audit logs contain information about tasks initiated by using the Contrail Service Orchestration (CSO) GUI or APIs. In addition to providing information about the resources that were accessed, audit log entries usually include details about user-initiated tasks, such as the name, role, and IP address of the user who initiated a task, the status of the task, and date and time of execution.

**NOTE:** Device-driven tasks (that is, tasks not initiated by the user) are not recorded in audit logs.

Administrators can use audit logs to review events. For example, administrators can identify the user accounts associated with an event, determine the chronological sequence of events. For audit log entries that have an associated job, you can click the hyperlinked job ID to go to the Jobs page, where you can view the details of the job.

## RELATED DOCUMENTATION

[About the Audit Logs Page | 309](#)

[Exporting Audit Logs | 313](#)

## About the Audit Logs Page

To access this page, select **Administration > Audit Logs**.

Use the Audit Logs page to view the tasks that you have initiated either by using the Contrail Service Orchestration (CSO) GUI or APIs. You can also export audit logs as a comma-separated values (CSV) file and purge audit logs after archiving them or without archiving them.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View the details of various user-initiated tasks by selecting **More > Details**. You can also mouse over the audit log and click on the **Detailed View** icon. See [“Viewing the Details of an Audit Log” on page 310](#).
- Export audit logs as a CSV file—See [“Exporting Audit Logs” on page 313](#).
- Purge audit logs—See [“Purging Audit Logs \(After Archiving or Without Archiving\)” on page 314](#).
- Search for audit logs by using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.
- Sort and filter audit logs:

**NOTE:** Sorting and filtering is applicable only to some fields.

- Click a column name to sort the audit logs based on the column name.
- Click the filter icon and select whether you want to show or hide column filters or apply a quick filter. For example, you can use audit log filtering to track user accounts that were added on a specific date, track configuration changes across a particular type of device, view services that were provisioned on specific devices, monitor user login and logout activities over time, and so on.
- Show or hide columns—Click the **Show Hide Columns** icon at the top right corner of the page and select the columns that you want displayed on the Audit Logs page.

[Table 120 on page 309](#) provides description of the fields on the Audit Logs page.

Table 120: Fields on the Audit Logs Page

Field	Description
Username	Displays the username of the user who initiated the task.

Table 120: Fields on the Audit Logs Page (*continued*)

Field	Description
User IP	Displays the IP address of the client from which the user initiated the task. For tasks that do not have an associated user IP address, this field is blank.
Object Name	Displays the name of the object on which the task was initiated. An object can be a tenant, site, device, device image, template, and so on.
Task	Displays the name of the task that triggered the audit log. For example, tenant.create, device.create, site.configure, site.provision, tenant.update, and so on.
Description	Displays details about the task.
Status	<p>Displays the status of the task that triggered the audit log:</p> <ul style="list-style-type: none"> <li>• Success—Job or task was completed successfully.</li> <li>• Failure—Job or task failed and was terminated.</li> <li>• Job Scheduled—Job is scheduled but has not yet started.</li> <li>• Recurring Job Scheduled—Recurring job is scheduled.</li> </ul>
End Time	Displays the date and time at which the execution of the task was completed. This timestamp is stored in UTC time in the database, but is mapped to the local time zone of the client computer.
Job ID	<p>For tasks that have associated jobs, displays the ID of the job associated with the task.</p> <p>You can click the job ID to go to the Jobs page, where you can view the status of the job.</p>

## RELATED DOCUMENTATION

[About the Jobs Page](#) | 49

## Viewing the Details of an Audit Log

Use the Audit Log Details pane to view details of an audit log.

To view the details of an audit log:

1. Select **Administration > Audit Logs**.

The Audit Logs page appears displaying the audit logs.

2. Select the audit log for which you want to view details and click **More > Details**. Alternatively, mouse over the audit log, and click on the **Detailed View** icon.

The Audit Log Details pane appears on the right side of the Audit Logs page. [Table 121 on page 311](#) provides descriptions of fields on the Audit Log Details pane.

3. Click the close icon (X) to close the Audit Log Details pane.

You are returned to the Audit Logs page.

**Table 121: Fields on the Audit Log Details Pane**

Field	Description
<b>Details</b>	
<b>User</b>	
Username	Displays the username of the user who initiated the task.
User IP	Displays the IP address of the client from which the user initiated the task. For tasks that do not have an associated user IP address, this field is blank.
<b>Task</b>	
Task	Displays the name of the task that triggered the audit log. For example, tenant.create, device.create, site.configure, site.provision, tenant.update, and so on.
Status	Displays the status of the task that triggered the audit log: <ul style="list-style-type: none"> <li>• Success—Job or task was completed successfully.</li> <li>• Failure—Job or task failed and was terminated.</li> <li>• Job Scheduled—Job is scheduled but has not yet started.</li> <li>• Recurring Job Scheduled—Recurring job is scheduled.</li> </ul>
Description	Displays details about the task.
<b>Affected Objects</b>	

Table 121: Fields on the Audit Log Details Pane (*continued*)

Field	Description
Object Name	<p>Displays the name of the affected object on which the task was initiated. An affected object can be a tenant, site, device, device image, template, and so on.. Click the hyperlinked object name to view details of the object:</p> <ul style="list-style-type: none"> <li>• If the affected object is a site, the Sites page appears. See <a href="#">“About the Sites Page” on page 749</a>.</li> <li>• If the affected object is a device, the Tenant Devices page appears. See <a href="#">“About the Devices Page” on page 457</a>.</li> <li>• If the affected object is a tenant, clicking on the tenant name displays an error message as you do not have permission to view this page.</li> </ul> <p><b>NOTE:</b> If the object is deleted or if you do not have permissions to view it, an error message is displayed.</p>
Object UUID	Displays the Universally Unique Identifier (UUID) of the affected object.
<b>Log Info</b>	
Audit Log ID	Displays the automatically-generated unique ID of the audit log associated with the task.
Job ID	<p>For tasks that have associated jobs, displays the ID of the job associated with the task.</p> <p>You can click the job ID to go to the Jobs page, where you can view the status of the job.</p>
End Time	Displays the date and time at which the execution of the task was completed. This timestamp is stored in UTC time in the database, but is mapped to the local time zone of the client computer.
<b>Raw Audit Log</b>	
Microservice	Displays the name of the microservice that initiated the execution of the task.
Raw Audit Log	Displays all the fields of the audit log that are stored in the database. The raw audit log typically contains additional details or parameters associated with the audit log.

## RELATED DOCUMENTATION

[About the Audit Logs Page](#) | 309



## Exporting Audit Logs

You can export audit logs as comma-separated values (CSV) file that can be opened or edited using an application such as Microsoft Excel. You can view and analyze the exported audit logs, as needed.

To export the audit logs:

1. Select **Administration > Audit Logs**.

The Audit Logs page appears displaying the audit logs.

2. Click **Export**.

The Export Audit Logs page appears.

3. Specify the time period for which you want to export the audit logs according to the guidelines provided in [Table 122 on page 313](#).

**NOTE:** You can export audit logs for a maximum of 30 days prior to the current date and time. For example, if the current date is May 31, 2018, you can export the audit logs starting from May 1, 2018.

4. Click **OK** to export the audit logs.

Depending on the settings of the browser that you are using, the CSV file containing the audit logs for the specified time period is either downloaded directly, or you are asked to open or save the file.

You are returned to the Audit Logs page.

After the file is downloaded, you can open the CSV file in an application such as Microsoft Excel and view and analyze the logs as required.

**Table 122: Fields on the Export Audit Logs Page**

Field	Description
Start Date and Time	Specify the date and time (in MM/DD/YYYY and HH:MM:SS 24-hour or AM/PM formats) from when the audit logs should be exported.
End Date and Time	Specify the date and time (in MM/DD/YYYY and HH:MM:SS 24-hour or AM/PM formats) up to when the audit logs should be exported.

RELATED DOCUMENTATION

<a href="#">Audit Logs Overview   308</a>
<a href="#">About the Audit Logs Page   309</a>
<a href="#">Viewing the Details of an Audit Log   310</a>

## Purging Audit Logs (After Archiving or Without Archiving)

You can manage the volume of audit log data stored by purging log files from the CSO database without archiving them or by purging log files after archiving them. You can purge audit logs immediately or schedule the purging for a later date and schedule the purging on a recurring basis.

To purge audit logs after archiving or without archiving them:


1. Select **Administration > Audit Logs**.

The Audit Logs page appears displaying the audit logs.

2. Click **Purge**.

The Purge Audit Logs page appears.

3. Complete the configuration according to the guidelines provided in [Table 123 on page 314](#)

 **NOTE:** Fields marked with an asterisk (\*) are mandatory.

4. Click **OK**.

You are returned to the Audit Logs page and one of the following operations occur:

- If you triggered a purge of the audit logs without archiving, a job to purge the audit logs is created.
- If you triggered a purge of the audit logs after archiving, a job is created to archive the audit logs and then purge the audit logs after archiving.

After the audit logs are purged successfully, the Audit Logs page refreshes automatically and displays only the audit logs that were not purged.

Table 123: Purge Audit Logs Settings

Field	Description
Purge Options	

Table 123: Purge Audit Logs Settings (*continued*)

Field	Description
<b>Purge Logs</b>	<p>Select one of the following options to purge audit logs:</p> <ul style="list-style-type: none"> <li>• Purge audit logs that were generated before a specified date and time—If you select this option, you must enter a date and time in the <b>Before</b> field.</li> <li>• Purge generated audit logs that are older than a specified number of days—If you select this option, you must specify the number of days in the <b>Older than</b> field.</li> </ul>
<b>Before</b>	<p>To purge audit logs before a specified date and time, enter the date (in MM/DD/YYYY format) and time (in HH:MM:SS 24-hour or AM/PM format)</p> <p>You specify the time in the local time zone of the client computer.</p>
<b>Older than</b>	<p>To purge generated audit logs older than a specified number of days, enter the number of days (from 1 through 90)</p>
<b>Archive Logs Before Purging</b>	<p>To archive audit logs <i>before</i> purging them, select this check box. By default, this check box is cleared, which means that audit logs are purged without archiving them.</p> <p><b>CAUTION:</b> If you choose not to archive the audit logs before purging, the audit logs are deleted from the CSO database and cannot be recovered.</p>
<b>Archive Mode</b>	<p>Specify whether you want to archive the log files locally (<b>local</b>) or on a remote server (<b>remote</b>).</p> <p>If you archive the logs on a remote server, which is the default option, you must enter access and login details for the remote server.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Archived log files are saved in a single file in compressed comma-separated values (CSV) format (extension .zip).</li> <li>• When you archive data locally, the archived log files are saved on the central microservices virtual machine (VM).</li> </ul>
<b>Username</b>	Enter a valid username to access the remote server.
<b>Password</b>	Enter a valid password to access the remote server on which the audit logs will be archived.
<b>Confirm Password</b>	For confirmation, re-enter the password to access the remote server.
<b>Remote Server IP Address</b>	Enter the IPv4 address of the remote server; for example, 192.0.2.10.

Table 123: Purge Audit Logs Settings (*continued*)

Field	Description
<b>Remote Server Path</b>	Enter the directory path on the remote server on which to store the archived log files. The directory that you specify must already exist on the remote server.
<b>Schedule Purge</b>	
<b>Type</b>	<p>Specify whether the audit logs should be purged immediately (<b>Run now</b>) or schedule the purge for later (<b>Schedule at a later time</b>).</p> <p>If you schedule the purge for later, enter the date (in MM/DD/YYYY format) and time (in HH:MM:SS 24-hour or AM/PM format) that you want the purge to occur.</p> <p>You specify the time in the local time zone of the client computer.</p>
<b>Recurrence</b>	<p>To specify whether the purge operation should occur on a recurring basis, select this check box.</p> <p><b>NOTE:</b> This option is enabled only if you choose to archive and purge audit logs older than a specified number of days.</p>
<b>Repeat</b>	Specify the periodicity of the recurrence. Currently, a weekly periodicity is the only option supported.
<b>On</b>	For purges that recur every week, specify one or more days on which you want the purge to recur.
<b>Time</b>	<p>Enter the time (in HH:MM:SS 24-hour or AM/PM format) that you want the recurring purge to occur. By default, the purge recurs at 12.00 AM.</p> <p>You specify the time in the local time zone of the client computer.</p>
<b>Ends</b>	<p>Specify whether the recurring purge ends or not:</p> <ul style="list-style-type: none"> <li>• Select <b>Never</b> to continue (without an end date) the recurring purge operation at the specified recurrence interval.</li> <li>• Select <b>On</b> and enter the date (in MM/DD/YYYY format) and time (in HH:MM:SS 24-hour or AM/PM format) on which to stop the recurring purge operation.</li> </ul> <p>You specify the time in the local time zone of the client computer.</p>

## RELATED DOCUMENTATION



# Managing Roles

## IN THIS CHAPTER

- [Roles Overview | 318](#)
- [About the Roles Page | 321](#)
- [Adding User-Defined Roles for Service Provider, OpCo, and Tenant Users | 322](#)
- [Editing, Cloning, and Deleting User-Defined Roles for Service Provider, OpCo, and Tenant Users | 324](#)
- [Access Privileges for Role Scopes \(Service Provider, Tenant, and Operating Company\) | 326](#)

## Roles Overview

### IN THIS SECTION

- [Types of Roles | 318](#)
- [Role Scopes | 319](#)
- [Access Privileges | 320](#)
- [Relationship Between Users, Roles, and Access Privileges | 320](#)
- [Benefits of Roles in CSO | 320](#)

A role is a function assigned to a user that defines the tasks that the user can perform within CSO. Each user can be assigned one or more roles depending on the tasks that the user is expected to perform.

User roles enable you to classify users based on the privileges to perform tasks on CSO objects. Roles assigned to a user determine the tasks and actions that the user can perform.

This topic contains the following sections:

### Types of Roles

There are two types of roles: predefined roles and custom roles.

- **Predefined roles**—System-defined roles with a set of predefined access privileges assigned to a user to perform tasks within the CSO application. Predefined roles are created in the system during CSO installation. For more information about predefined roles, see [“Role-Based Access Control Overview” on page 298](#).
- **Custom roles**—Object-based user-defined roles with a set of access privileges assigned to a user to perform tasks within the CSO application. Objects include menu and submenu items (for example, Resources, Devices, Images, and POPs) in the CSO application, from which you can create, edit, clone, and delete objects.

Custom roles can be created by:

- An SP administrator, an OpCo administrator, or a tenant administrator.
- A service provider user with the Create Role privilege. This user can create custom roles for service provider, tenant, and OpCo users.
- A tenant user with the Create Role privilege. This user can create custom roles for tenant users.
- An OpCo user with the Create Role privilege. This user can create custom roles for both OpCo and tenant users.

You can create custom roles and assign access privileges to each role by using the Roles page (**Administration > Roles**).

You can assign one or more roles to a user when you create or edit a user account. Each role can have one or more access privileges.

## Role Scopes

A role scope defines the capabilities of the user under a scope (service provider, tenant, and OpCo). A service provider administrator can assign service provider, OpCo, and tenant roles to service provider users and tenant roles to tenant users. A tenant administrator can assign tenant roles only to tenant users. A role can have the following scopes:

- **Service provider**—Represents a provider that offers services to other service providers and customers. A service provider could be a global service provider that provides services to its operating companies in different geographical locations. The operating companies act as service providers and provide services to their tenants. An SP administrator with access privileges can view and access resources across operating companies.
- **Tenant**—Represents a customer that can view, configure, and manage tenant sites through Customer Portal.
- **Operating company**—An operating company (OpCo) is a region-specific service provider manages its tenants and provides services to them. Tenants managed by one OpCo are isolated from tenants of another OpCo. An OpCo can manage all activities related to its own tenants. For more information, see [“Operating Companies Overview” on page 284](#).

## Access Privileges

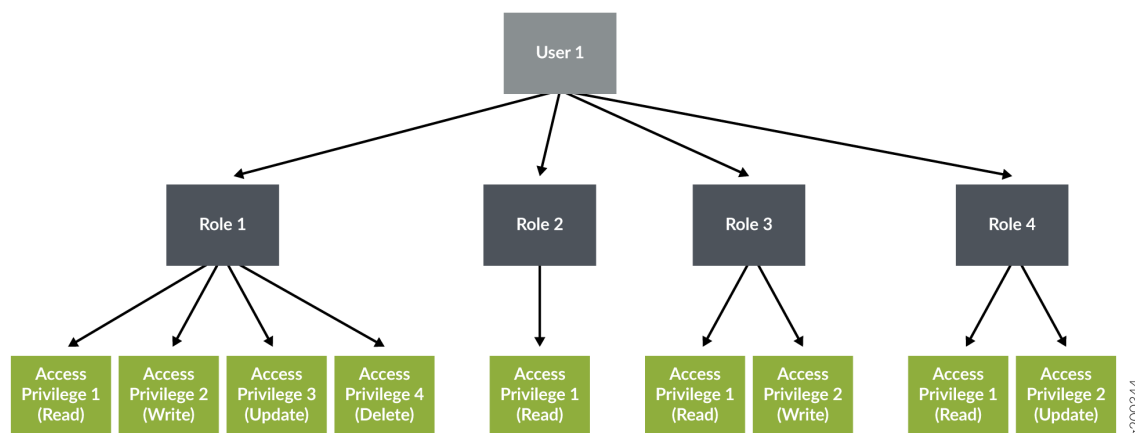
The following access privileges and actions can be assigned to a user role to access objects (Dashboard, Device Templates, Tenants, and so on) in CSO. For example, a user can be given only read, create, update privileges to device objects and only the delete privilege to security alerts objects.

- Read
- Create
- Update
- Delete
- Other actions (for example, for the device templates object, other actions such as cloning and editing the device template are supported).

## Relationship Between Users, Roles, and Access Privileges

Figure 11 on page 320 shows the relationship between users, user roles, and access privileges. A user can have one or more roles and each role can have one or more access privileges.

Figure 11: Relationship Between a User, Roles, and Access Privileges



## Benefits of Roles in CSO

- Provide a well-defined separation of responsibility and visibility.
- Provide granular-level access control on CSO objects within each navigation menu. Roles enable you to control which system users can access CSO objects based on certain business and operation needs.



RELATED DOCUMENTATION

<a href="#">Role-Based Access Control Overview   298</a>
<a href="#">About the Roles Page   321</a>
<a href="#">Editing, Cloning, and Deleting User-Defined Roles for Service Provider, OpCo, and Tenant Users   324</a>

## About the Roles Page

To access this page, select **Administration > Roles** in Administration Portal.

You can use the Roles page to view a list of predefined (system-defined) and custom (user-defined) roles that can be assigned to service provider and tenant users. You can create, edit, or delete custom roles and clone both custom and predefined roles.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a custom role. See [“Adding User-Defined Roles for Service Provider, OpCo, and Tenant Users” on page 322](#).
- Edit, clone, or delete a role. See [“Editing, Cloning, and Deleting User-Defined Roles for Service Provider, OpCo, and Tenant Users” on page 324](#).

### Field Descriptions

[Table 124 on page 321](#) describes the fields on the Roles page.

Table 124: Fields on the Roles Page

Field	Description
Role Name	Displays the name of the role.
Role Scope	Displays the role scope, such as service provider, OpCo, or tenant.
Role Type	Displays whether the role is a predefined role or a custom role.
Created By	Displays the username of the user that created the role.

RELATED DOCUMENTATION

<a href="#">Adding User-Defined Roles for Service Provider, OpCo, and Tenant Users   322</a>
<a href="#">Editing, Cloning, and Deleting User-Defined Roles for Service Provider, OpCo, and Tenant Users   324</a>

## Adding User-Defined Roles for Service Provider, OpCo, and Tenant Users

Use the Add Role page to create custom (user-defined) roles and assign access privileges (read, create, update, delete, and other actions) to service provider, OpCo, and tenant user roles.

An SP Administrator or a service provider user with the Create Role privilege can create custom roles for service provider, OpCo, and tenant users.

To create a custom role:

1. Select **Administration > Roles** in Administration Portal.  
The Roles page appears.
2. Click the add icon (+) to create a new role.  
The Add Role page appears.
3. Complete the configuration according to the guidelines provided in [Table 125 on page 322](#).
4. Click **OK**.

A new role is created and listed on the Roles page.

**NOTE:** The tenant list in the top banner of the CSO is not displayed if the service provider user that is logged in to CSO does not have tenant roles assigned.

Table 125: Fields on the Add Role Page

Field	Description
Role Name	Enter a unique role name. The name can contain alphanumeric characters, underscore, period, and space.
Description	Enter a description for the role.

Table 125: Fields on the Add Role Page (*continued*)

Field	Description
Role scope (Visibility)	<p>Select the scope of the role. You can assign the role to the service provider, OpCo, or tenant user. There are three scopes for user roles:</p> <ul style="list-style-type: none"> <li>• <b>Service Provider</b>—Select this option to assign the role to service provider users. If you select the role scope as Service Provider, then the <b>Privileges</b> section displays the objects of the Administration Portal</li> <li>• <b>Tenant</b>—Select this option to assign the role to tenant users. If you select the role scope as Tenant, then the <b>Privileges</b> section displays the objects of the Customer Portal.</li> <li>• <b>OpCo</b>—Select this option to assign the role to OpCo users. If you select the role scope as OpCo, then the <b>Privileges</b> section displays the objects of the OpCo.</li> </ul>
Privileges	<p><b>All Objects</b>—Displays the objects of Administration Portal, Customer Portal, or OpCos based on the scope of the role that you selected. You must select the check box against each object and then select the type of privileges (read, write, update, delete, and other actions) that you want to assign the user for the selected object. You can select one or more access privileges to assign to the user role.</p> <p><b>NOTE:</b> You must assign at least one access privilege to a role.</p> <p>If you select the first-level objects, the submenu items that belong to the main object and the corresponding access privileges are selected by default.</p> <p>The following access privileges can be assigned to a user role:</p> <ul style="list-style-type: none"> <li>• <b>Read</b>—Enables the user to read existing objects.</li> <li>• <b>Create</b>—Enables the user to create new objects.</li> <li>• <b>Update</b>—Enables the user to modify existing objects.</li> <li>• <b>Delete</b>—Enables the user to delete existing objects.</li> </ul> <p>You can also assign other actions to user roles. The other actions include retry, schedule update, schedule delete, activate, reboot, push license, clone, edit template, deploy, and upgrade history.</p>

## RELATED DOCUMENTATION

[Role-Based Access Control Overview | 298](#)
[About the Roles Page | 321](#)
[Editing, Cloning, and Deleting User-Defined Roles for Service Provider, OpCo, and Tenant Users | 324](#)

## Editing, Cloning, and Deleting User-Defined Roles for Service Provider, OpCo, and Tenant Users

### IN THIS SECTION

- [Editing Roles | 324](#)
- [Cloning Roles | 325](#)
- [Deleting Roles | 325](#)

You can edit and delete custom (user-defined) roles of service provider, OpCo, and tenant users from the Roles page. This topic has the following sections:

**NOTE:** You cannot modify or delete the predefined roles.

### Editing Roles

To modify the parameters configured for a role:

1. Select **Administration > Roles**.

The Roles page appears, displaying the details of the available roles.

2. Select the role that you want to edit and click the edit icon (pencil) to modify the attributes.

The Edit Role page appears. The fields on the Edit Role page are available for editing.

**NOTE:** You cannot modify the role name and role scope.

3. Modify the role description and privileges as needed.

4. Click **OK** to save the changes.

A confirmation message appears, indicating the status of the edit operation.

## Cloning Roles

You can clone a role (both custom and predefined) when you want to quickly create a copy of an existing role and modify its access privileges.

1. Select **Administration > Roles**.

The Roles page appears, displaying the details of the available roles.

2. Select the role that you want to clone and then click the **Clone** button at the top-right corner of the page.

The Clone Role: *Role-Name* page appears.

3. Specify an appropriate name for the clone role.

4. Click **OK** to save your changes.

A confirmation message appears, indicating the status of the clone operation.

The name of the clone role is displayed on the Roles page.

5. Select the new clone role and click the edit icon (pencil) to modify the parameters.

The Edit Role page appears.

6. Select the objects, and modify the access privileges of the role, as needed.

**NOTE:** You cannot modify the role name and role scope.

7. Click **OK** to save your changes.

A confirmation message appears, indicating the status of the edit operation.

## Deleting Roles

To delete a role:

1. Select **Administration > Roles**.

The Roles page appears, displaying the details of the available roles.

2. Select the role that you want to delete and then click the delete icon (X).

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected role.

A confirmation message appears, indicating the status of the delete operation.

RELATED DOCUMENTATION

<a href="#">About the Roles Page   321</a>
<a href="#">Adding User-Defined Roles for Service Provider, OpCo, and Tenant Users   322</a>

## Access Privileges for Role Scopes (Service Provider, Tenant, and Operating Company)

This topic describes the access privileges for the service provider, tenant, and Operating company (OpCo) role scopes. For more information about roles and role scopes, see [“Roles Overview” on page 318](#).

[Table 126 on page 327](#) shows the access privileges for service provider scope.

[Table 127 on page 330](#) shows the access privileges for operating company scope.

[Table 128 on page 332](#) shows the access privileges for tenant scope.

Table 126: Access Privileges for Service Provider Scope

Role Scope	Menu Name	Actions	Other Actions
Service Provider	SP Geo Map	Read	-
	Tenants SLA Performance	Read	-
	Alerts	Read and Delete	-
	Alarms	Read and Delete	-
	SD-WAN Alerts Definitions	Read, Create, Update, and Delete	-
	Security Alert Definitions	Read	-
	Jobs	Read	Retry Schedule Update Schedule Delete
	POPs	Read, Create, Update, and Delete	
	Cloud Hub Devices	Read, Create, and Delete	Activate Upgrade Reboot

Table 126: Access Privileges for Service Provider Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Tenant Devices	Read	Reboot Push License
	Device Templates	Read, Create, Update, and Delete	Clone Edit Template
	Images	Read, Create, and Delete	Deploy Upgrade History
	Flex Services	Read, Create, Update, and Delete	-
	Application SLA Profiles	Read, Create, Update, and Delete	-
	Application Traffic Type Profiles	Read, Create, Update, and Delete	-
	Network Services	Read	Allocate Detach
	Tenants	Read, Create, Update, and Delete	-
	OpCos	Read, Create, Update, and Delete	-
	Users	Read, Create, Update, and Delete	-
	Audit Logs	Read	-
	Roles	Read, Create, Update, and Delete	-
	Authentication	Read, Create, Update, and Delete	-
	Licenses	Read, Create, Update, and Delete	Push
	Signature Database	Read	Settings Download
	SMTP	Read and Update	-



Table 126: Access Privileges for Service Provider Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Email Templates	Read and Update	-
	Preferences	Read and Update	-
	Getting Started	Read	-
	What's New	Read	-
	Help Center	Read	-
	FAQ	Read	-
	Release Notes	Read	-
	About	Read	-

Table 127: Access Privileges for Operating Company Scope

Role Scope	Menu Name	Actions	Other Actions
Operating company (OpCo)	SP Geo Map	Read	-
	Tenants SLA Performance	Read	-
	Alerts	Read and Delete	-
	Alarms	Read	-
	SD-WAN Alerts Definitions	Read	-
	Security Alert Definitions	Read	-
	Jobs	Read	Retry Schedule Update Schedule Delete
	POPs	Read	-
	Cloud Hub Devices	Read	-
	Tenant Devices	Read	-
	Device Templates	Read, Create, Update, and Delete	Clone Edit Template
	Images	Read	-
	Application SLA Profiles	Read, Create, Update, and Delete	-
	Application Traffic Type Profiles	Read	-
	Tenants	Read, Create, Update, and Delete	-
	Users	Read, Create, Update, and Delete	-

Table 127: Access Privileges for Operating Company Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Roles	Read, Create, Update, and Delete	-
	Authentication	Read, Create, Update, and Delete	-
	Licenses	Read, Create, Update, and Delete	Push License
	Signature Database	Read	-
	SMTP	Read, Create, Update, and Delete	-
	Email Templates	Read and Update	-
	Getting Started	Read	-
	What's New	Read	-
	Help Center	Read	-
	FAQ	Read	-
	Release Notes	Read	-
	About	Read	-

Table 128: Access Privileges for Tenant Scope

Role Scope	Menu Name	Actions	Other Actions
Tenant	Tenant GeoMap	Read	-
	Link Switch Events	Read	-
	Jobs	Read	Retry Schedule Update Schedule Delete
	SD-WAN Alert Definitions	Read	-
	Security Alert Definitions	Read, Create, Update, and Delete	-
	Alerts	Read and Delete	Jump to Event Viewer
	Alarms	Read and Delete	
	Security Events	Read	Manage Filter Create Alert Create Report
	Application Visibility	Read	-
	Threats Map (Live)	Read	-
	Application SLA Performance	Read	-
	Devices	Read	Activate Push License Reboot RMA
	Images	Read	-

Table 128: Access Privileges for Tenant Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Deployments	Read	Deploy Schedule
	Network Services	Read, Update, and Delete	Start Disable
	SD-WAN Policy	Read and Update	Deploy
	Tenant Application SLA Profiles	Read, Create, Update, and Delete	-
	Firewall Policy	Read, Create, Update, and Delete	Deploy
	SSL Policy	Read, Create, Update, and Delete	Deploy
	NAT	Read, Create, Update, and Delete	Deploy
	UTM	Read, Create, Update, and Delete	-
	Schedule	Read, Create, Update, and Delete	-
	Address	Read, Create, Update, and Delete	-
	Department	Read, Create, and Delete	-
	Service	Read, Create, Update, and Delete	-
	Application Signature	Read, Create, Update, and Delete	-
	Site Management	Read, Create, and Delete	Configure Upgrade
	Site Groups	Read, Create, Update, and Delete	-
	Site LAN Segment	Read, Create, and Delete	Deploy Deploy History Re-assign

Table 128: Access Privileges for Tenant Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Report Definitions - Security	Read, Create, Update, and Delete	Run/Preview Send
	Report Definitions - SD-WAN	Read, Create, Update, and Delete	Run/Preview Send
	Generated Reports -Security	Read and Delete	-
	Generated Reports SD-WAN	Read and Delete	-
	Users	Read, Create, Update, and Delete	-
	Roles	Read, Create, Update, and Delete	-
	Licenses	Read, Create, Update, and Delete	Push License
	Tenant Signature Database	Read	Install
	Certificates	Read, Create, Update, and Delete	-
	VPN Authentication	Read	Renew
	Identity Management	Read and Update	-
	Getting Started	Read	-
	What's New	Read	-
	Help Center	Read	-
	FAQ	Read	-
	Release Notes	Read	-
	About	Read	-

## RELATED DOCUMENTATION

[Role-Based Access Control Overview](#) | 298

[About the Roles Page](#) | 321

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# Managing Dynamic VPN Tunnels

## IN THIS CHAPTER

- [Dynamic VPN Tunnels Overview | 337](#)
- [Configuring Dynamic VPN Tunnels Threshold for all Tenants | 339](#)



## Dynamic VPN Tunnels Overview

In releases earlier than CSO 4.1.0, static tunnels are established between spoke sites during the Zero Touch Provisioning (ZTP) process.

Starting with Release 4.1.0, during ZTP only the following static tunnels are established:

- Between an on-premise spoke site and the corresponding gateway site
- Between an on-premise spoke site and hub (Primary hub or secondary hub)
- Between two gateway sites

Therefore, the communication between two on-premise spoke sites is established only through the gateway site or the hub.

CSO can dynamically create or delete a VPN tunnel between two spoke sites (without passing through a gateway site or hub), if:

- The number of sessions closed between two spoke sites crosses the threshold value, and
- The WAN links of spoke sites have matching mesh tags.

**NOTE:** This feature is applicable only for SD-WAN sites in real-time optimized mode (Full mesh).

The default threshold value for creating a dynamic VPN tunnel (maximum number of sessions closed in a two-minute duration) is 5. The default threshold value for deleting a dynamic VPN tunnel (minimum number of sessions closed in a 15-minute duration) is 2.

The SP administrator, operating company (OpCo) administrator, or tenant administrator can modify the default threshold value on the following pages:

- The **Administration > Dynamic VPN** page of Administration portal (Global Level)
- The Add Tenant page (Tenant-level)
- The **Administration > Dynamic VPN** page of Customer portal (Global Level)
- The Add On-Premise Spoke Site page (Site-level)
- The Add Gateway Site page (Site-level)

The threshold value that you specify at site-level takes precedence over the tenant-level and global-level threshold values.

That is, the threshold value that you specify on the Add Tenant page overrides the threshold value that you specified on the Dynamic VPN page of Administration Portal.

Similarly, the threshold value that you specify in the Add Site page overrides the threshold value that you specified on the Dynamic VPN page and Add Tenant page.

CSO also provides the flexibility for the SP administrator, OpCo administrator, or the tenant administrator to create or delete dynamic VPN tunnels between a source site and a destination site by using the CSO GUI in Customer Portal.

## RELATED DOCUMENTATION

| [Configuring Dynamic VPN Tunnels Threshold for all Tenants](#) | 339

## Configuring Dynamic VPN Tunnels Threshold for all Tenants

CSO can dynamically create or delete a VPN tunnel (that does not pass through a gateway site or a cloud hub) between two spoke sites if the following conditions are met:

- The number of sessions closed between two spoke sites crosses the threshold value.
- The WAN links of the two spoke sites have matching mesh tags.

For more information on dynamic VPN tunnels, see [“Dynamic VPN Tunnels Overview” on page 337](#).

To modify threshold values at the global-level (for all tenants):

1. Select **Administration** > **Dynamic VPN**.

The Dynamic VPN page appears.

2. Complete the configuration according to the guidelines in [Table 129 on page 340](#).

**NOTE:** Fields marked with \* are mandatory.

3. Click **Save** to save the changes.

A confirmation message appears indicating that the threshold values are saved and you are returned to the Dynamic VPN page.

The threshold values that you specify here are immediately applicable for all the tenants that you add after modifying the threshold value.

**NOTE:** You can also modify the threshold values while adding a tenant. The threshold value that you specify on the Add Tenant page for a specific tenant overrides the threshold value that you specified on the Dynamic VPN page of the Administration Portal at the global level (for all tenants).

**Table 129: Fields on the Dynamic VPN page**

Field	Description
Threshold for Creating a Tunnel	
Sessions Closed	<p>Specify the number of sessions closed (for a duration of 2 minutes) between two spoke sites.</p> <p>If the number of sessions closed (for a duration of 2 minutes) is greater than or equal to the value that you specified, a dynamic VPN tunnel is created between two spoke sites.</p> <p>The default threshold value (the number of sessions closed for 2 minutes) is 5.</p> <p>For example, if you specify the number of sessions closed as 10, dynamic VPN tunnels are created if the number of sessions closed between two spoke sites in 2 minutes is greater than or equal to 10.</p>
Threshold for Deleting a Tunnel	
Sessions Closed	<p>Specify the number of sessions closed (for a duration of 15 minutes) between two spoke sites.</p> <p>If the number of sessions closed (for a duration of 15 minutes) is lesser than or equal to the value that you specified, a dynamic VPN tunnel is deleted between two spoke sites.</p> <p>The default threshold value (the number of sessions closed for 15 minutes) is 2.</p> <p>For example, if you specify the number of sessions closed as 20, dynamic VPN tunnels are deleted if the number of sessions closed between two spoke sites in 15 minutes is less than or equal to 20.</p>

## RELATED DOCUMENTATION

[Dynamic VPN Tunnels Overview](#) | 337

# Configuring Authentication

## IN THIS CHAPTER

- [Authentication Methods Overview | 341](#)
- [About the Authentication Page | 342](#)
- [Editing the Authentication Method | 343](#)
- [Configuring a Single Sign-On Server | 346](#)
- [Editing and Deleting SSO Servers | 349](#)
- [Configuring SMTP Settings | 350](#)

## Authentication Methods Overview

Contrail Service Orchestration supports single sign-on (SSO) authentication for the unified portal. You can configure one SSO server for a service provider and another for all its tenants.

You can authenticate and authorize users by using one of the following authentication methods:

- **Local**—User accounts are maintained locally in CSO, and users are authenticated and authorized by CSO.
- **Authentication by using an SSO server**—User accounts are maintained in the service provider's SSO server, but authorization information is stored in CSO. Users are authenticated by using the credentials stored in the SSO server.
- **Authentication and authorization by using an SSO server**—User accounts and user roles are maintained in the service provider's SSO server. Users are authenticated by the SSO server and authorized by CSO by using Security Assertion Markup Language (SAML) attributes.

When you log in to the unified Administration and Customer Portal, the login page is displayed. To log in to the unified Administration and Customer Portal, enter the username on the login page. If the username matches the username pattern configured for SSO, then you are redirected to the SSO page. If the username does not match the username pattern, you must enter the password.

For each SSO authentication method, a list of permitted roles must be provided to the SSO server. Only users with permitted roles in the SAML attribute are allowed to log in to CSO. Also, a mapping between the roles defined in CSO and the roles defined in the external SSO server (Identity Provider) must be provided. For more information, see [“Editing the Authentication Method” on page 343](#).

RELATED DOCUMENTATION

<a href="#">About the Authentication Page   342</a>
<a href="#">Editing the Authentication Method   343</a>
<a href="#">Configuring a Single Sign-On Server   346</a>

About the Authentication Page

To access this page, click **Administration > Authentication**.

Use this page to configure the authentication method for service provider and tenant users. You can also use this page to add, edit, and delete SSO servers, and modify the authentication method. You can also configure one SSO server for a service provider and another for all its tenants.

Tasks You Can Perform

- You can perform the following tasks from this page:
- Edit the authentication method. See [“Editing the Authentication Method” on page 343](#).
  - Configure an SSO server. See [“Configuring a Single Sign-On Server” on page 346](#).
  - Edit and delete an SSO server. See [“Editing and Deleting SSO Servers” on page 349](#).

Field Descriptions

[Table 130 on page 342](#) provides guidelines on using the fields on the Authentication page.

Table 130: Fields on the Authentication Page

Field	Description
<b>Authentication Method</b>	
Users	View the user’s type.  Example : SP Users or Tenant Users
Authentication Method	View the type of authentication method.  Example: Local Authentication
SSO Server	View the name of the SSO server.

Table 130: Fields on the Authentication Page *(continued)*

Field	Description
Username Pattern	View the username pattern.  Example: <i>*@aaa-example.com</i>
Permitted Roles	Displays the permitted role names.
<b>Single Sign-On (SSO) Servers</b>	
SSO Server	View the name of the SSO server.
Description	View the description of SSO server.
Metadata URL	View the URL of the identity provider metadata.  Example: <i>https://aaa-example.com/saml/metadata/64000</i>
Usage	View the information about whether the SSO server is used for authenticating SP users or tenant users.  Example: <i>SP Users</i>

## RELATED DOCUMENTATION

[Authentication Methods Overview | 341](#)

[Configuring a Single Sign-On Server | 346](#)

[Editing the Authentication Method | 343](#)

## Editing the Authentication Method

Use the Authentication page to modify the authentication method for service provider and tenant users.

To modify the authentication method:

1. Select **Administration > Authentication**.

The Authentication page appears.

2. Select the user type (SP User or Tenant User) for which you want to change the authentication method, click the edit icon.

The Authentication Type page appears.

3. Select any one of the following authentication methods that you want to configure for the user.

- Local Authentication
- Authentication with SSO Server
- Authentication and Authorization with SSO Server

For more information about authentication methods, see [“Authentication Methods Overview” on page 341](#).

4. If you select the **Authentication with SSO Server** or **Authentication and Authorization with SSO Server** method, then you must enter the configuration described in [Table 131 on page 344](#).

**Table 131: Fields on the Authentication Type Page**

Field	Description
SSO Server	Select the SSO server name from the list.
SSO Initiated By	<p>Select the SSO initiation method.</p> <ul style="list-style-type: none"> <li>• <b>Service Provider (CSO)</b>—Select this method if SSO authentication is initiated by CSO. For example, when the user tries to use CSO application without authentication, the user is redirected to the SSO Server. After authentication with the SSO Server, the user is directed to CSO.</li> <li>• <b>Identity Provider (SSO Server)</b>—Select this method to authenticate users by using the identity provider. When you login to the identity provider, it provides a list of applications that are integrated with the identity provider and you can access any of the applications. For example, if you click on the CSO application, you are directed to CSO and you can access the CSO application.</li> </ul>

If you select the **Service Provider (CSO)** method, then the following field is displayed:



Table 131: Fields on the Authentication Type Page (*continued*)

Field	Description
Username Pattern	<p>Enter a list of username patterns separated by a comma, space, or semicolon. For example, <code>*@aaa-example.com; *@xyz-example.com</code>.</p> <p><b>NOTE:</b> If the username matches the username pattern, the user is redirected to the SSO server to complete the authentication process. If the username does not match with any of the username patterns, then the local authentication is assumed.</p>
When you select <b>Identity Provider (SSO Server)</b> method, the following fields are displayed:	
Direct CSO Login Message	Enter the message to display when a user tries to directly access CSO without being authenticated by the SSO server.
Logout Message	Enter the message to be displayed when the user logs out from CSO.
Tenant Identifier	<p>Select the identifier to correlate the tenant Security Assertion Markup Language (SAML) attribute with the tenant. Whenever the tenant is onboarded into the system, the tenant is uniquely identified by any one of the following identifiers:</p> <ul style="list-style-type: none"> <li>• <b>Use Tenant Name</b>—Select this option to identify the tenants by using the tenant name.</li> <li>• <b>Use OSS Tenant ID</b>—Select this option to identify the tenants by using the tenant ID.</li> </ul>
Permitted Roles and Mapping	<p>Roles used in the SSO server (external system) are different from the roles used in CSO. Therefore, you must map the roles defined in CSO with the roles defined in the external SSO server (Identity Provider).</p> <p>To map the roles:</p> <ol style="list-style-type: none"> <li>1. Click add icon (+). A new row appears under the header in the table. If you want to delete the row, click the delete icon (X).</li> <li>2. Select the role from the <b>Role in CSO</b> column, and then enter one or more matching roles (separated by commas) in the <b>Mapped External Role</b> column.</li> <li>3. Click <b>OK</b> to save the changes. If you want to cancel, The user role in CSO is matched with the role in the SSO server.</li> </ol> <p>You can also modify the permitted role and delete one or more permitted roles.</p>

**NOTE:** If you select the **Local Authentication** type, the **SSO Server**, **SSO Initiated By**, and **Username Pattern** fields are not displayed.

5. Click **Save** to save the changes. If you want to discard the changes, click **Cancel** instead.

## RELATED DOCUMENTATION

[About the Authentication Page | 342](#)

[Configuring a Single Sign-On Server | 346](#)

[Editing and Deleting SSO Servers | 349](#)

## Configuring a Single Sign-On Server

Use this page to configure a single sign-on server (SSO) that is used for authenticating users. There are two entities involved during the SSO configuration:

- **SSO Server or Identity Provider**—An external server integrated with CSO.
- **Service Provider**—Acts as an SP and receives the SAML assertion sent by the SSO server in a response to a login request.

Both the identity provider and service provider trust each other and configuration is required for both the entities. Two use cases are possible:

- **Identity provider is configured first before SSO server is added in CSO**—The identity provider is configured first, and the SP administrator then adds the SSO server in CSO, and enters the server name and metadata URL.
- **IdP is configured after SSO server is added in CSO**—Enter the SSO server name and then click the **Next** button. CSO provides a list of URLs to be configured in the identity provider. After the identity provider is configured with the URLs, you can edit the SSO server name and enter the metadata URL.

**NOTE:** For both the use cases, the metadata URL is required before you use the SSO server.

To configure an SSO server:

1. Select **Administration > Authentication**.

The Authentication page appears.

2. Click the plus icon (+) in the Single Sign-On Server section.

The Add Single Sign-On Server page appears.

3. Complete the configuration according to the guidelines [Table 132 on page 347](#).

4. Click **Save** to save the changes. If you want to discard the changes, click **Cancel** instead.

5. After you configure both the SSO Server and CSO, click the **Test Login** button from the Authentication page.

The SSO login page appears and shows the SAML attributes.

**NOTE:** You must specify the metadata URL before you click the **Test Login** button. If you click the **Test Login** button without entering the metadata URL, an error message indicating that the metadata URL must be specified is displayed.

**Table 132: Fields on the Single Sign-On Server Page**

Field	Description
<b>Basic Info</b>	
SSO Server Name	Specify the name of the SSO server. You can use a string of alphanumeric characters, special characters such as the underscore (_) or the period (.), and spaces. The maximum length is 40 characters.
Description	Enter a meaningful description for the SSO server.
Metadata URL	Enter the URL from where the application metadata needs to be downloaded.
<b>SAML Settings</b>	
SAML URLs	CSO displays the SAML URL settings. The administrator use this information to configure the IdP.

Table 132: Fields on the Single Sign-On Server Page *(continued)*

Field	Description
Single Sign-On URL	Displays the SAML Assertion Consumer Service (ACS) URL for the application.  Example: <a href="https://aaa-example.com/ssol/sso server name/SAML2/POST">https://aaa-example.com/ssol/sso server name/SAML2/POST</a>
Audience URI (SP Entity ID)	Displays the service provider entity ID of the application.  Example: <a href="https://aaa-example.com/Shibboleth">https://aaa-example.com/Shibboleth</a>
Metadata URL	Displays the metadata URL of the application.  Example: <a href="https://aaa-example.com/saml/metadata/64000">https://aaa-example.com/saml/metadata/64000</a>
Download Metadata	Click this option to download metadata from the application.  The administrator can download the CSO metadata and use the metadata to configure the identity provider instead configuring individual identity provider fields at a time.
<b>SAML Attributes</b>	The identity provider needs to provide the SAML attributes if the authentication method is configured as <b>Authentication and Authorization with SSO Server</b> .  <b>NOTE:</b> No SAML attributes are required if the authentication method is configured as <b>Authentication with SSO Server</b> .
tenant	This attribute is required when the Tenant User is authenticated. The value of this attribute should match with the tenant name used when the tenant was onboarded.  <b>NOTE:</b> This field is not required for users with the SP Admin and SP Operator roles.
role	This attribute has four values. See <a href="#">Table 133 on page 348</a> .

Table 133: Attribute Values and Roles

Attribute Value	Role
cloud-admin	SP Admin
cloud-operator	SP Operator
tenant-admin	Tenant Admin
tenant-operator	Tenant Operator

## RELATED DOCUMENTATION

[About the Authentication Page | 342](#)

[Editing and Deleting SSO Servers | 349](#)

## Editing and Deleting SSO Servers

### IN THIS SECTION

- [Editing SSO Server Configuration | 349](#)
- [Delete SSO Server Configurations | 349](#)

From the **Administration > Authentication** page, you can edit the information of an SSO server, and delete one or more SSO servers.

### Editing SSO Server Configuration

To edit the SSO server configuration:

1. Select **Administration > Authentication**.

The Authentication page appears.

2. From the Single Sign-On (SSO) Servers section, select the check box of the SSO server name that you want to modify, and click the edit icon.

The Edit Single Sign-On page appears. The options available on the Add Single Sign-On Server page are available for editing.

3. Update the configuration as needed.
4. Click **Next** to save the changes. If you want to discard your changes, click **Cancel** instead.

### Delete SSO Server Configurations

Use the delete icon (X) at the top right corner of a page to delete one or more SSO servers.

To delete the SSO server configuration:

1. Select **Administration > Authentication**.

The Authentication page appears.

2. Select the SSO server name that you want to delete and click the delete icon (X).

The Confirm Delete page appears.

3. Click **Yes** to delete the SSO server or **No** to cancel the deletion.

If you click **Yes**, then the SSO server is deleted. After an SSO server is deleted, you cannot use that SSO server for authenticate or authorize users.

## RELATED DOCUMENTATION

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[About the Authentication Page | 342](#)

[Configuring a Single Sign-On Server | 346](#)

## Configuring SMTP Settings

Use this page to configure an SMTP e-mail server. The SMTP server is the local server that forwards your e-mail to the destination server. After you log in to the unified Administration or Customer portal for the first time, you must configure the SMTP settings for your deployment.

To configure SMTP settings:

1. Click **Administration > SMTP**.

The SMTP page appears.

2. Specify the SMTP settings that you want to configure to user for the mail server. See [Table 134 on page 351](#).

3. Click **Save**.

The status of the save operation is displayed.

Table 134: SMTP Settings

Field	Description
<b>SMTP Server</b>	
Server Address	Enter the hostname for the SMTP server.
TLS	Enable Transport Layer Security (TLS) protocol to ensure that the e-mail messages are transmitted over an encrypted channel.
Port Number	Enter the port number for the SMTP server. Check with your e-mail service provider for the SMTP port number. By default, the port number is set to 587 when TLS is enabled and to 25 when TLS is not enabled. However, you can modify the port number.
<b>SMTP Authentication</b>	
SMTP Authentication	<p>Enable this option if the e-mail server requires authentication before an e-mail can be sent.</p> <p>The <b>Username</b> and <b>Password</b> fields are displayed when you enable this option.</p> <p>Disable this option if you want to configure an unauthenticated e-mail server.</p> <p>The <b>From Name</b> and <b>From E-Mail Address</b> fields are displayed when you disable this option.</p>
User Name	Enter the username that you want to use for authentication.
Password	Enter the password that you want to use for authentication.
Confirm Password	Reenter the password for confirmation.
From Name	Enter your name. This name will appear as <b>from name</b> to the e-mail recipient.
From E-Mail Address	Enter your e-mail address in the user@domain format. This e-mail address will appear as the sender's e-mail address to the e-mail recipient.
<b>Test SMTP Settings</b>	
E-mail Address	Enter your e-mail address in the user@domain format.
Send Test E-mail	Enter the e-mail address and click <b>Send Test E-mail</b> to test the SMTP server connection. If the settings are correct, you will receive an e-mail, which confirms that the SMTP Server is working.

## RELATED DOCUMENTATION

[Authentication Methods Overview | 341](#)

[About the Authentication Page | 342](#)



# Configuring Licenses

## IN THIS CHAPTER

- [About the License Files Page | 353](#)
- [Uploading a License File | 355](#)
- [Editing and Deleting Licenses | 356](#)
- [Pushing a License to Devices | 357](#)

## About the License Files Page

To access this page, click **Administration > Licenses**.

You can use the License Files page to upload licenses for devices and virtual network services from your local file system. Each license file should contain only one license key. A license key is required to enable various features including virtual network services such as application-based routing, application monitoring, and vSRX security features.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Add license files. See [“Uploading a License File” on page 355](#).
- Edit and delete license entries. See [“Editing and Deleting Licenses” on page 356](#).
- Push licenses to devices. See [“Pushing a License to Devices” on page 357](#).
- View details of a license. Click the details icon that appears when you mouse over the row for each license file or click **More > Details**. See [“Viewing Object Details” on page 16](#).
- Show or hide columns about the license files.
- Sort the license files. See [“Sorting Objects” on page 17](#).
- Search an object about the license files. See [“Searching for Text in an Object Data Table” on page 16](#).

# Field Descriptions

Table 135 on page 354 describes the fields on the License Files page.

Table 135: Fields on the License Files Page

Field	Description
File Name	Displays the filename of the license.  Example: license_Image_v1.txt
Description	Displays the description of the license.  Example: License file for application routing.
Tenant	Displays the name of the tenant if the license is associated with a tenant.  Example: Tenant 1
Uploaded By	Displays the administrator who uploaded the license.  Example: test_admin
Uploaded	Displays the date and time when the license was uploaded.  Example: Jun 5, 2018, 12:41:08 PM
Devices	Displays the number of devices to which the license is pushed.  Click the number to view the devices to which the license is pushed.

## RELATED DOCUMENTATION

Uploading a License File   355
Editing and Deleting Licenses   356
Pushing a License to Devices   357

## Uploading a License File

To upload a license file:

1. Click **Administration > Licenses**.

The License Files page appears.

2. Click the plus icon (+).

The Add Licenses page appears.

3. In the License File field, specify the location of the license file that you want to upload. Alternatively, you can click Browse to navigate to the file location and select the file.

**NOTE:** Each license file should contain only one license key.

4. (Optional) From the Tenants list, select the tenant to which you want to associate the license file.

If you associate a license with a tenant, you can apply that license only to devices that belong to that tenant. If a tenant has licenses associated with the tenant, when a device is activated during ZTP, a matching license from the licenses associated with the tenant is downloaded to the device.

You can apply a license that is not associated with a tenant to any device of any of the tenants. During ZTP, when a device is activated for a tenant that does not have any license associated with it, a matching license from the licenses that are not associated with any tenant is downloaded to the device.

5. In the Description field, enter a description for the license that you want to upload.

6. Click **OK** to upload the license.

You are returned to the License Files page.

### RELATED DOCUMENTATION

[About the License Files Page](#) | 353

[Device Images Overview](#) | 190

## Editing and Deleting Licenses

### IN THIS SECTION

- [Editing a License Entry | 356](#)
- [Deleting a License | 356](#)

The following sections describe the procedure for editing and deleting uploaded licenses:

### Editing a License Entry

You can edit a license entry to modify the description for the license file.

1. Click **Administration > Licenses**.

The License Files page appears.

2. Select the license for which you want to modify the description and click the Edit icon.

The Update License page appears.

3. Update the description.

4. Click **OK** to save the changes. To discard the changes, click **Cancel**.

If you click **Cancel**, a confirmation message appears. Click **Yes** to confirm that you want to cancel the update.

### Deleting a License

To delete a license:

1. Click **Administration > Licenses**.

The License Files page appears.

2. Select the license that you want to delete and click the delete icon.

3. In the confirmation message, click **Yes** to delete the license.

To cancel the delete operation, click **No**.

## Pushing a License to Devices

You can push licenses on to devices from the Licenses page of the Administration portal. If a license is associated with a tenant, you can push that license only to devices associated with that tenant. However, if no tenant is associated with a license, you can apply the license to any device that belongs to any tenant.

When a license is applied to a device, the license information is added to the device object. When the same license is pushed to the device again, the a device-level error message is created. Similarly, if a pushed license does not match a device, the device generates an error message.

To push a license to a device:

1. Click **Administration > Licenses**.

The License Files page appears.

2. Select the license that you want to push to a device.

The **Push License** button is enabled.

3. Click the **Push License** button.

The Push License page appears.

4. From the Tenants list, select the tenant associated with the site and devices to which you want to apply the license.

**NOTE:** If the license has already been associated with a tenant, you cannot select a different tenant. You can apply the license only to the sites and devices associated with the tenant.

Sites and devices associated with the selected tenant appear.

5. Select the sites and devices to which you want to apply the license and click **Push Licenses**.

CSO applies the license to the selected devices.

### RELATED DOCUMENTATION

[About the License Files Page | 353](#)

[Editing and Deleting Licenses | 356](#)

# Customizing the Unified Portal

IN THIS CHAPTER

- [Personalizing the Unified Administration and Customer Portal | 358](#)

## Personalizing the Unified Administration and Customer Portal

Use this page to personalize the unified Administration and Customer Portal. You can personalize the login page, top-left logo, reports, and apply a font style and color palette to the left navigation bar and menu. You can create, edit, and delete custom color palette. You can also upload custom font styles and preview the custom color palette before you apply the settings.

To personalize the portal:

1. Click **Administration > Display Preferences**.  
The Display Preferences page appears.
2. Complete the configuration according to the guidelines in [Table 136 on page 358](#).

Table 136: Fields on the Display Preferences Page

Field	Action
<b>Logo</b>	
Portal (top left corner)	Click <b>Select</b> to upload a logo for the portal. This logo appears at the top left corner of the portal. PNG and SVG file formats are supported. The recommended image size is 25x25 pixel.
Reports	Click <b>Select</b> to upload a logo for the report. This logo appears in the security and SD-WAN reports. PNG file format is supported. The recommended image size is 111x116 pixel.
<b>Login Page</b>	

Table 136: Fields on the Display Preferences Page (*continued*)

Field	Action
Logo	Click <b>Select</b> to upload a logo for the login page of the portal. This logo appears at the top left corner of the login page. PNG and SVG file formats are supported. The recommended image size is 240x25 pixel.
Background	<p>Select a background image or background color for the login page of the portal.</p> <ul style="list-style-type: none"> <li>• <b>Image</b>—Click <b>Select</b> to upload a background image. This image appears in the background of the login page. PNG and SVG file formats are supported. The recommended image size is 1440x780 pixel.</li> <li>• <b>Fill Color (Gradient)</b>—Select the two colors for the gradient effect - top left to bottom right corner.</li> </ul>
<b>Font</b>	
Typeface	<p>Select a font style for the CSO GUI.</p> <p>If you want to upload a custom font style, click <b>Upload Custom Font</b>.</p> <ul style="list-style-type: none"> <li>• The <b>Upload Custom Fonts</b> page appears.</li> <li>• Click <b>Select</b> to upload custom font file (zip file). The zip file contains four formats of custom font styles (EOT, SVG, WOFF, and WOFF2) and a CSS file. You must add all four font files to the CSS file. The zip filename should be same as the CSS filename.</li> <li>• (Optional) Click <b>Download Sample Font File</b> to download a sample font file.</li> </ul> <p>The sample font file is downloaded to your local file system. You can view the different formats of files to be uploaded to customize your font.</p> <ul style="list-style-type: none"> <li>• Click <b>Ok</b>.</li> </ul> <p>A confirmation message is displayed and the custom font file is saved in CSO.</p>
Color Palette	<p>Click <b>Create Custom Palette</b> to create a custom color palette.</p> <p>The <b>Create Custom Palette</b> section is displayed.</p>

Table 136: Fields on the Display Preferences Page (*continued*)

Field	Action
<b>Create Custom Palette</b>	
<b>Background Colors</b>	
Palette Name	Enter a unique name for your color palette. You can use alphanumeric characters, space, and underscore (_). The maximum length is 32 characters.
Utility Bar	Select the background color of the utility navigation bar at the top of the unified portal.
Primary Navigation	Select the background color for the primary navigation panel.
Primary Navigation Active	Select the background color for the active element in the primary navigation panel.
Primary Navigation Hover	Select background color to be displayed when you mouse-over an element in the primary navigation panel.
Secondary Navigation	Select the background color of the secondary navigation panel.
Selected Tabs	Select the background color for the active tab in a tab container.
<b>Icons</b>	
Navigation, Utility Bar	Select the color for the icons on the utility navigation bar.
Grid (Table) Action	Select the background color for the icons on the grid.
Grid (Table) Action Hover	Select the background color for the icons on the grid when you mouse over it.
<b>Buttons</b>	
Primary Action	Select the background color of the primary button in its default state.
Primary Action Hover	Select the background color of the primary action button when you mouse over it.



Table 136: Fields on the Display Preferences Page (*continued*)

Field	Action
Secondary Action	Select the background color of the secondary action button in its default state.
Secondary Action Hover	Select the background color of the secondary action button when you mouse over it.
Secondary Action Border	Select the default border color of the secondary action button.
Secondary Action Border Hover	Select the color for the border on the secondary action button when you mouse over it.
Secondary Action Font	Select the color for the font on the secondary action button.

3. Click **Save Palette** to save the color palette.

The color palette is saved and a confirmation message is displayed. If you want to discard your changes, click **Cancel**.

- If you want to modify the custom color palette settings, click on the edit icon (pencil symbol) and update the settings as needed.
- If you want to delete the custom color palette, click the delete icon (X) next to the color palette.
  - The Confirm Color Palette Delete page appears.
  - Click **Yes** to confirm the deletion. The custom color palette is deleted.

4. Click **Preview** to preview the color palette before you apply the settings.

A confirmation message is displayed and you can preview the theme applied to the portal.

5. Click **Apply** to apply the settings.

The settings are applied to the portal.

If you want to discard your changes, click **Cancel**.

## RELATED DOCUMENTATION

# Managing Signature Database

## IN THIS CHAPTER

- [Signature Database Overview | 362](#)
- [About the Active Database Page | 363](#)
- [Downloading a Signature Database | 364](#)
- [Download Locations for Signature Database | 366](#)
- [Installing Signatures | 366](#)

## Signature Database Overview

The Application Firewall signature database includes signature definitions of attacks and applications that can be used to identify applications for tracking firewall policies and quality-of-service (QoS) prioritization.

Contrail Service Orchestration (CSO) enables you to download the signature database. During a download, the complete signature database is downloaded, and the download might take some time to complete. You can track the progress of the download by using job details.

All of the downloaded signatures are created as a default project in read-only mode. The configurations that are downloaded are also saved as a default project.

## RELATED DOCUMENTATION

- [About the Active Database Page | 363](#)
- [Downloading a Signature Database | 364](#)
- [Installing Signatures | 366](#)

## About the Active Database Page

To access this page, select **Administration > Signature Database**. The **Active Database** page appears.

Use the **Active Database** page to download and install the Application Firewall signature database to security devices. This database includes signature definitions of attacks and applications that can be used to identify applications for tracking firewall policies, SD-WAN flows, and QoS prioritization.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Schedule signature downloads. See [“Downloading a Signature Database” on page 364](#).
- Install signatures. See [“Installing Signatures” on page 366](#).

### Field Descriptions

The **Active Database** page provides an overall, high-level view of your signature database settings. The **Latest List of Signatures** table provides a search option that you can use to search for the signature you want. [Table 137 on page 363](#) describes the fields on this page.

**Table 137: Fields on the Active Database Page**

Field	Description
<b>Active Database</b>	
Database Version	Version of signature database.
Publish Date	Date when the signature database was published.
Update Job	Job ID of the last successful download signatures job.
Installed Device Count	Number of devices installed.
Detectors	Version number of the protocol detector currently running on the device.
Action	Install signature database configuration.
<b>Latest List of Signatures</b>	
Database Version	Version of latest signature database.

Table 137: Fields on the Active Database Page (*continued*)

Field	Description
Publish Date	Date when the signature database was published.
Update Summary	List of updated signature details for the selected database.
Detectors	Version number of the protocol detector currently running on the device.
Action	Full Download—Download the complete signature database; the download might take a while to complete.

## RELATED DOCUMENTATION

[Signature Database Overview | 362](#)
[Downloading a Signature Database | 364](#)
[Installing Signatures | 366](#)

## Downloading a Signature Database

Use this page to schedule a full download of the signature database. During a full download, the complete signature database is downloaded; the download might take some amount of time.

To download the signature database:

1. Select **Administration > Signature Database**.

The **Active Database** page appears.

2. Click **Signature Download Settings**.

The **Signature Download Settings** page appears.

3. Enter the download settings according to the guidelines provided in [Table 138 on page 365](#).

4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

[Table 138 on page 365](#) describes the fields on the **Signature Download Setting** page.

Table 138: Fields on the Signature Download Settings Page

Field	Description
Download URL	<p>Specifies the location of the Juniper hosted server from which the signature database is downloaded to the CSO server. The default download URL is <a href="https://signatures.juniper.net/">https://signatures.juniper.net/</a>. To download signatures from this location, you need an internet connection to be available to CSO.</p> <p>In case CSO does not have an internet connection, you can download the signatures from a local source such as your laptop or any other web server connected through the intranet to CSO. To do this, enter the location from which you want to download the signatures in the <b>Download URL</b> field.</p> <p>In order to perform offline download of signature database or package, you must first download the signature database to a folder location on any webserver. You must also start a local web server to host the signature database. For more information on the locations to which you can download the signature database on various servers, see “<a href="#">Download Locations for Signature Database</a>” on page 366.</p>
Signature Version	<p><b>NOTE:</b> The <b>Signature Version</b> field is enabled only when you change the value of <b>Download URL</b> from <a href="https://signatures.juniper.net/">https://signatures.juniper.net/</a> to any other value.</p> <p>Enter the 4 digit numeric value of the signature database version. The value must only contain numbers and not have any special characters or negative values.</p>
Type	<p>You can chose to download the signature database immediately or schedule the download for a later time and date.</p> <ul style="list-style-type: none"> <li>• Select <b>Run now</b> to automatically download the signature database immediately.</li> <li>• Select <b>Schedule at a later time</b> to download the signature database at the specified date and time, as follows: <ul style="list-style-type: none"> <li>• Click on the calendar icon to choose the date for the download.</li> <li>• Enter the time for the download. You can choose the 12 hour (AM or PM) or 24 hour format to specify the time by selecting the option from the drop-down list provided beside the time field.</li> </ul> </li> </ul> <p><b>NOTE:</b> The time-zone is picked-up based on the time-zone specified when CSO is installed.</p>

## RELATED DOCUMENTATION

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[Signature Database Overview | 362](#)


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[About the Active Database Page | 363](#)


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[Installing Signatures | 366](#)

## Download Locations for Signature Database

In order to perform offline download of signature database or package, you must first download the signature database to a folder location on any webserver. You need to start a local webserver to host the signature database or package.

The following are the folder locations to which you must download the signature package or database for different servers:

- **Python server**—You can use the `python -m SimpleHTTPServer 8000` command to start an HTTP server on port 8000. You need to log in as the root user and then execute the command at the root directory of the server. You must download the signature package to the folder location `/space/2/version/`. Therefore, the URL of the downloaded signature package is ***IP address: portnumber /space/2/version/latest-space-update.zip***.

For example, `10.213.18.101:8000/space/2/2981/latest-space-update.zip`

- **Apache server**—In Mac OS, you must download the signature package, `latest-space-update.zip`, to the folder location `/Library/WebServer/Documents/space/2/version/`.
- **Other servers**—For other servers, download the signature package, `latest-space-update.zip`, in the folder location `location /space/2/version/`.

### RELATED DOCUMENTATION

[Application Signatures Overview | 248](#)

[Signature Database Overview | 930](#)

## Installing Signatures

After the signature database is downloaded, you can install the active database.

**NOTE:** You must install the application identification license before installing the signature database. For the installation procedure, refer to the *Known Behavior* section of the *Contrail Service Orchestration Release Notes* (available at [https://www.juniper.net/documentation/en\\_US/release-independent/nfv/information-products/pathway-pages/index.html](https://www.juniper.net/documentation/en_US/release-independent/nfv/information-products/pathway-pages/index.html)).

To install the signature database:

1. Select **Administration > Signature Database**.

2. Click **Install Signatures**.

The **Install Signatures** page appears.

3. You can view the summary of active signature database version, which will be installed on your device.

4. Click the check box next to the devices on which you want to install the signature database.

You can also search, sort, or filter this information.

5. Select **Run now** to set the signature database to automatically install immediately.

6. Select **Schedule at a later time** to set the signature database to automatically download at the specified time and to take the following actions:

a. Choose a date by clicking the date picker icon.

b. Enter the time.

c. Select the time format from the drop-down list.

7. Click **OK**.

The signature database installation is complete.

## RELATED DOCUMENTATION

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[Signature Database Overview | 362](#)

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[About the Active Database Page | 363](#)

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[Downloading a Signature Database | 364](#)

# 2

PART

## Customer Portal

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# Introduction

## IN THIS CHAPTER

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- [Customer Portal Overview | 371](#)
- [Switching the Tenant Scope | 372](#)
- [Accessing Customer Portal | 373](#)
- [Setting Up Your Network with Customer Portal | 374](#)
- [Changing the Password on First Login | 375](#)
- [Changing the Customer Portal Password | 376](#)
- [Resetting the Password | 377](#)
- [Extending the User Login Session | 378](#)

## Unified Administration and Customer Portal Overview

Contrail Service Orchestration supports a unified portal for both service provider users and tenant users and for the services managed and consumed by the administrators and tenants.

The unified portal contains the features of vCPE, uCPE, and SD-WAN for both Administration and Customer portals; enforces role-based access control (RBAC), which prevents tenants from accessing administrator data; and supports different backend authentication methods for service provider users and tenant users.

The unified portal enable service providers to deploy Juniper Networks security features as a virtualized network function (VNF) function either in distributed or centralized mode or in the branch SRX Series device. This VNF provides advanced firewall and Network Address Translation (NAT) management capabilities to end users from a single pane of glass (SPOG) user interface, in a multitenant environment. Service provider administrators are able to manage all phases of the security policy life cycle more quickly and intuitively, from policy creation through deployment.

Firewall and NAT management features include policy configuration such as rule reordering, event viewer for firewall and NAT events, alerts and alarms, logs and dashboard widgets. All features have RBAC enforced, which enables either the SP administrator or the tenant administrator to configure policies for the tenant.

The unified portal also provides SD-WAN capabilities with integrated firewall, NAT management, and device management.

## RELATED DOCUMENTATION

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[Customer Portal Overview | 371](#)

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[Switching the Tenant Scope | 372](#)

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[Firewall Policy Overview | 503](#)

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[SLA Profiles and SD-WAN Policies Overview | 615](#)

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[NAT Policies Overview | 653](#)

## Customer Portal Overview

You use Customer Portal to activate and manage sites, customer premises equipment (CPE) devices, and network services in your network. Your service provider sets up the network topology, assigns network services to you, and provides initial login credentials for Customer Portal. You can change your password through Customer Portal after you log in for the first time.

Your network uses one of the following deployment topologies:

- A centralized deployment

In a centralized deployment, virtualized network functions (VNFs) reside in a service provider's cloud in a network point of presence (POP). Sites that access network services in this way are called *cloud sites* in this documentation.

- A distributed deployment

In the distributed deployment, VNFs reside on a CPE device located at a customer's site. These sites are called *on-premise sites* in this documentation.

- A combined centralized and distributed deployment

In this deployment, your network contains both cloud sites and on-premise sites. VNFs for a cloud site reside in the service provider's cloud and VNFs for an on-premise sites reside on the CPE device.

Each connection for a cloud site and each on-premise site can support one network service, although use of a network service on any connection or device is optional.

**NOTE:** NFX250 devices activate automatically when you power them up and configure basic connectivity settings, and you do not need to activate these devices through Customer Portal.

See the NFX250 documentation at:

[https://www.juniper.net/documentation/en\\_US/release-independent/junos/information-products/pathway-pages/nfx-series/product/](https://www.juniper.net/documentation/en_US/release-independent/junos/information-products/pathway-pages/nfx-series/product/)

## RELATED DOCUMENTATION

[Accessing Customer Portal | 373](#)

[Changing the Customer Portal Password | 376](#)

## Switching the Tenant Scope

Administration Portal users can change the tenant scope from all tenants to a specific tenant by using the tenant switcher displayed on the banner.

When you switch scope from all tenants to a specific tenant, the menu and pages displayed are almost the same as those displayed for Customer Portal users, with some additional actions visible to the Administration Portal users. When you switch back to the **All Tenants** scope, the menu and pages for the Administration Portal are displayed.

To switch from one scope to another:

- From the top right corner of the page, select the **All Tenants** scope to access Administration Portal or select a specific tenant (for example, aaa) to access Customer Portal. The menu and pages for Administration Portal or Customer Portal are displayed based on the scope selected from the drop-down list.

## RELATED DOCUMENTATION

[Unified Administration and Customer Portal Overview | 370](#)

[Role-Based Access Control Overview | 885](#)

## Accessing Customer Portal

To start Customer Portal:

1. Obtain the following information from your service provider:

- IP address for the Customer Portal host.
- Login credentials:
  - Username
  - Password

2. Using a Web browser, access the URL for Customer Portal.

For example, if the IP address of the host on which Customer Portal resides is 192.0.2.1, the URL is <https://192.0.2.1>.

**NOTE:** We recommend that you use Google Chrome Version 60 or later to access the Contrail Service Orchestration (CSO) GUIs.

3. Log in with the credentials provided.

The Customer Portal Dashboard page appears and you can now start to activate sites.

From CSO Release 3.1 onward, the customer portal functionality has been enhanced to provide a richer user experience. The menu bar on the left-hand side of the every page allows you to access the different tasks easily. The top-level menu items are listed in [Table 139 on page 373](#).

**Table 139: Customer Portal Menu**

Menu Name	Description
<b>Dashboard</b>	Configurable dashboard that offers you a customized view of network services through its widgets
<b>Monitor</b>	Monitor alerts and alarms, security, device, and software-defined WAN (SD-WAN) events; applications and jobs
<b>Resources</b>	Device and software image management
<b>Configuration</b>	Configure network services, shared objects, and policies (firewall, NAT, SD-WAN), and view and manage configuration deployments
<b>Sites</b>	Manage sites and site groups

Table 139: Customer Portal Menu (*continued*)

Menu Name	Description
<b>Reports</b>	Create report definitions and view reports
<b>Administration</b>	Manage users, licenses, and the signature database

## RELATED DOCUMENTATION

[Changing the Customer Portal Password | 376](#)

[Customer Portal Overview | 371](#)

## Setting Up Your Network with Customer Portal

Your service provider specifies which sites appear in your network and the network services that you can use. When you start working in Customer Portal, you must set up your network using the available sites and network services.

To set up your network with Customer Portal:

1. You can add an on-premise spoke site from the **Sites** page. See [“Adding On-Premise Spoke Sites for SD-WAN Deployment” on page 768](#).
2. Activate the on-premise spoke site. See [“Configuring a Single Site” on page 804](#).
3. Deploy network services. See [“Managing a Single Site” on page 803](#).
4. View and manage policies.
  - View and manage a firewall policy. See [“Creating Firewall Policy Intents” on page 505](#) and [“Deploying Policies” on page 746](#).
  - View and manage an SD-WAN policy. See [“Creating SLA Profiles” on page 631](#), [“Creating SD-WAN Policy Intents” on page 620](#), and [“Deploying Policies” on page 746](#).

## RELATED DOCUMENTATION

[Accessing Customer Portal | 373](#)

# Changing the Password on First Login

To enhance the security related to login credentials, you are prompted to change the password when you login to the portal for the first time.

To change the password when you log in for the first time:

1. Log in to the portal with the default login credentials.

The Change Password page appears with a message that you must change your password for security purposes.

**NOTE:** The Change Password page appears only if you are logging in to the portal for the first time.

2. Change your password following the guidelines provided in [Table 140 on page 375](#).

3. Click **Ok**.

**NOTE:** It is mandatory to change the login password when you log in to the portal for the first time. If you click **Cancel**, you are redirected to the login page.

The login password is changed and you are logged out of the system. To log in to the portal again, you must use your new password.

**Table 140: Fields on the Change Password Page**

Field	Description
New Password	Enter your new password.  The login password that you set must be between 6 and 21 characters long, and it must include at least one lowercase letter, one uppercase letter, one special character, and one number.  <b>NOTE:</b> The password strength indicator displays the efficiency of the password that you enter. You cannot proceed to the next step if the password strength indicator shows that the password is weak.
Confirm Password	Reenter the password for confirmation.  You can select <b>Show Password</b> to view the password.

## RELATED DOCUMENTATION

[Accessing Customer Portal | 373](#)[Changing the Customer Portal Password | 376](#)[Resetting the Password | 377](#)

## Changing the Customer Portal Password

To change the Customer Portal password:

1. Click the customer username that is located at the right side of the Customer Portal banner.

The drop-down list appears.

2. Click **Change Password**.

The Change Password page appears.

3. Specify the current password.

4. In the New Password text box, specify your new password.

The login password that you set must conform to a particular set of requirements such as minimum length of 6 characters, a maximum length of 21 characters, and that includes at least one lowercase letter, one uppercase letter, an alpha-numeric character, and a numeric character.

5. In the Confirm Password text box, specify your new password again.

Select the Show Password option to view the password.

6. Click **OK**.

You are logged out of the system. To log in to Customer Portal again, you must use your new password. Other sessions logged in with the same username are unaffected until the next login.

## RELATED DOCUMENTATION

[Customer Portal Overview | 371](#)[Accessing Customer Portal | 373](#)



# Resetting the Password

If you have forgotten your password, you can reset the password from the login screen.

**NOTE:** Your account is locked after five consecutive unsuccessful login attempts.

To reset the password:

1. On the login page, click the **Forgot Password** link.

The Forgot Password page appears, with a message that an e-mail notification with a verification code is sent to your e-mail address.

**NOTE:** The **Forgot Password** link appears only after you specify the username.

2. In **Verification Code**, specify the verification code that you have received through an e-mail.

**NOTE:** The verification code expires after a time duration of 15 minutes.

3. Click **OK**.

The Reset Password page appears.

4. Change your password following the guidelines provided in [Table 141 on page 377](#).

5. Click **OK**.

Your password is reset.

**Table 141: Fields on the Reset Password Page**

Field	Description
Username	Enter your username.

Table 141: Fields on the Reset Password Page (continued)

Field	Description
New Password	<p>Enter your new password.</p> <p>The login password that you set must be between 6 and 21 characters long, and it must include at least one lowercase letter, one uppercase letter, one special character, and one number.</p> <p><b>NOTE:</b> The password strength indicator displays the efficiency of the password that you enter. You cannot proceed to the next step if the password strength indicator shows that the password is weak.</p>
Confirm Password	<p>Reenter the password for confirmation.</p> <p>You can select <b>Show Password</b> to view the password.</p>

## RELATED DOCUMENTATION

- [Accessing Customer Portal | 373](#)
- [Changing the Password on First Login | 375](#)
- [Changing the Customer Portal Password | 376](#)

## Extending the User Login Session

In the unified portal, a login session expires in 60 minutes. After 55 minutes, the **Extend Session** page is displayed and, prompting you to enter your password. You must enter your password to extend the session. The **Extend Session** page is displayed when the **Local** authentication method is configured.

If you have logged in to the portal with SSO authentication, the **Extend Session** page is displayed and you can authenticate with the external SSO server. However, the SSO expiration is not under the control of CSO and the following can happen:

- If the external SSO session is expired, you will be authenticated in the **Extend Session** page. After successful authentication, the **Extend Session** page is closed automatically.
- If the external SSO session is not expired, the **Extend Session** page is closed automatically.

To extend the login session:

1. On the **Extend Session** page, enter your password in the **Password** field. If you want to end your session and exit from the portal, click **Cancel** instead and you are redirected to the Login page.

2. Click **OK**.

The success message **Your Session has been successfully extended** is displayed.

#### RELATED DOCUMENTATION

| [Changing the Customer Portal Password | 376](#)

# Using the Dashboard

## IN THIS CHAPTER

- [About the Customer Portal Dashboard | 380](#)

## About the Customer Portal Dashboard

To access the dashboard, select **Customer Portal > Dashboard**.

Each time you log in to Customer Portal, the first thing you see is a user-configurable dashboard that offers you a customized view of network services through its widgets.

You can drag these widgets from the top of the dashboard to your workspace, where you can add, remove, and rearrange them to meet your needs.

The dashboard automatically adjusts the placement of the widgets to dynamically fit on your browser window without changing their order. You can manually reorder the widgets by using the drag and drop option. In addition, you can press and hold the top portion of the widget to move it to a new location.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Customize the dashboard by adding, removing, and rearranging the widgets on a per user basis.
- Update the dashboard or an individual widget by clicking the refresh icon.
- Show or hide widget thumbnails by clicking **Select Widgets** at the top of the page.
- Add a widget to the dashboard by dragging the widget from the palette or thumbnail container into the workspace.
- Delete a widget from the dashboard page by clicking the delete icon (X) in the title bar.

### Field Descriptions

You can quickly view important data by using the widgets at the top of your dashboard.

Table 142 on page 381 describes the dashboard widgets.

**Table 142: Widgets on the Customer Portal Dashboard**

Widget	Description
Alerts Donut Chart	<p>View the total number of alerts grouped by severity level.</p> <p>Click each alert name to view the total number of tenant sites receiving alerts that are critical, major, or minor.</p>
Top 5 Sites with Alerts	<p>View the top five tenant sites receiving alerts.</p> <ul style="list-style-type: none"> <li>• <b>Name</b>—Name of the tenant site.</li> <li>• <b>Location</b>—Location of the tenant site.</li> <li>• <b>Status</b>—Type of alerts received: critical, major, or minor.</li> </ul>
Top Sites not meeting SLA	<p>View a bar chart of the top tenant sites that did not meet SLA requirements and the percentage of time that SLA requirements were not met.</p> <p>Sort the information based on profile and period ranging from the last hour to the last month.</p>
Top Profiles not meeting SLA	<p>View a bar chart of the top SLA profiles that did not meet SLA requirements and the percentage of time that SLA requirements were not met.</p> <p>Sort the information based on location and period ranging from the last hour to the last month.</p>
Top Sites Switching Links	<p>View a column chart of the top sites in the tenant that switched WAN links to meet SLA requirements and the number of link-switch events for the sites.</p> <p>Sort the information based on profile and period ranging from the last hour to the last month.</p>
Top Profiles Switching Links	<p>View a column chart of the top SLA profiles that switched WAN links and the number of link-switch events for the SLA profiles.</p> <p>Sort the information based on location and period ranging from the last hour to the last month.</p>
Top Applications by Throughput	<p>View a bar chart of the top sites in the tenant that did not meet SLA requirements and the percentage of time that SLA requirements were not met.</p> <p>Sort the information based on profile, location, and time period.</p>

Table 142: Widgets on the Customer Portal Dashboard (continued)

Widget	Description
Firewall: Top Denials	<p>View a column chart of the top requests denied by the firewall based on their source IP addresses, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
Firewall: Top Events	<p>View a bar chart of the top firewall events of the network traffic, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
IPS: Top Events	<p>View the top IPS events of the network traffic, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
Applications: Most Sessions	<p>View a bar chart of the top applications with a maximum number of sessions, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
IP: Top Destinations	<p>View the top IP destination addresses of the network traffic, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
IP: Top Sources	<p>View the top IP source addresses of the network traffic, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
IP: Top Spams by Source IPs	<p>View the number of spams detected by the source IPs.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
Virus: Top Blocked	<p>View viruses with the maximum number of blocks, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
Web Filtering: Top Blocked Websites	<p>View a bar chart of websites with the maximum number of blocks, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
IP: Top Source IPs by Volume	<p>View the top source IP addresses based on volume of traffic, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
Application: Top Application by Volume	<p>View the applications based on volume of traffic, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>

Table 142: Widgets on the Customer Portal Dashboard (continued)

Widget	Description
IP: Top Users/IP by Sessions	<p>View the top source IP addresses by sessions, sorted by count.</p> <p>Sort the information based on time period ranging from 5 minutes to 7 days.</p>
Threat Map: Virus	<p>View a world map showing total virus event count across countries.</p> <p>Sort the information based on source, destination, and time period ranging from 5 minutes to 7 days.</p>
Threat Map: IPS	<p>World map showing total IPS event count across countries.</p> <p>Sort the information based on source, destination, and time period ranging from 5 minutes to 7 days.</p>

RELATED DOCUMENTATION

| [Customer Portal Overview](#) | 371

# Managing Objects

## IN THIS CHAPTER

- [Sorting Objects | 384](#)
- [Viewing Object Details | 385](#)
- [Searching for Text in an Object Data Table | 385](#)

## Sorting Objects

You can use the **Show Hide Columns** icon in the top right corner of a page to show or hide objects on a page. You can also sort the objects in a page by clicking the object column. The following options are available for sorting the objects:

- Sort text in alphabetical order.
- Sort numbers in ascending or descending order.
- Sort by date or time.
- Rearrange columns in a table.
- Increase or decrease column width.

To show or hide an object:

1. Click the **Show Hide Columns** icon.

The objects that are relevant to the page are displayed. By default all objects are selected and displayed on the page.

2. Select the objects that need to be displayed on the page and clear the objects that are not required to be displayed.

The objects are displayed or hidden as per the selection.

## RELATED DOCUMENTATION



## Viewing Object Details

You can use the **Detailed View** page to view all the configured parameters of an object. Only some of the configured parameters appear in the list of features on the main page.

To view details for an object:

- Right-click the object that you want to see the detailed view for and click **Quick View**, or select the object and click **More > Details**.
- Alternatively, hover over the object name and click the **Detailed View** icon that appears before it.

The **Detailed View** page appears showing the configuration information. See the relevant *About the Objects Page* topic for a description of the fields on these pages.

### RELATED DOCUMENTATION

| [Sorting Objects | 384](#)

## Searching for Text in an Object Data Table

You can use the search icon in the top right corner of a page to search for text containing letters and special characters on that page.

To search for text:

1. Enter partial text or full text of the keyword in the search bar and click the search icon.  
The search results are displayed.
2. Click **X** next to a search keyword or click **Clear All** to clear the search results.

### RELATED DOCUMENTATION

| [Sorting Objects | 384](#)

| [Viewing Object Details | 385](#)

# Monitoring Security Alerts and Alarms

## IN THIS CHAPTER

- [About the Monitor Overview Page | 386](#)
- [Alerts Overview | 388](#)
- [About the Generated Alerts Page | 388](#)
- [About the Alert Definitions Page | 390](#)
- [Managing Security Alerts Definitions | 391](#)
- [Creating Security Alert Definitions | 392](#)
- [Editing, Cloning, and Deleting Security Alert Definitions | 394](#)
- [About the Alarms Page | 396](#)

## About the Monitor Overview Page

To access this page, click **Monitor > Overview**.

You can use the Monitor Overview page to view information about the alarms and alerts for tenants, network services, connections, and sites on a geographical map. The network operator views the alarms and alerts, and then takes the necessary actions to resolve the issues.

You can also view the visual representation of the hub and link failure on this page.

- **Hub Failure** —The hub and the link connected to the hub appear in red color.
- **Link Failure** — The link connected to the hub appears in red color. However, the hub remains active and appears in green color.

## Tasks You Can Perform

You can perform the following tasks from this page:

- View on-premise spoke site details.
- View cloud spoke sites.

- View cloud hub sites.
- View multiple sites.

Field Descriptions

Table 143 on page 387 shows the descriptions of the fields on the Monitor Overview page.

Table 143: Fields on the Monitor Overview Page

Field	Description
Sites	<p>View the sites at which the service is deployed.</p> <p>Click the <b>Sites</b> drop-down list and select <b>Show sites</b></p>
Connections	<p>View the connections in the network.</p> <p>Click the <b>Connections</b> drop-down list and select <b>Show connections</b>.</p>
Only the node with alerts	<p>View the nodes with issues with the service.</p> <p>Click the drop-down list located next to the <b>Only the nodes with alerts</b> check box and select the type of alerts.</p> <ul style="list-style-type: none"><li>• Critical—Issues that prevent the node from working and require action from the operator. The nodes with critical alerts are displayed in red.</li><li>• Major—Issues that prevent the node from working at this time, but they do not require action from the operator. The nodes with major alerts are displayed in orange.</li><li>• Minor—Issues that allow a node to continue working, but not optimally. The network operator may need to take action to resolve the issue. The nodes with minor alerts are displayed in yellow.</li></ul> <p><b>NOTE:</b> The nodes without any alerts are displayed in blue.</p>

RELATED DOCUMENTATION

<a href="#">Managing Security Alerts Definitions   391</a>
<a href="#">Creating Security Alert Definitions   392</a>

## Alerts Overview

Alerts and notifications are used to notify administrators about significant events within the system. Notifications can also be sent through e-mail. You will be notified when a predefined network traffic condition is met. The alert trigger threshold is the number of network traffic events crossing a predefined threshold within a period of time.

Alerts and notifications provide options for:

- Defining alert criteria based on a set of predefined filters. You can use the filters defined in the advanced search to create an alert. You can also save filters and add them to security alert definitions.
- Generating an alert message and notifying you when alert criteria are met.
- Searching for specific alerts on the Generated Alerts page based on alert ID, description, or alert type.
- Supporting event-based alerts.

For example, If you are an administrator, you can define a condition such that if the number of firewall-deny events crosses a predefined threshold in a given time range for a specific device, you will receive an e-mail alert.

**NOTE:** If a threshold is crossed and remains so for a long duration, new alerts are not generated. Alerts are generated again when the number of logs matching the alert criteria drops below the threshold and crosses the threshold again.

### RELATED DOCUMENTATION

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[About the Generated Alerts Page | 388](#)

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[About the Alert Definitions Page | 390](#)

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[Managing Security Alerts Definitions | 391](#)

## About the Generated Alerts Page

To access this page, click **Monitor > Alerts & Alarms > Alerts**.

Use this page to view the system event-based alerts in response to a configured alert definition. The generated alerts help you to identify problems that appear in your monitored network environment and

displays both security and CSO alerts. You can view statistics such as the number of critical and non-critical alerts.

## Tasks You Can Perform

You can perform the following tasks from this page:

- Select the generated alert and then right-click or click **More > Jump to Events and Logs**. The corresponding events that triggered the alert are displayed.
- Select the generated alert and then right-click or click **More > Detail View**. The Alert Detail page appears displaying all the details of the alert.
- Select the generated alert and then right-click or click **More > Clear All Selections**.

## Field Descriptions

[Table 144 on page 389](#) provides guidelines on using the fields on the Generated Alerts page.

**Table 144: Fields on the Generated Alerts Page**

Field	Description
Severity	View the severity of the alert.
Time	View the date and time when the alert was generated.
Site	View the name of the tenant site.
Source	View the source of the alert. The source identifies whether an alert is a security alert or an SD-WAN alert.
Description	View the description of the alert.
Alert Type	View the type of alert.
ID	View the alert ID. Alert ID is a unique identification for each alert. For example, b4a3c027-7157-4861-8e3c-c872721cff2d.
Service Instance	View the service instance associated with the alert..
Object Type	View the object type.
Alert Name	View the name of the alert.
Tenant	View the name of the tenant.

## RELATED DOCUMENTATION

[Managing Security Alerts Definitions](#) | 391

## About the Alert Definitions Page

To access this page, select **Monitor > Alarms & Alerts > Alert Definitions** in the Customer Portal.

Use the Alert Definitions page to view alert definitions for SD-WAN and manage alert definitions for security. An alert definition consists of data criterion for triggering alerts about issues in the SD-WAN environment. Alert definitions also define the necessary action required to resolve issues based on the severity of the alert. An alert is triggered when the event threshold exceeds the data criteria that is defined. You can create an alert definition to monitor your data in real time and identify issues and attacks before they impact your network.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View SD-WAN alert definitions. The SD-WAN alert definitions are loading by default when the Alert Definitions page is loaded. See [Table 8 on page 25](#) for descriptions of the fields on the SD-WAN alert definitions pane.
- Manage Security alert definitions. See [“Managing Security Alerts Definitions” on page 391](#).
- Show or hide columns that contain information about SD-WAN alert definitions. See [“Sorting Objects” on page 384](#).
- Search for alert definitions using keywords. Click the search icon. Enter partial text or full text of the keyword in the search bar and press Enter. The search results are displayed.

### Field Descriptions

[Table 8 on page 25](#) describes the fields on the SD-WAN Alert Definitions pane.

Table 145: Fields on the SD-WAN Alert Definitions Pane

Field	Description
Rule Priority	View the priority of the alert definition. A value of one (1) indicates highest priority.
Alert Description	View the description of the alert.

Table 145: Fields on the SD-WAN Alert Definitions Pane (*continued*)

Field	Description
Filter	View the matching alert criteria to trigger the alert.
Action	View the action to be performed to resolve issues.
Context	View the additional configuration parameters that you can pass on to the rule action function.

## RELATED DOCUMENTATION

[Managing Security Alerts Definitions | 391](#)

[About the Generated Alerts Page | 388](#)

## Managing Security Alerts Definitions

Use the Security pane to generate alerts that warn you of problems in your monitored environment. An alert definition consists of data criteria for triggering an alert. An alert is triggered when the event threshold exceeds the data criteria that is defined.

### Tasks You Can Perform

You can perform the following tasks from this pane:

- Create security alert definition. See [“Creating Security Alert Definitions” on page 392](#).
- Edit, clone, and delete security alert definition. See [“Editing, Cloning, and Deleting Security Alert Definitions” on page 394](#).

### Field Descriptions

[Table 146 on page 391](#) provides guidelines on using the fields on the Security alert definitions pane.

Table 146: Fields on the Security Alert Definitions Pane

Field	Description
Alert Name	View the name of the alert.

Table 146: Fields on the Security Alert Definitions Pane (*continued*)

Field	Description
Alert Description	View the description for the alert.
Filter	View filter values of the alert.
Recipients	View recipients' e-mail addresses where alert notifications are sent.
Status	View the status of the alert.
Alert Type	View the type of alert. Example: Event-based

## RELATED DOCUMENTATION

[Alerts Overview | 388](#)
[Creating Security Alert Definitions | 392](#)

## Creating Security Alert Definitions

You can create an alert definition to monitor your data in real time. You can identify issues and attacks before they impact your network.

For example, if you are an administrator, you can define a condition such that if the number of firewall deny events crosses a predefined threshold in a given time frame for a specific device, you receive an e-mail alert.

To create a security alert definition:

1. Select **Monitor > Alerts & Alarms > Alert Definitions > Security**.

The Security alert definitions page appears.

2. Click the create icon (+) or add icon (+).

The Create an Alert Definition page appears.



3. Complete the configuration according to the guidelines provided in [Table 147 on page 393](#).
4. Click **OK**. If you want to discard the changes, click **Cancel** instead.

A new alert definition with the configured alert triggering condition is created. You can view the generated alerts from the alert definition to troubleshoot the issues with your system.

**Table 147: Fields on the Security Alert Definitions Page**

Field	Description
<b>General</b>	
Alert Name	Enter a unique string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 63 characters.
Alert Description	Enter a description for the alerts; maximum length is 1024 characters.
Alert Type	Displays the type of alert that is system-based.
Status	Select the Active check box to view only the active alerts.
Severity	Select the severity level of the alert: info, minor, major, critical.
<b>Trigger</b>	
Use Data Criteria from Filters	<p>Specifies the data criteria from the list of default and user-created filters that are saved from the Event Viewer.</p> <p>To add saved filters:</p> <ul style="list-style-type: none"> <li>• Click the <b>Use data criteria</b> from filters link. The Add Saved Filters page appears.</li> <li>• Select the filters to be added.</li> <li>• Click <b>OK</b>.</li> </ul>
Add Data Criteria	Specifies the data criteria based on the Time Span period, Group By, and Filter By option. Filtered data only displays the subset of data that meets the criteria that you specify.
<b>Recipient(s)</b>	
E-mail Address(es)	Specify the e-mail addresses for the recipients of the alert notification.
Custom Message	Enter a custom string for identifying the type of alert in the alert notification e-mail.

## RELATED DOCUMENTATION

[Managing Security Alerts Definitions | 391](#)

[Editing, Cloning, and Deleting Security Alert Definitions | 394](#)

## Editing, Cloning, and Deleting Security Alert Definitions

### IN THIS SECTION

- [Editing Security Alert Definitions | 394](#)
- [Cloning Security Alert Definitions | 394](#)
- [Deleting Security Alert Definitions | 395](#)

You can edit, clone, and delete security alert definitions.

### Editing Security Alert Definitions

To edit the security alert definition:

1. Select **Monitor > Alerts & Alarms > Alert Definitions > Security**.

The Security Alerts Definition page appears.

2. Select the check box of the security alert definition that you want to modify, and click the edit icon.

The Edit Alert Definition page appears. The options available on the Create Alert Definition page are available for editing.

3. Update the configuration as needed.

4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

### Cloning Security Alert Definitions

You can clone an alert definition when you want to quickly create a copy of an alert definition and modify its parameters including the name of the alert.

To clone an alert definition:

1. Select **Monitor > Alerts & Alarms > Alert Definitions > Security**.

The Security Alert Definitions page appears.

2. Select the alert definition that you want to clone, and click **More > Clone** at the top right corner of the page.

The Clone Alert Definition page appears. The options available on the Create Alert Definition page are available for editing.

3. Click **OK** to save the configuration.

A new alert definition is created.

## Deleting Security Alert Definitions

You can click the delete icon (X) to delete one or more alert definitions.

To delete the alert definition:

1. Select **Monitor > Alerts & Alarms > Alert Definitions > Security**.

The Security Alerts Definition page appears.

2. Select the alert definition that you want to delete and click the delete icon (X icon).

The Confirm Delete page appears.

3. Click **Yes** to delete the alert definition or **No** to cancel the deletion.

If you click **Yes**, then the alert definition is deleted from the main page.

## RELATED DOCUMENTATION

[Managing Security Alerts Definitions | 391](#)

[Creating Security Alert Definitions | 392](#)

# About the Alarms Page

To access this page, select **Monitor > Alerts & Alarms > Alarms** in the Customer Portal.

Use this page to view system generated alarms. Alarms alert you to conditions that might prevent the device from operating normally. System alarm conditions are preset based on fault monitoring and performance monitoring (FMPM) being performed on a device. For example, conditions such as hardware issues, drop in throughput and latency of data, temperature variations, and capacity optimization issues automatically trigger an alarm.

The difference between alerts and alarms lies in the type of events that are being monitored. An alert is used to notify administrators about significant events within the system. For example, when a predefined network traffic condition is met. For more information about alerts, see [“Alerts Overview” on page 388](#).

For example, an alarm is raised when

## Tasks You Can Perform

You can perform the following tasks from this page:

- View alarm activity within a specific time range:
  - You can select the time range by clicking on the options provided—2 hours (2h), 4 hours (4h), 8 hours (8h), 16 hours (16h), 24 hours (24h), or 1 week (1w). By default, alarm activity is displayed for 1 week.
  - You can view alarm activity for a custom time range by clicking on **Custom** and providing the time range.
- View details about the alarm. See [Table 148 on page 396](#) for more information.
- Select the generated alarm and then right-click or click **More > Detail View** to view the details of the alarm.

## Field Descriptions

[Table 148 on page 396](#) provides information about the fields on the Alarms page.

Table 148: Fields on the Alarms Page

Field	Description
Severity	View the severity of the alarm.
Time	View the date and time when the alarm was generated.
Tenant	View the name of the tenant.

Table 148: Fields on the Alarms Page (*continued*)

Field	Description
Site	View the site for which the alarm was generated.
Source	View the source of the alarm.
Description	View the description of the alarm.
ID	View the alarm ID.
Link Name	View the name of the link that generated the alarm.
Service Instance	View the service instance associated with the alarm.
Object Type	View the type of alarm. Example: Event-based
POP	View the point of presence (POP) of the alarm.

## RELATED DOCUMENTATION

[About the Generated Alerts Page | 388](#)
[About the Alert Definitions Page | 390](#)
[Managing Security Alerts Definitions | 391](#)

# Monitoring Security

## IN THIS CHAPTER

- [About the All Security Events Page | 398](#)
- [About the Firewall Events Page | 403](#)
- [About the Web Filtering Events Page | 406](#)
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- [About the Content Filtering Events Page | 411](#)
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- [About the IPS Events Page | 418](#)
- [About the Screen Events Page | 421](#)

## About the All Security Events Page

To access this page, click **Monitoring > Security Events > All Events**.

Use this page to get an overall, high-level view of your network environment. You can view abnormal events, attacks, viruses, or worms when log data is correlated and analyzed.

This page provides administrators with an advanced filtering mechanism and provides visibility into actual events collected by the Log Collector. Using the time-range slider, you can instantly focus on areas of unusual activity by dragging the time slider to the area of interest to you. The slider and the Custom button under Time Range remain at the top of each tab. Users select the time range, and then they can decide how to view the data, using the summary view or detail view tabs.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all events in your network. See [“Summary View” on page 399](#).
- View the comprehensive details of events in a tabular format that includes sortable columns. See [“Detail View” on page 399](#).

## Summary View

You can view a brief summary of all the events in your network. At the center of the page is critical information, including total number of events, viruses found, total number of interfaces that are down, number of attacks, CPU spikes, and system reboots. This data is refreshed automatically based on the selected time range. At the bottom of the page is a swim lane view of different events that are happening at a specific time. The events include firewall, web filtering, VPN, content filtering, antispam, antivirus, and IPS. Each event is color-coded, with darker shades representing a higher level of activity. Each tab provides deep information like type, and number of events occurring at that specific time.

[Table 149 on page 399](#) describes the widgets on the All Events Summary View page.

**Table 149: Widgets on the All Events Summary View Page**

Field	Description
Total Events	View the total number of all the events that includes firewall, web filtering, IPS, IPSec VPNs, content filtering, antispam, and antivirus events.
Virus Instances	View the total number of virtual instances running in the system.
Attacks	View the total number of attacks on the firewall.
Interface Down	View the total number of interfaces that are down.
CPU Spikes	View the total number of times a CPU utilization spike has occurred.
Reboots	View the total number of system reboots.
Sessions	View the total number of sessions established through firewall.

## Detail View

Click **Detail View** for comprehensive details of events in a tabular format that includes sortable columns. You can sort the events using the Group By option. For example, you can sort the events based on severity. The table includes information such as the rule that caused the event, severity for the event, event ID, traffic information, and how and when the event was detected.

## Advanced Search

You can perform advanced search of all events using the text field present above the tabular column. It includes the logical operators as part of the filter string. Enter the search string in the text field and based on your input, a list of items from the filter context menu is displayed. . You can select a value from the list and then select a valid logical operator to perform the advanced search operation Press Enter to display the search result in the tabular column below.

To delete the search string in the text field, click the delete icon (X icon).

Examples of event log filters are shown in the following list:

- Specific events originating from or landing within United States

Source Country = United States OR Destination Country = United States AND Event Name = IDP\_ATTACK\_LOG\_EVENT, IDP\_ATTACK\_LOG\_EVENT\_LS, IDP\_APPDDOS\_APP\_ATTACK\_EVENT\_LS, IDP\_APPDDOS\_APP\_STATE\_EVENT, IDP\_APPDDOS\_APP\_STATE\_EVENT\_LS, AV\_VIRUS\_DETECTED\_MT, AV\_VIRUS\_DETECTED, ANTISPAM\_SPAM\_DETECTED\_MT, ANTISPAM\_SPAM\_DETECTED\_MT\_LS, FWAUTH\_FTP\_USER\_AUTH\_FAIL, FWAUTH\_FTP\_USER\_AUTH\_FAIL\_LS, FWAUTH\_HTTP\_USER\_AUTH\_FAIL, FWAUTH\_HTTP\_USER\_AUTH\_FAIL\_LS, FWAUTH\_TELNET\_USER\_AUTH\_FAIL, FWAUTH\_TELNET\_USER\_AUTH\_FAIL\_LS, FWAUTH\_WEBAUTH\_FAIL, FWAUTH\_WEBAUTH\_FAIL\_LS

- User wants to filter all RT flow sessions originating from IP addresses in specific countries and landing on IPs in specific countries

Event Name = RT\_FLOW\_SESSION\_CREATE, RT\_FLOW\_SESSION\_CLOSE AND Source IP = 177.1.1.1, 220.194.0.150, 14.1.1.2, 196.194.56.4 AND Destination IP = 255.255.255.255, 10.207.99.75, 10.207.99.72, 223.165.27.13 AND Source Country = Brazil, United States, China, Russia, Algeria AND Destination Country = Germany, India, United States

- Traffic between zone pairs for policy – IDP2

Source Zone = trust AND Destination Zone = untrust, internal AND Policy Name = IDP2

- UTM logs coming from specific source country, destination country, source IP addresses with or without specific destination IP addresses.

Event Category = antispam, antivirus, contentfilter, webfilter AND Source Country = Australia AND Destination Country = Turkey, United States, Australia AND Source IP = 1.0.0.0, 1.1.1.3 OR Destination IP = 74.125.224.47, 5.56.17.61

- Events with specific sources IPs or events hitting HTP, FTP, HTTP, and unknown applications coming from host DC-SRX1400-1 or VSRX-75.

Application = tftp, ftp, http, unknown OR Source IP = 192.168.34.10, 192.168.1.26 AND Hostname = dc-srx1400-1, vsrx-75

[Table 150 on page 400](#) describes the fields on the All Events Detail View Page.

**Table 150: Fields on the All Events Detail View Page**

Field	Description
Time	View the time when the log was received.
Event Name	View the event name of the log.



Table 150: Fields on the All Events Detail View Page (*continued*)

Field	Description
Site	View the name of the tenant site.
Source Country	View the source country name.
Source IP	View the source IP address from where the event occurred.
Destination Country	View the destination country name from where the event occurred.
Destination IP	View the destination IP address of the event.
Source Port	View the source port of the event.
Destination Port	View the destination port of the event.
Description	View the description of the log.
Attack Name	View the attack name of the log: Trojan, worm, virus, and so on.
Threat Severity	View the severity level of the threat.
Policy Name	View the policy name in the log.
UTM Category or Virus Name	View the UTM category of the log.
URL	View the accessed URL name that triggered the event.
Event Category	View the event category of the log.
User Name	View the username of the log.
Action	View the action taken for the event: warning, allow, and block.
Log Source	View the IP address of the log source.
Application	View the application name from which the events or logs are generated
Hostname	View the hostname in the log.
Service Name	The name of the application service. For example, FTP, HTTP, SSH, and so on.

Table 150: Fields on the All Events Detail View Page (*continued*)

Field	Description
Nested Application	View the nested application in the log.
Source Zone	View the source zone of the log.
Destination Zone	View the destination zone of the log.
Protocol ID	View the protocol ID in the log.
Roles	View the role name associated with the log.
Reason	View the reason for the log generation. For example, a connection tear down may have an associated reason such as “authentication failed”.
NAT Source Port	View the translated source port.
NAT Destination Port	View the translated destination port.
NAT Source Rule Name	View the NAT source rule name.
NAT Destination Rule Name	View the NAT destination rule name.
NAT Source IP	View the translated (or natted) source IP address. It can contain IPv4 or IPv6 addresses.
NAT Destination IP	View the translated (also called natted) destination IP address.
Traffic Session ID	View the traffic session ID of the log.
Path Name	View the path name of the log.
Logical system Name	View the name of the logical system.
Rule Name	View the name of the rule.
Profile Name	View the name of the All events profile that triggered the event.

## RELATED DOCUMENTATION

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## About the Firewall Events Page

To access this page, click **Monitor > Security Events > Firewall**.

Use the Firewall Events page to view information about security events based on firewall policies. Analyzing firewall logs yields useful security management information, such as attempts to breach your network and observing the inherent characteristics of your traffic in real-time. Using the time-range slider, you can quickly focus on the area of activity that you are most interested in. Once the time range is selected, all of the data presented in your view is refreshed automatically. You can also use the Custom button to set a custom time range.

There are two ways to view your data. You can select either the **Summary View** tab or the **Detail View** tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all the firewall events in your network. See [“Summary View” on page 403](#)
- View the comprehensive details of events in a tabular format that includes sortable columns. See [“Detail View” on page 404](#).

### Summary View

The data presented in the line graph (also known as swim lanes) is refreshed automatically based on the selected time range. The line graph shows light blue lanes that represent all firewall events and dark blue lanes represent blocked firewall events.

Below the swim lanes are widgets displaying critical information such as top sources, top destinations, top users, and top reporting devices.

[Table 151 on page 404](#) describes the widgets on the Summary View page.

**Table 151: Widgets on the Summary View Page**

Widget	Description
Top Sources	View the top source IP addresses of the network traffic; sorted by event count.
Top Destinations	View the top destination IP addresses of the network traffic; sorted by event count.
Top Users	View then top users of the network traffic; sorted by event count.
Top Reporting Devices	View the top reporting devices in the network; sorted by event count.

## Detail View

Detail view includes information such as the rule that caused the event, severity for the event, event ID, traffic information, and how and when the event was detected

[Table 152 on page 404](#) provides guidelines on using the fields on the Detail View page.

**Table 152: Fields on the Detail View Page**

Field	Description
Time	View the time when the log was received.
Event Name	View the event name of the log.
Source Country	View the source country name from where the event originated.
Source IP	View the source IP address from where the event occurred.
Destination Country	View the destination country name from where the event occurred.
Destination IP	View the destination IP address of the event.
Source Port	View the source port of the event.
Destination Port	View the destination port of the event.
Description	View the description of the log.
Policy Name	View the policy name in the log.
User Name	View the username of the log.

Table 152: Fields on the Detail View Page (*continued*)

Field	Description
Action	View the action taken for the event: warning, allow, and block.
Log Source	View the IP address of the log source (IPv4 or IPv6).
Application	View the application name from which the events or logs are generated.
Hostname	View the hostname in the log.
Service Name	The name of the application service. For example, FTP, HTTP, SSH, and so on.
Nested Application	View the nested application in the log.
Source Zone	View the user traffic received from the zone.
Destination Zone	View the destination zone of the log.
Protocol ID	View the protocol ID in the log.
Roles	View the role names associated with the event.
NAT Source Port	View the translated source port.
NAT Destination Port	View the translated destination port.
NAT Source Rule Name	View the NAT source rule name.
NAT Destination Rule Name	View the NAT destination rule name.
NAT Source IP	View the translated (or natted) source IP address. It can contain IPv4 or IPv6 addresses.
NAT Destination IP	View the translated (also called natted) destination IP address.
Traffic Session ID	View the traffic session ID of the log.
Rule Name	View the rule name of the log.

## RELATED DOCUMENTATION

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## About the Web Filtering Events Page

To access this page, click **Monitor > Security Events > Web Filtering**.

Use the Web Filtering page to view information about security events based on Web filtering policies. Web filtering allows you to permit or block access to specific websites by URL or by URL category using cloud-based lookups, a local database, or an external Websense server. Analyzing Web filtering logs yields useful security management information such as users detected accessing restricted URLs and actions taken by the system. Using the time-range slider, you can quickly focus on the area of activity that you are most interested in. Once the time range is selected, all of the data presented in your view is refreshed automatically. You can also use the Custom button to set a custom time range.

There are two ways to view your data. You can select either the **Summary View** tab or the **Detail View** tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all the Web filtering events in your network. See [“Summary View” on page 406](#).
- View the comprehensive details of events in a tabular format that includes sortable columns. See [“Detail View” on page 407](#).

### Summary View

The top of the page has a swim lane graph of all the Web filtering events against the blocked events.

Below the swim lanes are widgets displaying critical information such as top sources, top destinations, top users, and top reporting devices.

You can use the widgets at the bottom of the page to view critical information such as top URLs blocked, top matched profiles, top sources, and top destinations.

[Table 153 on page 407](#) describes the widgets on the Summary View page.

**Table 153: Widgets on the Summary View Page**

Widget	Description
Top URLs blocked	View the URL names that are blocked; sorted by event count.
Top Matched Profiles	View the web filtering profile names; sorted by event count.
Top Sources	View the top source IP addresses of the network traffic; sorted by event count.
Top Destinations	View the top destination IP addresses of the network traffic; sorted by event count.

## Detail View

You can aggregate the events using the Group By option. For example, you can group the events based on source country. The table includes information such as the event name, UTM category, source IP address, source country, and so on.

[Table 154 on page 407](#) provides guidelines on using the fields on the Detail View page.

**Table 154: Fields on the Detail View Page**

Fields	Description
Time	View the time when the event occurred.
Event Name	View the event name of the log.
Source Country	View the source country name from where the event originated.
Source IP	View the source IP address from where the event occurred (IPv4 or IPv6).
Destination Country	View the destination country name from where the event occurred.
Destination IP	View the destination IP address of the event (IPv4 or IPv6).
Source Port	View the source port of the event.
Destination Port	View the destination port of the event.
Description	View the description of the log.

Table 154: Fields on the Detail View Page (*continued*)

Fields	Description
UTM category or Virus Name	View the UTM category of the log: enhanced, local, and redirect.
URL	View the accessed URL name that triggered the event.
Action	View the action taken for the event: warning, allow, and block.
Log Source	View the IP address of the log source (IPv4 or IPv6).
Host Name	View the hostname in the log.
Source Zone	View the user traffic received from the zone.
Roles	View the role names associated with the event.
Reason	View the reason for the log generation. For example, unrestricted access.
Path Name	View the path name of the log.
Profile Name	View the name of the Web filtering profile that triggered the event.

## RELATED DOCUMENTATION

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[About the IPsec VPNs Events Page | 409](#)
[About the Content Filtering Events Page | 411](#)
[About the Antispam Events Page | 413](#)
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## About the IPsec VPNs Events Page

To access this page, click **Monitor > Security Events > IPsec VPNs**.

Use this page to view information about security events based on IPsec VPN policies. The event viewer provides a view of all IPsec VPN events.

Using the time-range slider, you can quickly focus on the area of activity that you are most interested in. Once the time range is selected, all of the data presented in your view is refreshed automatically. You can also use the custom button to set a custom time range.

There are two ways to view your data. You can select either the **Summary View** tab or the **Detail View** tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all the IPsec VPN events in your network. See [“Summary View” on page 409](#).
- View the comprehensive details of events in a tabular format that includes sortable columns. See [“Detail View” on page 410](#).

### Summary View

The top of the page has a swim lane graph of all the VPN events. You can use the widgets at the bottom of the page to view critical information such as top sources, top destinations, and top reporting devices.

[Table 155 on page 409](#) describes the widgets on the Summary View page.

**Table 155: Widgets on the Summary View Page**

Widget	Description
Top Sources	View the top source IP addresses of the network traffic; sorted by event count.
Top Destinations	View the top destination IP addresses of the network traffic; sorted by event count.
Top Reporting Devices	View the top reporting device IP addresses; sorted by event count.

## Detail View

You can aggregate the events using the Group By option. For example, you can group the events based on source country. The table includes information such as the event name, log source, host name, source country, and so on.

[Table 156 on page 410](#) provides guidelines on using the fields on the Detail View page.

**Table 156: Fields on the Detail View Page**

Fields	Description
Time	View the time when the event occurred.
Event Name	View the event name of the log.
Source Country	View the source country name from where the event originated.
Destination Country	View the destination country name from where the event occurred.
Destination Port	View the destination port of the event.
Description	View the description of the log.
Log Source	View the IP address of the log source (IPv4 or IPv6).
Host Name	View the hostname in the log.
Rule Name	View the name of the antivirus profile that triggered the event.

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[About the Firewall Events Page | 403](#)

[About the Web Filtering Events Page | 406](#)

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## About the Content Filtering Events Page

To access this page, click **Monitor > Security Events > Content Filtering**.

Use this page to view information about security events based on content filtering policies. The event viewer provides a view of all content filtering events and how the events are handled by content filter. This page can be used to view traffic on the network in real time or as a debugging tool to view how content filtering is operating.

Content filtering provides basic data loss prevention functionality. Content filtering screens traffic based on MIME type, file extension, protocol commands, and embedded object type. It either permits or blocks specific commands or extensions on a protocol-by-protocol basis.

Using the time-range slider, you can quickly focus on the area of activity that you are most interested in. Once the time range is selected, all of the data presented in your view is refreshed automatically. You can also use the Custom button to set a custom time range.

There are two ways to view your data. You can select either the **Summary View** tab or the **Detail View** tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all the content filtering events in your network. See [“Summary View” on page 411](#).
- View the comprehensive details of events in a tabular format that includes sortable columns. See [“Detail View” on page 412](#).

### Summary View

The top of the page has a swim lane graph of all the content filtering events against the blocked events. You can use the widgets at the bottom of the page to view critical information such as top blocked protocol commands, top reasons, and top sources.

[Table 157 on page 411](#) describes the widgets on the Summary View page.

**Table 157: Widgets on the Summary View Page**

Widget	Description
Top Blocked Protocol commands	View the top command names or file extensions blocked on a protocol-by-protocol basis.
Top Reasons	View the top reasons for blocking the content. For example: Inappropriate or harmful communication.

Table 157: Widgets on the Summary View Page (*continued*)

Widget	Description
Top Sources	View the top source IP addresses of the network traffic; sorted by event count.

## Detail View

You can aggregate the events using the Group By option. For example, you can group the events based on source country. The table includes information such as the event name, UTM category, source IP address, source country, and so on.

[Table 158 on page 412](#) provides guidelines on using the fields on the Detail View page.

Table 158: Fields on the Detail View Page

Fields	Description
Time	View the time when the event occurred.
Event Name	View the event name of the log.
Source Country	View the source country name from where the event originated.
Source IP	View the source IP address from where the event occurred (IPv4 or IPv6).
Description	View the description of the log.
UTM Category or Virus Name	View the UTM category of the log: enhanced, local, and redirect.
URL	View the accessed URL name that triggered the event.
Argument	View the type of traffic. For example, FTP and HTTP.
Action	View the action taken for the event: warning, allow, and block.
Log Source	View the IP address of the log source (IPv4 or IPv6).
Host Name	View the hostname in the log.
Source Zone	View the user traffic received from the zone.
Roles	View the role names associated with the event.
Reason	View the reason for the log generation. For example, unrestricted access

Table 158: Fields on the Detail View Page (*continued*)

Fields	Description
Profile Name	View the name of the content filtering profile that triggered the event.

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- [About the Firewall Events Page | 403](#)
- [About the Web Filtering Events Page | 406](#)
- [About the IPsec VPNs Events Page | 409](#)
- [About the Antispam Events Page | 413](#)
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## About the Antispam Events Page

To access this page, click **Monitor > Security Events > Antispam**.

Use this page to view information about security events based on antispam policies. The event viewer provides a view of all antispam events and the action taken by the antispam scanner.

The antispam scanner inspects and block spam by scanning inbound and outbound SMTP e-mail traffic. The filtering can be server-based using an external spam block list server or local-based using local lists (blocklists and allowlists) for matching.

Using the time-range slider, you can quickly focus on the area of activity that you are most interested in. Once the time range is selected, all of the data presented in your view is refreshed automatically. You can also use the Custom button to set a custom time range.

There are two ways to view your data. You can select either the **Summary View** tab or the **Detail View** tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all the antispam events in your network. See [“Summary View” on page 414](#).

- View the comprehensive details of events in a tabular format that includes sortable columns. See [“Detail View” on page 414](#).

## Summary View

The top of the page has a swim lane graph of all antispam events. You can use the widget at the bottom of the page to view source IP addresses of the network traffic, sorted by event count.

## Detail View

You can aggregate the events using the Group by option. For example, you can group the events based on source country. The table includes information such as the event name, UTM category, source IP address, source country, and so on.

[Table 159 on page 414](#) provides guidelines on using the fields on the Detail View page.

**Table 159: Fields on the Detail View Page**

Fields	Description
Time	View the time when the event occurred.
Event Name	View the event name of the log.
Source Country	View the source country name from where the event originated.
Source IP	View the source IP address from where the event occurred (IPv4 or IPv6).
Description	View the description of the log.
UTM Category or Virus Name	View the UTM category of the log: enhanced, local, and redirect.
URL	View the accessed URL name that triggered the event.
Argument	View the type of traffic. For example, FTP and HTTP.
Action	View the action taken for the event: warning, allow, and block.
Log Source	View the IP address of the log source (IPv4 or IPv6).
Host Name	View the hostname in the log.
Source Zone	View the user traffic received from the zone.
Roles	View the role names associated with the event.

Table 159: Fields on the Detail View Page (*continued*)

Fields	Description
Reason	View the reason for the log generation. For example, unrestricted access
Profile Name	View the name of the content filtering profile that triggered the event.

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## About the Antivirus Events Page

To access this page, click **Monitor > Security Events > Antivirus**.

Use this page to view information about security events based on antivirus policies. The event viewer provides a view of all antivirus events and the action taken by the virus scanner.

The antivirus scanner inspects files transmitted over several protocols to determine if the files exchanged are malicious (for example, viruses, Trojans, rootkits, and worms).

Using the time-range slider, you can quickly focus on the area of activity that you are most interested in. Once the time range is selected, all of the data presented in your view is refreshed automatically. You can also use the Custom button to set a custom time range.

There are two ways to view your data. You can select either the **Summary View** tab or the **Detail View** tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all the antivirus events in your network. See [“Summary View” on page 416](#).

- View the comprehensive details of events in a tabular format that includes sortable columns. See “[Detail View](#)” on page 416.

Summary View

The top of the page has a swim lane graph of all the antivirus events against the blocked events. You can use the widgets at the bottom of the page to view critical information such as top blocked protocol commands, top reasons, and top sources.

[Table 160 on page 416](#) provides guidelines on using the widgets on the Detail View page.

Table 160: Widgets on the Summary Page

Field	Description
Top Sources	View the top source IP addresses of the network traffic; sorted by event count.
Top Destinations	View the top destination IP addresses of the network traffic; sorted by event count.
Top Reporting/Attacked Devices	View the top reporting/attacked device IP addresses; sorted by event count.
Top Viruses	View the top virus names detected; sorted by event count.
Top Source Countries	View the top source country names where the events originated; sorted by event count.
Top Destination Countries	View the top destination country names where the events occurred; sorted by event count.

Detail View

You can aggregate the events using the Group By option. For example, you can group the events based on source country. The table includes information such as the event name, UTM category, source IP address, source country, and so on.

[Table 161 on page 416](#) provides guidelines on using the fields on the Detail View page.

Table 161: Fields on the Detail View Page

Fields	Description
Time	View the time when the event occurred.



Table 161: Fields on the Detail View Page (*continued*)

Fields	Description
Event Name	View the event name of the log.
Source Country	View the source country name from where the event originated.
Source IP	View the source IP address from where the event occurred (IPv4 or IPv6).
Destination Country	View the destination country name from where the event occurred.
Destination IP	View the destination IP address of the event (IPv4 or IPv6).
Source Port	View the source port of the event.
Destination Port	View the destination port of the event.
Description	View the description of the log.
UTM Category or Virus Name	View the UTM category of the log: enhanced, local, and redirect.
URL	View the accessed URL name that triggered the event.
Action	View the action taken for the event: warning, allow, and block.
Log Source	View the IP address of the log source (IPv4 or IPv6).
Host Name	View the hostname in the log.
Source Zone	View the user traffic received from the zone.
Roles	View the role names associated with the event.
Reason	View the reason for the log generation. For example, unrestricted access.
Profile Name	View the name of the antivirus profile that triggered the event.

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## About the IPS Events Page

To access this page, click **Monitor > Security Events > IPS**.

Use the IPS Events page to view information about security events based on IPS policies. Analyzing IPS logs yields useful security management information, such as abnormal events, attacks, viruses, or worms.

Using the time-range slider, you can quickly focus on the area of activity that you are most interested in. Once the time range is selected, all of the data presented in your view is refreshed automatically. You can also use the custom button to set a custom time range.

There are two ways to view your data. You can select either the **Summary View** tab or the **Detail View** tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all the all the IPS events in your network. See “[Summary View](#)” on page 418.
- View the comprehensive details of events in a tabular format that includes sortable columns. See “[Detail View](#)” on page 419.

### Summary View

The data presented in the area graph is refreshed automatically based on the selected time range. You can use widgets to view critical information such as IPS severities, top sources, top destinations, top reporting devices, top IPS attacks, top source countries, and top destination countries.

[Table 162 on page 418](#) provides guidelines on using the widgets on the Detail View page.

Table 162: Widgets on the Summary Page

Field	Description
IPS Severities	View the top IPS severities of the events based on the severity level: high, medium, low.

Table 162: Widgets on the Summary Page (continued)

Field	Description
Top Sources	View the top source IP addresses of the network traffic; sorted by the number of event occurrences.
Top Destinations	View the top destination IP addresses of the network traffic; sorted by the number of event occurrences.
Top Reporting/Attacked Devices	View the top devices that are attacked by IPS events; sorted by the number of times users are active on the network.
Top IPS attacks	View the top IPS attacks in the network traffic; sorted by the times devices are attacked.
Top Source Countries	View the top source countries from where the event source originated; sorted by the number of IP addresses.
Top Destination Countries	View the top source countries from where the event source originated; sorted by the number of IP addresses.

## Detail View

You can sort the events using the Group By option. For example, you can sort the events based on severity. The table includes information such as the rule that caused the event, severity for the event, event ID, traffic information, and how and when the event was detected.

[Table 163 on page 419](#) provides guidelines on using the fields on the Detail View page.

Table 163: Fields on the Detail View Page

Column	Description
Time	View the time when the log was received.
Event Name	View the event name of the log.
Source Country	View the source country name from where the event originated.
Source IP	View the source IP address from where the event occurred.
Destination Country	View the destination country name from where the event occurred.
Destination IP	View the destination IP address of the event.

Table 163: Fields on the Detail View Page (*continued*)

Column	Description
Source Port	View the source port of the event.
Destination Port	View the destination port of the event.
Description	View the description of the log.
Attack name	View the attack name of the log: Trojan, worm, virus, and so on.
Threat Severity	View the threat severity of the event.
Policy Name	View the policy name in the log.
Action	View the action taken for the event: warning, allow, and block.
Log Source	View the IP address of the log source.
Application	View the application name from which the events or logs are generated.
Hostname	View the host name in the log.
Service Name	View the name of the application service. For example, FTP, HTTP, SSH, and so on.
Nested Application	View the nested application name in the log.
Source Zone	View the source zone of the log.
Destination Zone	View the destination zone of the log.
Protocol ID	View the protocol ID in the log.
NAT Source Port	View the translated source port.
NAT Destination Port	View the translated destination port
NAT Source IP	View the NAT source IP address of the log.
NAT Destination IP	View the NAT destination IP address of the log.
Rule Name	View the name of the rule.

## RELATED DOCUMENTATION

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## About the Screen Events Page

To access this page, click **Monitor > Security Events > Screen**.

Use this page to view information about screen events that occur as a result of the screen options configured on SRX Series or vSRX security devices. Screen options are a detection and defense mechanism configured to filter the connection attempts bound towards a security zone. Screen options are used to prevent attacks, such as IP address sweeps, port scans, denial of service (DOS) attacks, Internet Control Message Protocol (ICMP), UDP, and SYN (Synchronize) floods.

You can view information related to screen events, including ICMP screening, IP screening, TCP screening, and UDP screening.

Using the time-range slider, you can quickly focus on the time and area of activity that you are most interested in. Once the time range is selected, all of the data presented in your view is refreshed automatically. You can also use the **Custom** button to set a custom time range.

There are two ways to view your data. You can select either the **Summary View** tab or the **Detail View** tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View a brief summary of all the screen events in your network. See [“Summary View” on page 422](#).
- View the comprehensive details of events in a tabular format that includes sortable columns. See [“Detail View” on page 422](#).

## Summary View

The top of the page has a swim lane graph of all the screen events. You can use the widgets at the bottom of the page to view critical information such as, top sources, top source countries, top destinations, and top destination countries.

[Table 164 on page 422](#) describes the widgets on the Detail View page.

**Table 164: Widgets on the Summary Page**

Field	Description
Top Sources	Top five source IP addresses with highest network traffic.
Top Destinations	Top five destination IP addresses with highest network traffic.
Top Source Countries	Top five countries from which the traffic that triggered the highest number of events originated and the number of events per country.
Top Destination Countries	Top five countries to which the traffic that triggered the highest number events was sent and the number of events per country.

## Detail View

You can group the events using the **Group By** option. For example, you can group the events based on source country. The table includes information such as the event name, UTM category, source IP address, source country, and so on.

[Table 165 on page 422](#) describes the fields on the Detail View page.

**Table 165: Fields on the Detail View Page**

Fields	Description
Log Generated Time	Time when the event occurred.
Log Received Time	Time the log was received at the log collector.
Site	Name of the tenant site from which the event originated.
Event Name	Name of the device event in the log.
Source Country	Country from which the traffic that triggered the event originated.
Source IP	Source IP address for the traffic that triggered the event (IPv4 or IPv6).

Table 165: Fields on the Detail View Page (*continued*)

Fields	Description
Destination Country	Country to which the traffic that triggered the event was sent.
Destination IP	Destination IP address for the traffic that triggered the event (IPv4 or IPv6).
Source Port	Source TCP/UDP port number of the traffic that triggered the event.
Destination Port	Destination TCP/UDP port number of the traffic that triggered the event.
Attack Name	Name of the attack in the log for threat event. For example, trojan, worm, virus, and so on.
Description	Brief description of the event.
Threat Severity	Level of severity of the threat. For example, minor, major, critical, and so on.
Policy Name	Name of the policy which generates the log. The policy is configured on the SRX Series or vSRX device.
Virus Name	This field is not applicable for screen events.
URL	Accessed URL that triggered the event.
Event Category	Event category in the log. For example, screen.
User Name	User name identified by the SRX Series or vSRX device, if user identity is enabled on the device.
Argument	Type of traffic. For example, FTP and HTTP.
Action	Action taken for the event. For example, warning, allow, and block.
Log Source	IP address of the device where the log is received (IPv4 or IPv6).
Application	Name of the application associated with the traffic that triggered the event.
Host Name	Hostname of the device where the log was generated.
Service Name	Name of the application service used for the traffic that triggered the event. For example, FTP, HTTP, SSH, and so on.
Nested Application	Nested application associated with the traffic that triggered the event.

Table 165: Fields on the Detail View Page (*continued*)

Fields	Description
Source Zone	Source security zone of the traffic that triggered the event.
Destination Zone	Destination security zone of the traffic that triggered the event.
Protocol ID	Protocol ID of the traffic that triggered the event.
Roles	Roles of the user as defined in the Active Directory, if available.
Reason	Reason for the log generation. For example, unrestricted access.
NAT Source Port	Translated source port.
NAT Destination Port	Translated destination port.
NAT Source Rule Name	NAT source rule name configured on the SRX Series or vSRX device.
NAT Destination Rule Name	NAT destination rule name configured on the SRX Series or vSRX device.
NAT Source IP	Translated source IP address for the traffic that triggered the event (IPv4 or IPv6).
NAT Destination IP	Translated destination IP address for the traffic that triggered the event (IPv4 or IPv6).
Traffic Session ID	Traffic session ID of the log.
Path Name	This field is not applicable for screen events.
Logical System Name	Name of the logical system which received the log.
Rule Name	Name of the rule which generates the log. This rule is configured on the SRX Series or vSRX device.
Profile Name	Name of the profile which filters the traffic that triggered the event.
Client Host Name	Hostname of the client associated with the traffic that triggered the event. For example, if a specific computer is infected, the name of that computer is displayed.
Malware info	Information about the malware causing the event.



RELATED DOCUMENTATION

<a href="#">About the All Security Events Page   398</a>
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<a href="#">About the Web Filtering Events Page   406</a>
<a href="#">About the IPsec VPNs Events Page   409</a>
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# Monitoring SD-WAN Events

## IN THIS CHAPTER

- [SD-WAN Events Overview | 426](#)
- [About the SD-WAN Events Page | 427](#)

## SD-WAN Events Overview

Service-level agreements (SLAs) define the expected class of service (CoS) for all applications and application groups in a site. The network operator needs tools to measure and monitor the performance metrics for all applications to determine the quality of the network and adherence to an assured CoS. To ensure compliance with SLAs, the network operator also needs tools to take remedial action when network performance deteriorates and SLAs are not being met. SD-WAN link-switch events enable the network to switch WAN links to meet the site's SLA requirements when the network-designated WAN link is unable to meet the site's SLA requirements.

Because SLA parameters override the path preference, in dynamic SD-WAN policies, the SD-WAN network chooses the best possible WAN link for traffic management. The WAN link is chosen based on the SLA parameters defined in the SLA profile. If multiple links match the SLA profile, the least loaded link is chosen. When a policy intent is deployed on a site, if the WAN link chosen by the SD-WAN network is unable to meet the SLA requirements in runtime, then the site switches WAN links to meet the SLA requirements. This link switching is called an SD-WAN event. Link switching also takes into account the priority defined in the SLA profile and SLA profiles with higher priority are given precedence while finding alternate WAN links. The ability of a site to switch WAN links ensures that SLA requirements are met and instances of not meeting the SLA requirements are minimized.

In static policies, link switching cannot occur even if the designated WAN link is unable to meet the SLA requirements, because path preference is defined.

## RELATED DOCUMENTATION

[About the SD-WAN Events Page | 427](#)

[SLA Profiles and SD-WAN Policies Overview | 615](#)

## About the SD-WAN Events Page

To access this page, click **Monitor > SD-WAN Events** in the Customer Portal.

You can use the SD-WAN Events page to view information about SD-WAN events. An SD-WAN event is triggered when the SLA requirements for a site are not met on its network-designated WAN link and the site switches WAN links to meet the SLA requirements.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View details about all SD-WAN events.
- View details about SD-WAN events in a customized time range.
- Show or hide columns that contain information about SD-WAN events. See [“Sorting Objects” on page 17](#).
- Search for SD-WAN events using keywords. Click the search icon. Enter partial text or full text of the keyword in the search bar and press Enter. The search results are displayed.

### Field Descriptions

[Table 166 on page 427](#) describes the fields on the SD-WAN Events page.

**Table 166: Fields on the SD-WAN Events Page**

Field	Description
Time Range	View a graphical representation of SD-WAN events against a defined time range. The x-axis represents the defined time and the y-axis represents SD-WAN events.  Use the slider to decrease or increase the time range within which you want to view SD-WAN events. You can also choose from pre-defined time ranges such as 2h, 4h, 8h, 16h, 24h, or Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, Previous 1 day is selected.
Time	View the time at which the links were switched.
Site	View the site that switched links.
SLA Profile	View the SLA profile associated with the site.
Source	View the designated WAN link.
Destination	View the new WAN link to which the site switched.

Table 166: Fields on the SD-WAN Events Page *(continued)*

Field	Description
Duration	View the time duration for which the SLA requirement for a site was not met before the site switched WAN links. A time duration of 0 indicates that the site switched WAN links before it failed to meet the SLA requirements, and the SLA requirements were met immediately on the new WAN link with no loss in meeting SLA requirements.

RELATED DOCUMENTATION

| [SD-WAN Events Overview](#) | 426

# Monitoring Applications

## IN THIS CHAPTER

- [About the SLA Performance of a Single Tenant Page | 429](#)
- [Viewing the SLA Performance of a Site | 432](#)
- [Viewing the SLA Performance of an Application or Application Group | 436](#)
- [Application Visibility Overview | 438](#)
- [About the Application Visibility Page | 438](#)
- [Viewing Application or User Visibility Data for Specific Sites | 441](#)

## About the SLA Performance of a Single Tenant Page

To access this page, select **Monitor > Application SLA Performance > *Tenant-Name* SLA Performance** in the Customer Portal.

You can use the *Tenant-Name* SLA Performance page to view performance reports for all sites in a tenant. You can view the SLA performance of all sites that have met and all the sites that have not met the defined SLA target values for the specified time range. You can customize your view and also the time range for which you want to view the SLA performance.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View the SLA performance for all sites in the tenant that have met the defined SLA target values, without switching WAN links, for the specified time range.
- View the SLA performance for all sites in the tenant that have met the defined SLA target values, after switching WAN links, for the specified time range.
- View the SLA performance for all sites in a tenant that have not met the defined SLA target values for the specified time range.
- View the SLA performance for all sites in a tenant in grid or card views.

Select card view or grid view at the top right of the page. By default, card view is selected.

- Customize the time range to view the SLA performance for all sites in a tenant.
- View the SLA performance for multiple departments within a single tenant.

Select the specific department for which you want to view the SLA performance from the drop-down list at the top right of the page.

## Field Descriptions

Table 167 on page 430 describes the fields on the *Tenant-Name* SLA Performance page.

**Table 167: Fields on the SLA Performance of a Single Tenant Page**

Field	Description
Time range	The time range for which you want to view the SLA performance. You can choose from Previous 1 hour, Previous 1 day, Previous 1 week, Previous 1 month, and Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, <b>Previous 1 day</b> is selected.
View	The view in which you want to display the SLA performance for all sites in the tenant. You can choose between card and grid views. By default, card view is selected.
Sites Not Meeting SLAs	<p>The sites that did not meet the defined SLA target values in the selected time range.</p> <p>Click each site to view more information about the SLA performance of the applications and application groups in the site. See <a href="#">“Viewing the SLA Performance of a Site” on page 432</a>.</p>
Sites Meeting SLAs With Switch	<p>The sites that switched WAN links to meet the defined SLA target values in the selected time range.</p> <p>Click each site to view more information about the SLA performance of the applications and application groups in the site. See <a href="#">“Viewing the SLA Performance of a Site” on page 432</a>.</p>
Sites Meeting SLAs Without Switch	<p>The sites that met the defined SLA target values in the selected time range without switching WAN links.</p> <p>Click each site to view more information about the SLA performance of the applications and application groups in the site. See <a href="#">“Viewing the SLA Performance of a Site” on page 432</a>.</p>

Table 168 on page 431 describes the fields in the card and grid views.

Table 168: Fields on the SLA Performance of a Single Tenant Page in Card and Grid Views

Field	View	Description
Name	Card and Grid	View the name of the site.
SLA not met (Time)	Card and Grid	View the average time (in %) during which all the sites in a tenant did not meet the defined SLA target values.
Profiles	Card	View the time (in %) during which defined SLA target values were not met for each SLA profile. The top two profiles with highest priority and the percentage of time during which SLA target values were not met are listed. The remaining profiles and their combined sum of time (in %) for which SLA target values were not met are listed under <b>Others</b> . The SLA profile priority is indicated inside a circle. You can define priority of the SLA profile when you create an SLA profile.
Profile SLA Not Met	Grid	<p>Hover over the profile priority to view the SLA profile name.</p>
App - Groups	Card and Grid	View the total number of applications and application groups in the site.
Switch Events	Card and Grid	View the number of times the site switched WAN links over the number of designated WAN links. A switch event, also called SD-WAN event, occurs when a site switches WAN links to meet the SLA requirements.
Switch Events Per Profile	Card and Grid	View the number of times the site switched WAN links for each profile. You can view the switch events for the top two SLA profiles in the decreasing order of switch events for each profile.

## RELATED DOCUMENTATION

[Viewing the SLA Performance of a Site | 432](#)

[Viewing the SLA Performance of an Application or Application Group | 436](#)

[SD-WAN Events Overview | 426](#)

[Creating SLA Profiles | 631](#)

## Viewing the SLA Performance of a Site

### IN THIS SECTION

- [SLA Not Met by SLA Profiles | 432](#)
- [Applications SLA Performance by Throughput | 433](#)
- [SLA Performance for ALL | 435](#)

You can use the **Monitor > Applications > Tenant\_name SLA Performance > Site\_name SLA Performance** page in the Customer Portal to view the SLA performance for all applications and application groups in a site. You can view the SLA performance for all applications and application groups in a site for a specified time range and in graph or grid views.

The **Site\_name SLA Performance** page is divided into the following sections:

### SLA Not Met by SLA Profiles

You can use the **SLA Not Met by SLA Profiles** section on the **Site\_name SLA Performance** page to view the SLA profiles for which SLA requirements were not met and the time at which they were not met. The y-axis represents the SLA profiles and the x-axis represents the specified time range. The **SLA Not Met by SLA Profiles** section can be viewed and remains the same in both graph and grid views.

To view a graphical representation of SLA profiles for which SLA target values were not met:

1. Select the time range for which you want to view the SLA profiles for which SLA target values were not met. You can choose from Previous 1 hour, Previous 1 day, Previous 1 week, Previous 1 month, and Custom. For custom time, you must enter from and to dates in MM/DD/YYYY format and the time in HH:MM:SS format. By default, Previous 1 day is selected.

The graphical representation of SLA profiles for which SLA target values were not met is displayed for the selected time range.



2. (Optional) You can use the sliders at the sides of the graph to further customize the time range.

The graphical representation of SLA profiles for which SLA target values were not met is refreshed and displayed for the customized time range. The graphical representation of SLA performance data in the subsequent sections on the page is also refreshed and displayed for the customized time range.

## Applications SLA Performance by Throughput

You can use the **Applications SLA Performance by Throughput** section on the **Site\_name SLA Performance** page to view average throughput performance of all applications and application groups in a site. You can also customize your view by selecting graph or grid views. In the graph view, you can further select scatter plot or tree map.

To view a graphical representation of average throughput performance of all applications and application groups in a site:

1. Select **Graph View** at the top right of the page. By default, Graph View is selected.

A graphical representation of average throughput performance of all applications and application groups in a site against the target throughput is displayed in the **Scatter Plot** view. The y-axis represents the average throughput. 0% on the x-axis represents the target throughput (in %) defined in the SLA profiles, while the regions on the left and right of the target represent percentages below and above the target throughput, respectively.

A carousel at the bottom of the section also displays the list of all applications and application groups with their SLA profiles, target throughput, and average throughput values.

2. Click **Legend** at the bottom right of the section to view the plotting legend.

The items described in the **Legend** are:

- A single application is represented by a blue circle.
- An application group is represented by a blue square.
- An application or application group whose target throughput value in the SLA profile was modified during runtime is represented by an uncolored circle and uncolored square, respectively.
- The SLA profiles are represented by their priority numbers within the colored or uncolored circles and squares.

3. (Optional) You can use the sliders at the sides of the graph further to customize the time range.

The carousel is refreshed for the customized time range.

4. Click the circles or squares to view more information about the application or application groups. See [“Viewing the SLA Performance of an Application or Application Group” on page 436](#).
5. Select **Tree Map** at the top right of the section to view a list of all applications and application groups in a site and their average throughput values.

A list of all applications and application groups in a site along with their associated SLA profiles and the average throughput values is displayed.

To view a tabular representation of average throughput performance of all applications and application groups in a site:

1. Select **Grid View** at the top right of the page.

A list of all applications and application groups along with their SLA profiles, average throughput, and target throughput values is displayed in a tabular format.

[Table 169 on page 434](#) describes the fields on the Applications SLA Performance by Throughput grid view.

**Table 169: Fields on the Applications SLA Performance by Throughput Grid View**

Field	Description
Name	View name of the application or application group.
SLA Profile	View the SLA profile associated with the application or application group.
Type	View the type—application or application group
Category	View the category of the application or application group. The value of Category can be Messaging, Web, Infrastructure, Remote-Access, Multimedia, Video, and so on.
Sessions	View number of sessions consumed by the application or application group.
Throughput Avg. Performance	View the average throughput performance value (in %) of the application or application group. The upward triangle on the left of the average throughput performance value indicates that the average throughput is higher than the target throughput configured in the SLA profile of the application or application group. The value (in %) denotes the percentage above the target throughput value. Similarly, the downward triangle on the left of the average throughput performance value indicates that the average throughput is lower than the target throughput configured in the SLA profile of the application or application group. The value (in %) denotes the percentage below the target throughput value.

2. (Optional) Click the details icon to the left of the application or application group name to view more information about the application or application group. See [“Viewing the SLA Performance of an Application or Application Group” on page 436](#).

## SLA Performance for ALL

View a graphical representation of the performance of the SLA parameters such as round-trip time (RTT), latency, packet loss, and jitter for the specified time range for MPLS and Internet WAN links for all SLA profiles. The y-axis represents the SLA parameters and the x-axis represents the specified time range. You can also view the respective target SLA parameters in the graphs.

**NOTE:** The graphical representation of the performance of all SLA parameters for the WAN links is available only in the graph view.

To view a graphical representation of the performance of all SLA parameters for the WAN links:

- Select **All** at the top right of the section. By default, All is selected.

A graphical representation of the performance of the SLA parameters such as RTT, latency, packet loss, and jitter for the specified time range for all WAN links is displayed.

- Select **wan\_0**, **wan\_1**, and so on at the top right of the section to view the performance of the SLA parameters for the MPLS and Internet WAN links. You can enable and configure **wan\_0**, **wan\_1**, and so on and map them to MPLS or Internet links when you create a site.

The graphical representation of the performance of the SLA parameters such as RTT, latency, packet loss, and jitter for the specified time range is refreshed and only the performance for the selected WAN link is displayed.

- (Optional) Click **Legend** at the bottom right of the section to view the plotting legend for the horizontal dotted lines parallel to the x-axis in the graphs. The horizontal dotted lines represent the respective target SLA parameters of the SLA profiles.

**NOTE:** RTT is represented as Delay on the [“Application SLA Profiles” on page 630](#) page.

## RELATED DOCUMENTATION

[About the SLA Performance of a Single Tenant Page | 429](#)

# Viewing the SLA Performance of an Application or Application Group

You can use the **Monitor > Applications > Tenant-Name SLA Performance > Site-Name SLA Performance** page in the Customer Portal to view the SLA performance for individual applications and application groups in a site. You can also view the SLA performance of the associated SLA profile for all SLA parameters.

To view SLA performance of an application or application groups:

- Click one of the circles or squares in the **Applications SLA Performance by Throughput** section on the **Site-Name SLA Performance** page.

The page that appears displays SLA performance details of the application or application group.

[Table 170 on page 436](#) describes the fields on the application or application group SLA Performance details page.

**Table 170: Fields on the Application or Application Group Details Page**

Field	Description
Category and Description	View the category of the application or application group. The category can be Messaging, Web, Infrastructure, Remote-Access, Multimedia, Video, and so on.  You can also view a description of the application or application group.
SLA	View the name of the SLA profile associated with the application or application group.
Target	View the current target throughput defined in the SLA profile associated with the application or application group. If the target throughput was modified during runtime, the date and time when the throughput was modified and the previously defined throughput value are also displayed.
Avg. Performance	View the average throughput performance (in %) above or below the configured target throughput. The average throughput (in Mbps) is displayed within parentheses.
SLA Metrics by Throughput	View a graphical representation of the SLA metrics by throughput during the specified time range for that application or application group. The y-axis represents the throughput (in Mbps). The x-axis represents the specified time range. Hover over the graph to view the throughput value and time at any specified point. You can also view the sessions consumed by the WAN links for the application or application group time range.

Table 170: Fields on the Application or Application Group Details Page (*continued*)

Field	Description
Global SLA Profile Performance	<p>View the performance for all the SLA parameters of the SLA profile associated with the application or application group. The SLA performance is represented by a color-coded donut chart. The section in blue in the donut chart indicates the percentage of time during which SLA requirements for the SLA profile were met. The section in red in the donut chart indicates the percentage of time during which SLA requirements for the SLA profile were not met.</p> <p>Click the red colored section of the donut chart to view more information about when SLA requirements for the SLA profile were not met. The <b>SLA Profile Performance</b> page appears. The SLA Profile Performance page displays the following fields:</p> <ul style="list-style-type: none"> <li>• SLA Profile—SLA profile associated with the application or application group</li> <li>• Target—Target throughput configured in the SLA profile</li> <li>• SLAs Not Met—Percentage of time SLA requirements were not met for the SLA profile</li> <li>• Sessions—Number of sessions consumed by the application or application group</li> <li>• Start Time—Time at which the WAN links associated with the application or application groups started to fail meeting the SLA requirements</li> <li>• End Time—Time at which SLA profile requirements started to be met again</li> <li>• Avg Val—Average throughput (in Mbps) when the SLA requirements started to fail</li> <li>• Duration—Total duration (in seconds) during which SLA requirements were not met</li> <li>• From—Source WAN link</li> <li>• To—Destination WAN link</li> </ul>

## RELATED DOCUMENTATION

[About the SLA Performance of a Single Tenant Page | 429](#)

[Viewing the SLA Performance of a Site | 432](#)

## Application Visibility Overview

You can use the **Application Visibility** page to view information about bandwidth consumption, session establishment, and the risks associated with your applications.

Analyzing your network applications yields useful security management information, such as abnormal applications that can lead to data loss, heavy bandwidth usage, time-consuming applications, and personal applications that can elevate business risks.

### RELATED DOCUMENTATION

[About the Application Visibility Page | 438](#)

[Viewing Application or User Visibility Data for Specific Sites | 441](#)

## About the Application Visibility Page

To access this page, select **Monitor > Applications > Visibility**.

There are two ways in which you can view your application visibility data—**Chart View** or **Grid View**. By default, the data is displayed in **Chart View**.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View application visibility data in **Chart View**. See [“Chart View” on page 438](#).
- View application visibility data in **Grid View**. See [“Grid View” on page 440](#).
- Select a device to which the application visibility settings are applicable. See [“Viewing Application or User Visibility Data for Specific Sites” on page 441](#).

### Chart View

Click the **Chart View** link for a brief summary of the top 50 applications consuming the maximum bandwidth in your network. The data can be presented graphically as a bubble graph, heat map, or a zoomable bubble graph. The data is refreshed automatically based on the selected time range. You can also use the **Custom** button to set a custom time range.

You can hover over your applications to view critical information such as total number of sessions, total number of blocks, category, bandwidth consumed, risk levels, and characteristics. You can also view the top five users accessing your application.

[Table 171 on page 439](#) provides guidelines on using the fields on the **Chart View** of the **Application Visibility** page.

**Table 171: Fields on the Chart View**

Field	Description
All Devices	Displays application visibility data for all the sites managed by CSO. Click <b>Edit</b> to select individual devices for which you want to view the data.
Show By	<p>Select from the following options to view a user's data:</p> <ul style="list-style-type: none"> <li>• Bandwidth—Shows data based on the amount of bandwidth the application has consumed for a particular time range.</li> <li>• Number of Sessions—Shows data based on the number of sessions consumed by the application.</li> </ul>
Time Span	<p>Select the required time range to view a user's data.</p> <p>Use the custom option to choose the time range if you want to view data for more than one day. The time range is from 00:00 through 23:59.</p>
Select graph	<p>Select from the following graphical representations to view an application's data:</p> <ul style="list-style-type: none"> <li>• Bubble Graph</li> <li>• Heat Map</li> <li>• Zoomable Bubble Graph</li> </ul> <p>By default, data is shown in the Bubble Graph format.</p>
Group By	<p>Select from the following options to view the application's data:</p> <ul style="list-style-type: none"> <li>• Risk—Grouped by critical, high, unsafe, and so on.</li> <li>• Category—Grouped by categories such as web, infrastructure, and so on.</li> </ul>
Number of Sessions	Displays the total number of application sessions.
Number of Blocks	Displays the total number of times the application was blocked.
Bandwidth	Displays the bandwidth usage of the application.
Risk Level	Displays the risk associated with the application. For example, critical, high, unsafe, and so on.
Category	Displays the category of the application. For example, web, infrastructure, and so on.

Table 171: Fields on the Chart View *(continued)*

Field	Description
Characteristics	Displays the characteristics of the application. For example, prone to misuse, bandwidth consumer, capable of tunneling, and so on.

## Grid View

Click the **Grid View** link to obtain comprehensive details about applications. You can view top users by volume, top applications by volume, top category by volume, top characteristics by volume, and sessions by risk. You can also view the data in a tabular format that includes sortable columns. You can sort the applications in ascending or descending order based on application name, risk level, and so on.

[Table 172 on page 440](#) describes the widgets in this view. Use these widgets to get an overall, high-level view of your applications, users, and the content traversing your network.

[Table 172 on page 440](#) provides guidelines on using the fields on the **Grid View** of the **Application Visibility** page.

Table 172: Widgets on the Grid View

Field	Description
Top Users By Volume	Top users of the application; sorted by bandwidth consumption.
Top Apps By Volume	Top applications using the network traffic, such as Amazon, Facebook, and so on, sorted by bandwidth consumption.
Top Category By Volume	The top category of the application, such as Web, infrastructure, and so on; sorted by bandwidth consumption.
Top Characteristics By Volume	Top behavioral characteristics of the application, such as whether it is highly prone to misuse, the top bandwidth consumer, and so on.
Sessions By Risk	Number of events or sessions received; grouped by risk.

[Table 173 on page 441](#) describes the fields in the table below the widgets. Users are displayed by usernames or IP addresses. When you click a link, the **User Visibility** page appears in a grid view, with the correct filter applied. Sessions are also displayed as links and when you click a link, the **All Events** page appears with all security events.



Table 173: Detailed View of Applications

Field	Description
Application Name	Name of the application, such as Amazon, Facebook, and so on.
Risk Level	Risk associated with the application: critical, high, unsafe, moderate, low, and unknown.
Users	Total number of users accessing the application.
Volume	Bandwidth used by the application.
Total Sessions	Total number of application sessions.
No of Rejects	Total number of sessions blocked.
Category	Category of the application, such as Web, infrastructure, and so on.
Sub Category	Subcategory of the application. For example, social networking, news, and advertisements.
Characteristics	Characteristics of the application. For example, prone to misuse, bandwidth consumer, capable of tunneling.

## RELATED DOCUMENTATION

[Application Visibility Overview | 438](#)
[Viewing Application or User Visibility Data for Specific Sites | 441](#)
[About the SLA Performance of a Single Tenant Page | 429](#)

## Viewing Application or User Visibility Data for Specific Sites

### IN THIS SECTION

- [Viewing Application Visibility Data for Specific Sites | 442](#)

- [Viewing User Visibility Data for Specific Sites | 442](#)

You can select one or more sites for which you want to view application visibility or user visibility data (such as bandwidth consumption and number of sessions). By default, the application visibility and user visibility data is displayed for all sites in a tenant.

### Viewing Application Visibility Data for Specific Sites

To select the sites for which you want to view the application visibility data:

1. Select **Monitor > Application Visibility**.

The **Application Visibility** page appears.

2. Click the **Edit** link (next to the Show By field).

The **Select Sites** page appears.

3. From the Sites field:

- Click **Selective** to select the sites for which you want to view the application visibility data:

The available sites are displayed in the **Available** column.

- Click **All** to view application visibility data for all sites in the tenant.

If you click All, proceed to step 5.

4. Select the sites from the **Available** column and click the right arrow to move them to the **Selected** column.

5. Click **OK** to save your changes.

You are returned to the Application Visibility page and the application visibility data is displayed for the sites that you selected.

To view application visibility data for other sites, repeat step 2.

### Viewing User Visibility Data for Specific Sites

To select the sites for which you want to view the user visibility data:

1. Select **Monitor > User Visibility**.

The **User Visibility** page appears.

2. Click the **Edit** link (next to the Show By field).

The **Select Sites** page appears.

3. From the Sites field:

- Click **Selective** to select the sites for which you want to view the user visibility data.

The available sites are displayed in the **Available** column.

- Click **All** to view user visibility data for all sites in the tenant.

If you click All, proceed to step [5](#).

4. Select the sites from the **Available** column and click the right arrow to move them to the **Selected** column.

5. Click **OK** to save your changes.

You are returned to the User Visibility page and the user visibility data is displayed for the sites that you selected.

To view user visibility data for other sites, repeat step [2](#).

# Monitoring Threats

## IN THIS CHAPTER

- [About the Threats Map \(Live\) Page | 444](#)

## About the Threats Map (Live) Page

## IN THIS SECTION

- [Tasks You Can Perform | 445](#)
- [Field Descriptions | 446](#)
- [Threat Types | 447](#)

To access this page, select **Monitor > Threats Map (Live)** in Customer Portal.

Use this page to visualize incoming and outgoing threats between geographic regions. You can view blocked and allowed threat events based on feeds from intrusion prevention systems (IPS), antivirus, and antispam engines, unsuccessful login attempts, and screen options. You can also click a specific geographical location to view the event count and the top five inbound and outbound IP addresses.

The threat data is displayed starting from 12:00 AM (midnight) up to the current time (in your time zone) on that day and is updated every 30 seconds. The current date and time is displayed at the top right and a legend is displayed at the bottom left of the page.

If a threat occurs when you are viewing the page, an animation shows the country from which the threat originated (source) and the country in which the threat occurred (destination).

**NOTE:** Threats with unknown geographical IP addresses are displayed as undefined.

# Tasks You Can Perform

You can perform the following tasks from this page:

- Toggle between updating the data and allowing live updates—Click the **Pause** icon to stop the page from updating the threat map data and to stop animations. Click the **Play** icon to update the page data and resume animations.
- Zoom in and out of the page—Click the zoom in (+) and zoom out (–) icons to zoom in and out of the page.
- Pan the page—Click and drag the mouse to pan the page.
- View country-specific details:
  - Click a country on the threat map to view threat information specific to that country. A *Country-Name* pop-up appears displaying country-specific information.
  - Click the **View Details** link in the *Country-Name* pop-up to view additional details. The *Country-Name* (Details) panel appears.

For more information, see [Table 174 on page 445](#).

**Table 174: Country-Specific Threat Information**

Field	Description	Displayed In
<i>Number-of-threat-events</i> <b>Threat Events since 12:00 am</b>	Displays the total number of threat events (inbound and outbound) since midnight for that country.  Click the hyperlinked number to go to the All Events page, where you can view more information about the events.	<i>Country-Name</i> pop-up
<b>Inbound</b> <i>(Number-of-threat-events)</i>	Displays the total number of inbound threats for the country and the IP address and the number of events for that IP address for the top five inbound events.	<i>Country-Name</i> pop-up
<b>Outbound</b> <i>(Number-of-threat-events)</i>	Displays the total number of outbound threats for the country and the IP address and the number of events for that IP address for the top five outbound events.	<i>Country-Name</i> pop-up
<i>Number-of-threat-events</i> <b>Events since 12:00 am</b>	Displays the total number of threat events (inbound and outbound) since midnight for that country.  Click the hyperlinked number to go to the All Events page, where you can view more information about the events.	<i>Country-Name</i> (Details) panel

Table 174: Country-Specific Threat Information (*continued*)

Field	Description	Displayed In
<b>Number-of Inbound Events</b>	<p>Displays the total number of inbound threats for the country and the number of inbound threat events for each of the following categories:</p> <ul style="list-style-type: none"> <li>• IPS Threats</li> <li>• Virus</li> <li>• Spam</li> <li>• Device Authentication</li> <li>• Screen</li> </ul> <p>Click the hyperlinked number for a category to go to the page for that category, where you can view more information about that category. For example, clicking the hyperlinked number for IPS threats takes you to the IPS Events page.</p> <p>Click the <b>Top 5 IP Addresses (Inbound)</b> to view the IP address and the number of events for that IP address for the top five inbound events.</p>	<i>Country-Name</i> (Details) panel
<b>Number-of Outbound Events</b>	<p>Displays the total number of outbound threats for the country and the number of outbound threat events for each of the following categories:</p> <ul style="list-style-type: none"> <li>• IPS Threats</li> <li>• Virus</li> <li>• Spam</li> <li>• Device Authentication</li> <li>• Screen</li> </ul> <p>Click the hyperlinked number for a category to go to the page for that category, where you can view more information about that category. For example, clicking the hyperlinked number for screens takes you to the Screen Events page.</p> <p>Click the <b>Top 5 IP Addresses (Outbound)</b> to view the IP address and the number of events for that IP address for the top five outbound events.</p>	<i>Country-Name</i> (Details) panel

## Field Descriptions

Table 175 on page 447 displays the fields the Threats Map (Live) page.

Table 175: Fields on the Threats Map (Live) Page

Field	Description
<b>Total Threats Blocked &amp; Allowed</b>	Displays the total number of threats blocked and allowed. Click the hyperlinked number to go to the All Events page (filtered view of the Detail View tab), where you can view more information about the IPS, virus, spam, device authentication, and screen events.
<b>Threats Blocked &amp; Allowed</b>	<p>Displays the total number of threats blocked and allowed by the following categories:</p> <ul style="list-style-type: none"> <li>• IPS Threats</li> <li>• Virus</li> <li>• Spam</li> <li>• Device Authentication</li> <li>• Screen</li> </ul> <p>Click the hyperlinked number for a category to go to the page for that category, where you can view more information about that category. For example, clicking the hyperlinked number for IPS threats takes you to the IPS Events page (filtered view of the Detail View tab).</p>
<b>Top Target Devices</b>	Displays the top five targeted devices and the number of threats per device. Click the hyperlink for a device to go to the All Events page (filtered view of the Detail View tab), where you can view more information about the IPS, virus, spam, device authentication, and screen events for that device.
<b>Top Destination Countries</b>	Displays the top five destination countries and the number of threats per country. Click the hyperlink for a country to go to the All Events page (filtered view of the Detail View tab), where you can view more information about the IPS, virus, spam, device authentication, and screen events for that country.
<b>Top Source Countries</b>	Displays the top five source countries and the number of threats per country. Click the hyperlink for a country to go to the All Events page (filtered view of the Detail View tab), where you can view more information about the IPS, virus, spam, device authentication, and screen events for that country.

## Threat Types

The Threats Map (Live) page displays blocked and allowed threat events based on feeds from IPS, antivirus, and antispam engines, unsuccessful login attempts, and screen options. [Table 176 on page 448](#) describes different types of threats blocked and allowed.

Table 176: Types of Threats

Attack	Description
IPS threat events	<p>Intrusion detection and prevention (IDP) attacks detected by the IDP module.</p> <p>The information reported about the attack (displayed on the IPS Events page) includes information about:</p> <ul style="list-style-type: none"> <li>• Source of attack</li> <li>• Destination of attack</li> <li>• Type of attack</li> <li>• Session information</li> <li>• Severity</li> <li>• Policy information that permitted the traffic.</li> <li>• Action: traffic permitted or dropped.</li> </ul>
Virus events	<p>Virus attacks detected by the antivirus engine.</p> <p>The information reported about the attack (displayed on the Antivirus Events page) includes information about:</p> <ul style="list-style-type: none"> <li>• Source of the infected file</li> <li>• Destination</li> <li>• Filename</li> <li>• URL used for accessing the file</li> </ul>
Spam events	<p>E-mail spam that is detected based on the blocklist spam e-mails.</p> <p>The information reported about the attack (displayed on the Antispam Events page) includes information about:</p> <ul style="list-style-type: none"> <li>• Source</li> <li>• Action: E-mail is rejected or allowed.</li> <li>• Reason for identifying as e-mail spam.</li> </ul>
Device authentications	<p>The firewall authentication messages generated due to unauthorized attempts to access the network. The reported information (displayed on the All Events page) contains the reason for authentication failure and the source of the request.</p>



Table 176: Types of Threats (continued)

Attack	Description
Screen events	<p>Events that are detected based on screen options.</p> <p>The information reported about the attack (displayed on the Screen Events page) includes information about:</p> <ul style="list-style-type: none"><li>• Internet Control Message Protocol (ICMP) screening</li><li>• IP screening</li><li>• TCP screening</li><li>• UDP screening</li></ul>

RELATED DOCUMENTATION

| [About the All Security Events Page](#) | 398

# Monitoring Jobs

## IN THIS CHAPTER

- [About the Jobs Page | 450](#)
- [Editing and Deleting Scheduled Jobs | 452](#)
- [Viewing Job Details | 454](#)
- [Retrying a Failed Job on Devices | 454](#)

## About the Jobs Page

To access this page, click **Monitor > Jobs**.

A job is an action that is performed on any object that is managed by CSO, such as a device, tenant, site, or user. You can monitor the status of jobs that have run or are scheduled to run in CSO. You can run the job immediately or schedule it for a later date and time. You can view the status of the job whether it is completed or failed. You can retry tssm.ztp type jobs that are failed. See [“Retrying a Failed Job on Devices” on page 454](#).

Use this page to view the list of all jobs and the jobs that are scheduled to be executed. You can view general information about the jobs and the overall progress and status of the jobs. You can also edit and delete scheduled jobs.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View details about a job. See [“Viewing Job Details” on page 454](#).
- Edit and delete scheduled jobs. See [“Editing and Deleting Scheduled Jobs” on page 452](#).

### Field Descriptions

[Table 177 on page 451](#) provides guidelines on using the fields on the Jobs page.

Table 177: Fields on the Jobs Page

Field	Description
Job Name	View the name of the job.  Example: MSEC_DOWNLOAD_IPS/APPLICATION_SIGNATURES_08_Jul_17_124229_024
Resource Name	View the resource name of the job.  Example: Download IPS/Application Signatures
Status	View the status of the job to know whether the job succeeded or failed.  Example: Success
Owner	View the name of the owner who created the job.  Example: cspadmin
Number of Tasks	View the number of tasks associated with the job.  Example: 2  For example, the tasks <b>site.ucpe-32</b> and <b>customer.sdwan</b> are associated with the job.
Job Type	When a job is initiated from a object in CSO, CSO assigns a unique ID to that job, which serves to identify the job (along with the job type) on the Jobs page. The following is a list of some of the job types supported in CSO: <ul style="list-style-type: none"> <li>• Configure Sites</li> <li>• Download Signature</li> <li>• Create Sites</li> <li>• Remove Site</li> </ul>
Start Date	View the start date and time of a task associated with the job.
End State	View the end date and time of a task associated with the job.

## Field Descriptions

Table 178 on page 452 provides guidelines on using the fields on the Scheduled Jobs page.

**Table 178: Fields on the Scheduled Jobs Page**

Field	Description
Schedule ID	<p>View the unique ID of the scheduled job. The value is generated by the database when a new schedule record is inserted into the database.</p> <p>Example: 48</p>
Name	<p>View the unique name of the scheduled job.</p> <p>Example: Tenant Delete_csp.tssm_remove_site_e340354716ae43859fad5ba15669eee2</p>
Status	<p>View the status of the last triggered job. The following states are available: scheduled, In progress, complete, or failed.</p> <p>The default status is scheduled.</p>
Job Type	<p>View the job type.</p> <p>Example: tssm onboard tenant</p>
Owner	<p>View the name of the owner who scheduled the job.</p> <p>Example: cspadmin</p>
Next Run Time	<p>View the time when the job is scheduled to run next.</p>

## RELATED DOCUMENTATION

| [Editing and Deleting Scheduled Jobs | 452](#)

## Editing and Deleting Scheduled Jobs

### IN THIS SECTION

- [Editing Scheduled Jobs | 453](#)
- [Deleting Scheduled Jobs | 453](#)

You can edit and delete scheduled jobs. This topic contains the following sections:

## Editing Scheduled Jobs

You can modify the date and time of deployment of scheduled jobs.

To modify a scheduled job:

1. Select **Monitor > Jobs > Scheduled Jobs**.

The Scheduled Jobs page appears.

2. Select the job that you want to reschedule the deployment, and click the edit icon.

The Edit Schedule page appears.

3. To execute the job immediately, delete the existing scheduled entry, create a new entry, and then select the **Run now** option. To reschedule the job for a later date and time, or select the **Schedule at a later time** option.

4. Click **Save** to save the changes.

The modified job and its details are displayed on a page

## Deleting Scheduled Jobs

You can delete one or more scheduled jobs.

To delete a scheduled job:

1. Select **Monitor > Jobs> Scheduled Jobs**.

The Scheduled Jobs page appears with a list of jobs.

2. Select the check box of the job that you want to delete and then click the delete icon (X).

The Confirm Delete page appears.

3. Click **Yes** to confirm.

The scheduled job is deleted.

## RELATED DOCUMENTATION

[About the Jobs Page | 450](#)

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## Viewing Job Details

You can use the Detailed View page to view all the parameters of a job.

To view details of a job:

- Right-click the job name that you want to see the detailed view for and select **Detail View**, or select the job and click **More > Detail View**.
- Alternatively, hover over the job name and click the Detailed View icon that appears before it.

The Detailed View page appears, showing the details of the job and the number of tasks associated with the job. Click **View Logs** to view the status of the jobs. See “[About the Jobs Page](#)” on page 450 for a description of the fields on these pages.

### RELATED DOCUMENTATION

## Retrying a Failed Job on Devices

You can retry **tssm.ztp** type jobs that did not complete successfully on your devices. Retrying a failed job saves time because instead of creating the job again and executing it, you can simply retry the failed job.

**NOTE:** The **Retry Job** button is enabled only for failed ZTP jobs.

To retry a job that was not successful:

1. Select **Monitor > Jobs**.

The Jobs page appears.

2. Select the failed job (**tssm.ztp** type) that you want to retry.
3. At the top right corner of the Jobs page, click the **Retry Job** button.

The job is executed in the back end and the device status on the Sites page is changed to **PROVISIONED**.

#### RELATED DOCUMENTATION

[About the Jobs Page | 49](#)

[Editing and Deleting Scheduled Jobs | 52](#)

# Managing Devices

## IN THIS CHAPTER

- [Multidepartment CPE Device Support | 456](#)
- [About the Devices Page | 457](#)
- [Performing Return Material Authorization \(RMA\) for a Single-CPE Device | 460](#)
- [Performing Return Material Authorization \(RMA\) for Dual-CPE Devices | 462](#)
- [Granting RMA for a Device | 467](#)
- [Managing a Single CPE Device | 472](#)
- [Rebooting a CPE Device | 475](#)
- [Configuring APN Settings on NFX Series Devices | 476](#)

## Multidepartment CPE Device Support

Multitenancy enables a single NFX Series device to be mapped to serve across multiple departments within a single tenant. Each department has its own Layer 3 VPN and all Layer 3 VPNs are carried over to the hub using a shared overlay. The traffic is segregated to each department. A single overlay of IPsec or generic routing encapsulation (GRE) tunnels is used to carry all department traffic from the site through MPLS-based traffic separation.

Multitenancy is a cost-effective approach where the cost of a device and its maintenance is shared among multiple departments across a tenant. With multitenant device support, a dedicated share of the device is allocated to each department, and the data is kept private from the other tenants that access the same device.

**NOTE:** Only users with the Tenant Administrator role have access to the Customer Portal GUI.

The tenant administrator can perform the following tasks:

- Manage and monitor all policies and dashboards for all departments.
- Manage applications in the dashboard for each tenant.



- Create SD-WAN and security policies for each tenant and monitor the dashboard at the site level or at the department level.
- View or select SD-WAN or security services on the shared CPE device through the management portal.
- View the shared CPE device and its services and networks even though the WAN links might be shared by multiple departments.

The service provider administrator can see all departments within the CPE device and activate the device.

## RELATED DOCUMENTATION

[About the SLA Performance of a Single Tenant Page | 429](#)

[Viewing the SLA Performance of a Site | 432](#)

## About the Devices Page

To access this page, click **Resources > Devices**.

You can use the Devices page to view the list of available CPE devices at the customer premises. You can also view information about each CPE device in the network.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Quickly view activation data created for CPEs in the widgets that appear at the top of the page. See [Table 46 on page 102](#).
- Manage a single CPE. See [“Managing a Single CPE Device” on page 472](#).
- Reboot a CPE device. See [“Rebooting a CPE Device” on page 475](#).
- Push licenses to devices. Select the devices and click **Push License**.

The Push License page appears displaying the list of licenses uploaded in CSO. Select the license(s) which you want to push to the selected devices. Click **Push Licenses** to push the licenses to the selected devices. To cancel the action, click **Cancel**.

For information on pushing licenses to devices, see [“Pushing a License to Devices” on page 357](#).

- Perform Return Material Authorization (RMA) to replace a device that is faulty or not reachable. You can perform RMA for a single-CPE or a dual-CPE device.
  - For information on performing RMA on single-CPE devices, see [“Performing Return Material Authorization \(RMA\) for a Single-CPE Device” on page 460](#)

- For information on performing RMA on dual-CPE devices, see [“Performing Return Material Authorization \(RMA\) for Dual-CPE Devices” on page 462](#)
- View details about a CPE . Click the details icon that appears when you mouse over the row for a device or click **More > Details**. See [“Viewing Object Details” on page 385](#).
- Show or hide columns about the CPE.
- Sort CPE devices. See [“Sorting Objects” on page 384](#).
- Search an object about the CPE. See [“Searching for Text in an Object Data Table” on page 385](#).

## Field Descriptions

- [Table 46 on page 102](#) describes widgets on the Devices page.
- [Table 47 on page 103](#) describes the fields on the Devices page.

**Table 179: Widgets on the Devices Page**

Widget	Description
CPE by Status	<p>Displays the management status of the CPE devices deployed in the cloud.</p> <ul style="list-style-type: none"> <li>• Pending Activation—Number of CPE devices that are yet to connect to the regional server.</li> <li>• Activation Failed—Number of CPE devices that could not connect to the regional server.</li> <li>• Expected—Number of CPE devices that are yet to connect to the regional server.</li> <li>• Active—Number of CPE devices that have downloaded images, but are not yet configured.</li> <li>• Provisioned—Number of CPE devices on which IPsec tunnels are fully operational.</li> <li>• Provision Failed—Number of CPE devices failed as the vSRX was not instantiated properly.</li> </ul>

**Table 180: Fields on the Devices Page**

Field	Description
Device Name	<p>Displays the name of the device.</p> <p>Example: sunny-NFX-250</p>

Table 180: Fields on the Devices Page (continued)

Field	Description
Tenant	<p>Displays the name of the tenant.</p> <p>Example: tenant-blue</p>
Site Name	<p>Displays the name of the tenant site.</p> <p>Example: site-blue-white</p>
Management Status	<p>Displays the management status of the CPE devices deployed in the cloud.</p> <ul style="list-style-type: none"> <li>• EXPECTED—Regional server has the activation details for the CPE device, but CPE device has not yet established a connection with the server.</li> <li>• DEVICE DETECTED—Device is configured and is reachable by CSO. After the user enters the activation code for the device, the activation code is validated and device is authenticated.</li> <li>• RMA—CPE device has been tagged for RMA as a result of the user applying the <b>Initiate RMA</b> action on the device.</li> <li>• ACTIVE—ZTP is initiated, CPE device has downloaded images, but not yet configured, and stage-1 configuration is pushed to the device.</li> <li>• PROVISIONED—ZTP is complete, and IPsec tunnel is established and operational on the device.</li> <li>• PROVISION_FAILED—Multiple factors lead to failure in provisioning a device. If any of the steps in ZTP fails or if any process fails as a part of device activation, then provision fails. For example, CPE device provisioning fails when the vSRX is not instantiated properly.</li> </ul>
Model	<p>Displays the name of the device model.</p> <p>Example: NFX</p>
Active Services	<p>Displays the number of services that are activated for the device.</p> <p>Example: 3</p>
Operational Status	<p>Displays whether the device is up or down.</p>
Location	<p>Displays the name of the location.</p> <p>Example: San Jose, CA</p>

Table 180: Fields on the Devices Page *(continued)*

Field	Description
Status Message	Displays the latest status message.  Example: IPsec provision success
WAN Links	Displays the number of WAN links.  Example: 2
POP Name	Displays the name of the POP.  Example: pop_blue
Image Name	Displays the name of the device image file.  Example: install_nfx_fmfm_agent_1_0.sh
OS Version	Displays the Junos OS Release version.  Example: 15.1X49-D40
Serial Number	Displays the serial number of the device.  Example: XXXXXXXXXXXXX
UUID	Displays the universally unique identifier (UUID) of the device.  Example: xxxxxxxx-xxxx-xxxx-xxx-xxxxxxxxxxxx

## RELATED DOCUMENTATION

[Managing a Single CPE Device](#) | 472

## Performing Return Material Authorization (RMA) for a Single-CPE Device

Sometimes, due to hardware failure, a device managed by Contrail Service Orchestration (CSO) needs to be returned to the vendor for repair or replacement. In such situations, you perform Return Material Authorization (RMA) to back up the configuration of the faulty device, recall the faulty device and replace it with a new or restored device, push the required configuration to the replacement device, and activate it in order for CSO to recognize and manage the replacement device.

**NOTE:** When you request RMA on a site that is associated with a single-CPE device and has a version earlier than the CSO version, the site version is upgraded to the CSO version. The site version is upgraded as part of the device activation and zero touch provisioning (ZTP) process of the replacement device that is performed after RMA.

To return a faulty device and replace it with a new or restored device using RMA:

1. Select **Resources > Devices**.

The **Devices** page appears displaying all the devices and clusters.

2. Select the faulty device and click **More > Initiate RMA**.

A confirmation page appears requesting for confirmation to go ahead with the initiate RMA process for the device. Click **Yes** to confirm RMA for device.

Click **No** to cancel the process

**NOTE:**

- The **Initiate RMA** option is enabled for a device only if the management status is **PROVISIONED**.
- On the Sites page (**Sites > Site Management**), the **Site Status** for the device for which you performed **Initiate RMA**, will remain **PROVISIONED**, however, you will see a red colored **RMA** tag beside the current status to indicate that RMA has been initiated for this device.

If you click **Yes**, the RMA process is initiated for the selected device. The management status of the device changes to **RMA**. Once you put a device in the RMA state, you have to start the process getting a replacement for the device. This action is performed outside of CSO.

3. After you receive the replacement of the device, provide the details of the replacement device by clicking **More > Grant RMA**. See [“Granting RMA for a Device” on page 467](#).

**NOTE:** The **Grant RMA** option is enabled only if the management status is **RMA**.

4. Activate the device by selecting the device and clicking **Activate Device**. Enter the **Activation Code** of the device to activate the device for usage.

When the device is activated, its **Management Status** changes to **PROVISIONED**. An **RMA** tag is also displayed beside the management status indicating that the RMA process is not yet complete. Hover

over the RMA tag to see the additional steps that you need to perform in order to complete the RMA process.

5. Manually push the following configuration to the newly provisioned device:

**NOTE:**

- In SD-WAN deployments, once the new device is in the **PROVISIONED** state, you can proceed to configure the device by manually pushing application signatures, certificates, and policies.
  - In hybrid WAN deployments, service chains will be restored automatically.
- Licenses—If the replaced device is a physical SRX device, you need to generate a new license and upload it.
  - Application Signatures—Push the application signatures to the replaced device. See [“About the Application Signatures Page” on page 734](#).
  - Certificates—Import and install the required certificates on the replaced device. See [“Importing a Certificate” on page 936](#) and [“Installing and Uninstalling Certificates” on page 939](#).
  - Policies—Push the defined firewall and NAT policies to the replaced device. See [“About the Firewall Policy Page” on page 504](#) and [“About the NAT Policies Page” on page 656](#).

To complete the RMA process, you have to remove the RMA tag manually. To remove the RMA tag, hover over the **PROVISIONED (RMA)** tag, select the checkbox indicating that you have completed all the steps for RMA, and click **OK**.

## RELATED DOCUMENTATION

[About the Devices Page | 457](#)

[Granting RMA for a Device | 467](#)

## Performing Return Material Authorization (RMA) for Dual-CPE Devices

### IN THIS SECTION

- [Performing RMA for an NFX Cluster | 463](#)
- [Performing RMA for an SRX Cluster | 465](#)

You can perform RMA of devices in an NFX or SRX cluster when the devices fail or need to be replaced with new devices. During the RMA process, the configuration of a faulty device is backed up and the faulty device is shipped back to Juniper Networks. Juniper Networks ships a new device to the customer for replacing the faulty device. At the customer site, the new device is installed, the configuration backed up from the faulty device is pushed to the new device, and the new device is activated. CSO then manages the new device.

**NOTE:** On a site associated with an NFX dual-CPE device, if the site version is lower than that of the CSO version, you can perform RMA only at the cluster level. After RMA of the cluster, the version of the site is upgraded to that of CSO as part of the device activation and ZTP process of the replacement devices in the cluster.

The following sections discuss how you can perform RMA for an NFX or SRX cluster:

### Performing RMA for an NFX Cluster

Starting from CSO Release 4.1.0 onward, when an NFX250 device in a dual CPE cluster fails, you can perform RMA for only the failed device. Previously, RMA had to be done for both the devices in the cluster.

To perform RMA for an NFX cluster:

1. Select **Resources > Devices**.

The **Devices** page appears displaying all the devices and clusters.

Alternatively,

a. Select **Sites > Site Management**.

The **Sites** page appears.

b. Click a site that contains the NFX cluster for which you want to perform RMA.

The *site* page appears

c. On the *site* page, click the **Devices** tab to view the devices and clusters installed at the site.

2. Do one of the following:

- To perform RMA at the cluster lever, select the cluster.
- To perform RMA for a single device in the cluster, select the device.

A confirmation dialog box appears. Click **Yes** to confirm RMA for the selected NFX cluster or device.

Click **No** to cancel the process.

If you click **Yes**, the RMA process is initiated for the selected NFX cluster or device. The **Management Status** of the device changes to **RMA**.

**NOTE:**

- The **Initiate RMA** option is enabled for an NFX cluster only if the management status is **PROVISIONED**.
- On the Sites page (**Sites > Site Management**), the status of the site, where the NFX cluster or the device for which you initiated RMA is installed, remains as **PROVISIONED**. However, a red-colored **RMA** tag appears beside the **Site Status** to indicate that RMA is initiated for a cluster or device at the site.

After the NFX cluster or device is in the **RMA** state, you can raise a device replacement request for one or more faulty devices in the NFX cluster. This action is performed outside of CSO.

3. After you receive the new devices or device, click **More > Grant RMA** to enter the details of the new devices or device. See [“Granting RMA for a Device” on page 467](#).

**NOTE:** The **Grant RMA** option is enabled only when the management status of the device is **RMA**.

4. To activate the devices in the NFX cluster, do one of the following:
  - To activate both the devices in the cluster, select the cluster (in case of whole cluster is RMAed).
  - To activate a single device in the cluster, select the device (in case of a single device is RMAed).
5. Click **Activate Device**.

The Activate Device page appears.

6. Enter the **Activation Code** for the new device or devices.

When the device is activated, its **Management Status** changes to **PROVISIONED**. An **RMA** tag is displayed beside the management status indicating that the RMA process is not yet complete. Mouse over the RMA tag to see the additional steps that you need to perform to complete the RMA process.

7. Manually push the following configuration to the newly provisioned devices:



**NOTE:**

- In SD-WAN deployments, once the new devices are in the **PROVISIONED** state, you can proceed to configure the devices by manually pushing application signatures, certificates, and policies.
- In hybrid WAN deployments, service chains are restored automatically.
- When you perform RMA on a single device, CSO restores certificates on the new device. However, application signatures and policies need to be pushed manually.

- **Application Signatures**—Push the application signatures to the replaced device. See [“About the Application Signatures Page” on page 734](#).
- **Certificates**—Import and install the required certificates on the replaced devices. See [“Importing a Certificate” on page 936](#) and [“Installing and Uninstalling Certificates” on page 939](#).
- **Policies**—Push the defined firewall and NAT policies to the replaced devices. See [“About the Firewall Policy Page” on page 504](#) and [“About the NAT Policies Page” on page 656](#).

To complete the RMA process, you have to remove the RMA tag manually. To remove the RMA tag, mouse over the **PROVISIONED (RMA)** tag, select the check box indicating that you have completed all the steps for RMA, and click **OK**.

### Performing RMA for an SRX Cluster

For an SRX cluster, you can perform RMA on a member device of the cluster. That is, you can select the faulty device from the SRX cluster and perform RMA on it individually.

**NOTE:** You cannot perform RMA for an SRX cluster at the cluster level.

To return a faulty device in an SRX cluster and replace it with a new or restored device by using RMA:

1. Select **Resources > Devices**.

The **Devices** page appears displaying all the devices and clusters.

Alternatively,

- a. Select **Sites > Site Management**.

The **Sites** page appears.

- b. Click a site that contains the SRX cluster for which you want to perform RMA.

The *site* page appears

c. On the *site* page, click the **Devices** tab to view the devices and clusters installed at the site.

2. Select the faulty device in the SRX cluster and click **More > Initiate RMA**.

A confirmation page appears. Click **Yes** to confirm RMA for device.

Click **No** to cancel the process.

**NOTE:**

- The **Initiate RMA** option is enabled for a device only if the management status is **PROVISIONED**.
- On the Sites page (**Sites > Site Management**), the status of the site, where the device for which you performed **Initiate RMA** is installed, remains as **PROVISIONED**. However, a red-colored **RMA** tag appears beside the current site status to indicate that RMA is initiated for a cluster or device at the site.

If you click **Yes**, the RMA process is initiated for the selected device. The management status of the device changes to **RMA**. Once you put a device in the RMA state, you can raise a device replacement request for the faulty device in the SRX cluster. This action is performed outside of CSO.

3. After you receive the replacement of the faulty device, provide the details of the replacement device by clicking **More > Grant RMA**. See [“Granting RMA for a Device” on page 467](#).

**NOTE:** The **Grant RMA** option is enabled for a device only if the management status is **RMA**.

To complete the RMA process, you have to remove the RMA tag manually. To remove the RMA tag, mouse over the **PROVISIONED (RMA)** tag, select the check box indicating that you have completed all the steps for RMA, and click **OK**.

## RELATED DOCUMENTATION

[About the Devices Page | 457](#)

[Performing Return Material Authorization \(RMA\) for a Single-CPE Device | 460](#)

[Granting RMA for a Device | 467](#)

## Granting RMA for a Device

### IN THIS SECTION

- [Granting RMA for a Single-CPE Device | 467](#)
- [Granting RMA for a Dual-CPE Device | 469](#)
- [Granting RMA for an SRX Device within an SRX Cluster | 470](#)

### Granting RMA for a Single-CPE Device

Before you perform **Grant RMA for a Device**, ensure that:

- You have received the replacement of the faulty device.
- You have the serial number and the activation code of the replacement device.

To perform **Grant RMA** for a device:

1. Select **Resources > Devices**.

The **Devices** page appears displaying all the devices and clusters.

Alternatively,

- a. Select **Sites > Site Management**.

The **Sites** page appears.

- b. Click a site that contains the single-CPE device for which you want to perform RMA.

The *site* page appears

- c. On the *site* page, click the **Devices** tab to view the devices and clusters installed at the site.

2. Select the faulty device for which you initiated RMA and click **More > Grant RMA**.

The **Grant RMA for Device** page appears.

**NOTE:** The **Grant RMA** option is enabled only when the **Management Status** of the device is **RMA**.

3. Complete the configuration according to the guidelines provided in [Table 181 on page 468](#).
4. Click **OK** to perform the grant RMA process.

When you perform **Grant RMA** for a device, a job is created to perform the following tasks:

- The device-related configuration is backed up to the CSO database, and the existing device is recalled and the new or restored device is added to the network.
- The management status of the device changes to **EXPECTED** on the **Devices** page. An **RMA** tag is also displayed beside the management status to indicate that the RMA process is not yet complete. Mouse over the RMA tag to see additional steps that you need to perform for completing the RMA process.

On the Sites (**Sites > Site Management**) page, the status of the site, where the device for which you performed **Grant RMA** is installed, changes to **Expected**.

**NOTE:** You can see the progress of this job on the **Monitor > Jobs** page. This job might take around 15 minutes to complete.

To complete the RMA process and start using the new device, you must activate the device using the **Activate Device** option. See step 5 in [“Performing Return Material Authorization \(RMA\) for a Single-CPE Device” on page 460](#).

[Table 181 on page 468](#) provides guidelines on using the fields on the **Grant RMA for Device** panel.

**Table 181: Fields on the Grant RMA for Single-CPE Device Page**

Field	Description
Customer Name	Displays the name of the tenant who is performing RMA.
Site Name	Displays the name of site in which the faulty device is present.
Device Name	Displays the name of the faulty device that will be replaced with a new one through the <b>Grant RMA</b> process.
Serial Number	Enter the serial number of the replacement device. The serial number is case sensitive. Example: DD2316AF0177
Activation Code	Enter the activation code for the replacement device. You receive the activation code (Example: 545454) from the service provider, outside of CSO.

## Granting RMA for a Dual-CPE Device

Before you perform **Grant RMA for a Device**, ensure that:

- You have received the replacement for the faulty devices.
- You have the serial numbers and the activation codes of the replacement devices.

To perform **Grant RMA** for a dual-CPE device(cluster):

1. Select **Resources > Devices**.

The **Devices** page appears displaying all the devices and clusters.

Alternatively,

- a. Select **Sites > Site Management**.

The Sites page appears.

- b. Click a site that contains the dual-CPE device for which you want to perform RMA.

The *site* page appears

- c. On the *site* page, click the **Devices** tab to view the devices and clusters installed at the site.

2. Select the cluster or the device in the cluster for which you initiated RMA and click **More > Grant RMA**.

The **Grant RMA for Device** page appears.

**NOTE:** The **Grant RMA** option is only enabled if the **Management Status** of the device is **RMA**.

3. Complete the configuration according to the guidelines provided in [Table 182 on page 470](#).

4. Click **OK** to complete the grant RMA process.

When you perform **Grant RMA**, the following actions are performed:

- The cluster-related configuration is backed-up to the CSO database, and the devices in the cluster are recalled and the new or restored device are added to the network.
- The management status of the cluster changes to **EXPECTED** on the **Devices** page. An **RMA** tag is also displayed beside the management status indicating that the RMA process is not yet complete. Mouse over the RMA tag to see the additional steps that you must perform to complete the RMA process.

On the Sites (**Sites > Site Management**) page, the status of the site, where the cluster or device for which you performed **Grant RMA** is installed, changes to **Expected**.

**NOTE:** You can see the progress of this job on the **Monitor > Jobs** page. This job might take around 15 minutes to complete.

Table 182 on page 470 provides guidelines on using the fields on the **Grant RMA for Device** panel.

**Table 182: Fields on the Grant RMA for Dual-CPE Device Page**

Field	Description
Customer Name	Displays the name of the tenant performing RMA.
Site Name	Displays the name of site in which the faulty device is present.
Device Name	Displays the name of the faulty device that will be replaced with new or restored devices through the <b>Grant RMA</b> process.
Primary Serial Number	Enter the serial number of the primary replacement device. The serial number is case sensitive. Example: DD2316AF0177
Primary Activation Code	Enter the activation code for the primary replacement device. You will receive the activation code from the service provider, outside of CSO. Example: 545454
Secondary Serial Number	Enter the serial number of the secondary replacement device. The serial number is case sensitive. Example: DD2316AF0145
Secondary Activation Code	Enter the activation code for the secondary replacement device. You receive the activation code from your service provider, outside of CSO. Example: 545476

### Granting RMA for an SRX Device within an SRX Cluster

Before you perform **Grant RMA for a Device**, ensure that:

- You have received the replacement for the faulty device.
- You have the serial number and the activation code of the replacement device.

To perform **Grant RMA** for a device:

1. Select **Resources > Devices**.

The **Devices** page appears displaying all the devices and clusters.

Alternatively,

- a. Select **Sites > Site Management**.

The Sites page appears.

- b. Click a site that contains the SRX device for which you want to perform RMA.

The *site* page appears

- c. On the *site* page, click the **Devices** tab to view the devices and clusters installed at the site.

2. Select the defective device for which you initiated RMA and click **More > Grant RMA**.

The **Grant RMA for Device** page appears.

**NOTE:** The **Grant RMA** option is enabled only when the **Management Status** of the device is **RMA**.

3. Complete the configuration according to the guidelines provided in [Table 183 on page 471](#).

4. Click **OK** to perform the grant RMA process.

When you perform **Grant RMA** for a device, a job is created to update the device object in CSO with the serial number and activation code of the replacement device.

On the Sites page (**Sites > Site Management**), the status of the site, where the device for which you performed **Grant RMA** is installed, changes to **PROVISIONED**.

**NOTE:** You can see the progress of this job on the **Monitor > Jobs** page.

[Table 183 on page 471](#) provides guidelines on using the fields on the **Grant RMA for Device** panel.

**Table 183: Fields on the Grant RMA for Device Page (for SRX Device in an SRX Cluster)**

Field	Description
Customer Name	Displays the name of the tenant who is performing RMA.
Site Name	Displays the name of site in which the faulty device is present.

Table 183: Fields on the Grant RMA for Device Page (for SRX Device in an SRX Cluster) (*continued*)

Field	Description
Device Name	Displays the name of the faulty device that will be replaced with a new one through the <b>Grant RMA</b> process.
Serial Number	Enter the serial number of the replacement device. The serial number is case sensitive. Example: DD2316AF0177
Activation Code	Enter the activation code for the replacement device. You receive the activation code (Example: 545454) from the service provider, outside of CSO.

## RELATED DOCUMENTATION

[About the Devices Page | 457](#)

[Performing Return Material Authorization \(RMA\) for a Single-CPE Device | 460](#)

[Performing Return Material Authorization \(RMA\) for Dual-CPE Devices | 462](#)

## Managing a Single CPE Device

You can use the Devices page to view and manage a single customer premises equipment (CPE) device at the tenant site. To access this page, click **Resources > Devices > Device-Name**.

To manage a single CPE device at the tenant site:

1. Click **Overview** tab.

View the following information on the Overview tab:

- Geographical location of the device at the tenant site.
- Aggregate throughput of the device.
- Recent alerts for the device.
- Recent Alarms for the device.
- License details of the device.
- Details of the device, such as serial number, management IP address, OS version, device template, tenant name, site name, and site location.

2. Click **Policies** tab.

View the following information on the Policies tab:



- List of all policies applicable to a CPE device.
    - Click a policy name to view the rules that are applicable for the CPE device.
    - Click the edit icon at the end of the row to edit a policy. You are taken to the **Configuration > Policy** page, where you can edit the policies.
  - Details about the tenant user who last updated the policy.
  - Time when the policy was last updated.
  - Deployment status of the policy.
  - Number of rules applicable to the device compared to the total number of rules applicable to the tenant.
3. Click **Configuration** tab.
- Complete the configuration according to the guidelines provided in [Table 184 on page 473](#), [Table 185 on page 474](#), and [Table 186 on page 474](#).
4. Click **Save** to save the changes.
5. You can also perform the following operations from this page.
- Click **Deploy** to deploy the configuration.
  - Click **Rollback** to rollback to previous working configuration.
  - Click **Deployment History** to view the deployment history.
  - Click **View Changes** to view the changes between current and previous configuration.
  - Click **Render Template** to render the configuration in CLI format.

**Table 184: Fields on the SRX Root Password Tab**

Field	Description
<b>Edit Settings for SRX root password</b>	
Password	<p>Enter your new password.</p> <p>The password that you set must be between 6 and 21 characters long, and it must include at least one lowercase letter, one uppercase letter, one special character, and one number.</p>
Confirm Password	Reenter the password for confirmation.

Table 185: Fields on the NFX Root Password Tab

Field	Description
<b>Edit Settings for NFX root password</b>	
Password	<p>Enter your new password.</p> <p>The password that you set must be between 6 and 21 characters long, and it must include at least one lowercase letter, one uppercase letter, one special character, and one number.</p>
Confirm Password	Reenter the password for confirmation.

Table 186: Fields on the APN Configuration Tab

Field	Description
<b>Edit Settings for APN Configuration</b>	
Use default APN settings	<p>Click the toggle button to change the default APN settings.</p> <ul style="list-style-type: none"> <li>• Enabled(Default)—Select this option to use the default APN setting that is shipped along with the CPE device.</li> <li>• Disabled—Select this option to configure the APN settings.</li> </ul>
<b>APN Settings</b>	
APN Name	Enter the access point name (APN) of the gateway router. The name can contain alphanumeric characters and special characters.
SIM Change Required	<p>Click the toggle button to change the SIM card.</p> <ul style="list-style-type: none"> <li>• Enabled(Default)—Select this option to change the APN settings and to use a new SIM card.</li> <li>• Disabled—Select this option to change the APN settings without changing the SIM card.</li> </ul>
Authentication Method	<p>Select the authentication method for the APN configuration.</p> <ul style="list-style-type: none"> <li>• PAP— Select to use Password Authentication Protocol (PAP) authentication. This is the default option.</li> <li>• CHAP— Select to use Challenge Handshake Authentication Protocol (CHAP) authentication.</li> <li>• None—Select to indicate that there is no authentication method.</li> </ul>

Table 186: Fields on the APN Configuration Tab (*continued*)

Field	Description
<b>Authentication Info</b>	
SIP User ID	Enter the Session Initiation Protocol (SIP) user ID for authentication if you have selected the APN authentication method as either <b>PAP</b> or <b>CHAP</b> .
SIP Password	Enter the SIP password for authentication if you have selected the APN authentication method as either <b>PAP</b> or <b>CHAP</b> .

## RELATED DOCUMENTATION

| [About the Devices Page](#) | 457

## Rebooting a CPE Device

You need to reboot a CPE device if the device is down, or if all troubleshooting options fail.

To reboot a CPE device:

1. Select **Resources > Devices**.
2. Select the CPE device that you want to reboot and select **More > Reboot**.

A Device Reboot job link is created and the Status Message column displays the status as **Reboot in-progress**.

**NOTE:** If you reboot a tenant device, deployments that are in progress are stopped.

3. (Optional) Click the **Device Reboot** link to view the device reboot logs.
4. (Optional) You can view the job status on the **Monitor > Jobs** page.

You can view the status of reboot in the Status Message column.

On successful reboot of the CPE device, the Status Message column displays the status as **Reboot Succeeded**.

If a CPE device is not reachable or if the reboot time exceeds the timeout value, the reboot fails and the Status Message column displays the status as **Reboot Failed**.

**NOTE:** The timeout value for rebooting a CPE device is 14 minutes.

## RELATED DOCUMENTATION

[About the Devices Page | 457](#)

## Configuring APN Settings on NFX Series Devices

### IN THIS SECTION

- [Configuring APN Settings with SIM Change on NFX Devices | 476](#)
- [Configuring APN Settings without SIM Change on NFX Devices | 478](#)

You can configure Access Point Name (APN) settings on NFX150 and NFX250 CPE devices, with or without SIM change. You change the APN settings either to use a private APN with the current LTE service provider or to use a different LTE service provider.

### Configuring APN Settings with SIM Change on NFX Devices

To configure APN settings with SIM change:

1. Select **Resources > Devices**.

The Devices page appears.

2. Click the device that you want to configure.

The *Device-Name* page appears.

3. Click **Configuration** tab and change the APN settings according to the guidelines provided in [Table 187 on page 477](#).

4. Click **OK**.

The new settings are applied after one minute.

5. Remove the USB dongle from the CPE device, change the SIM card, and re-insert the USB dongle.

The system checks for the new APN settings every minute.

- If the applied APN setting is compatible with the new SIM card—The LTE WAN link and its tunnels goes down after one minute and remain down till the new SIM card is inserted. The LTE dongle LED indicates that the connection is down during this period. Maximum one minute after the new SIM is inserted, the LTE dongle LED indicates connection Up. The LTE WAN link and its tunnels comes up automatically.
- If the applied APN setting is not compatible with the new SIM—The LTE WAN link and its tunnels goes down after one minute and remains down even after the new SIM card is inserted. The LTE dongle LED indicates that the connection is down even after the new SIM is inserted.

6. To revert back to the old SIM, remove the USB dongle, replace the current SIM with the previous SIM, and re-insert the dongle.

The system checks for the new APN settings every minute. Maximum one minute after the old SIM is inserted, the LTE dongle LED indicates that the connection is up (using the old SIM and old APN). The LTE WAN link and its tunnels comes up automatically

**Table 187: Fields for the APN Configuration Settings on the Stage-2 Initial Configuration Page**

Field	Description
Use default APN settings	<p>Click the toggle button to change the default APN settings.</p> <ul style="list-style-type: none"> <li>• Enabled—Select this option to use the default APN setting that is shipped along with the CPE device. This is the default option.</li> <li>• Disabled—Select this option to configure the APN settings.</li> </ul>
<b>APN Settings</b>	
APN Name	Enter the access point name (APN) of the gateway router.
SIM Change Required	<p>Click the toggle button to change the SIM card. You change the SIM card either to use a different LTE service provider or to use a private APN with the current LTE service provider.</p> <ul style="list-style-type: none"> <li>• Enabled—Select this option to change the APN settings and to use a new SIM card. This is the default option.</li> <li>• Disabled—Select this option to change the APN settings without changing the SIM card.</li> </ul>

Table 187: Fields for the APN Configuration Settings on the Stage-2 Initial Configuration Page (*continued*)

Field	Description
Authentication Method	<p>Select the authentication method for the APN configuration.</p> <ul style="list-style-type: none"> <li>• PAP— Select to use Password Authentication Protocol (PAP) authentication. This is the default option.</li> <li>• CHAP— Select to use Challenge Handshake Authentication Protocol (CHAP) authentication.</li> <li>• None—Select to indicate that there is no authentication method.</li> </ul>
<b>Authentication Information</b>	
SIP User ID	Enter the Session Initiation Protocol (SIP) user ID for authentication.
SIP Password	Enter the SIP password for authentication.

### Configuring APN Settings without SIM Change on NFX Devices

To configure APN settings without SIM change:

1. Select **Resources > Devices**.

The Devices page appears.

2. Click the device that you want to configure.

The *Device-Name* page appears.

3. Click **Configuration** tab and change the APN settings according to the guidelines provided in [Table 187 on page 477](#).

4. Click **OK**.

The new settings will be applied after one minute.

- If the applied APN settings are valid, then in CSO, the LTE WAN link and its associated tunnels will go down momentarily and then gets re-established automatically.
- If the applied APN settings are invalid, then after one minute, the LTE dongle LED will indicate connection down. In CSO, the LTE WAN link and its associated tunnels will go down. After two minutes, the LTE dongle LED will indicate connection Up (using old APN). In CSO, the LTE WAN link and its tunnels will come up automatically

RELATED DOCUMENTATION

| [About the Devices Page](#) | 457

# Managing Device Images

## IN THIS CHAPTER

- [Device Images Overview | 480](#)
- [About the Device Images Page | 480](#)
- [Deleting Device Images | 481](#)

## Device Images Overview

An image management system provides full lifecycle management of images for all network devices, including CPE device and virtualized network function (VNF) images. A *device image* is a software installation package for the CPE device or an image for a virtual application that runs on the device. For example, for a NFX Series device platform, you require an NFX software image and a software image for the vSRX application that provides security functions and routing on the device.

## RELATED DOCUMENTATION

| [About the Device Images Page | 480](#)

## About the Device Images Page

To access this page, click **Resources > Images**.

You can use the Images page to view the list of device images that are available in tenant's network.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View details about a device image. Click the details icon that appears when you hover over the name of an image or click **More > Details**. See [“Viewing Object Details” on page 16](#).



- Show or hide columns about the device image. See [“Sorting Objects” on page 17](#).
- Search an object for a device image. See [“Searching for Text in an Object Data Table” on page 16](#).

Field Descriptions

[Table 76 on page 191](#) shows the fields on the Images page.

Table 188: Fields on the Device Images Page

Field	Description
Image Name	View the name of the device image.  Example: juniper_srx_v1.tgz
Type	View the type of the device image.  Example: VNF Image
Version	View the version number of the device image.  Example: 1.1
Vendor	View the vendor name of the device.  Example: Juniper
Size	View the size of the device image.  Example: 14 KB

RELATED DOCUMENTATION

| [Device Images Overview](#) | 480

Deleting Device Images

You can delete one or more device images from the Device Images page.

To delete a device image:

1. Select **Resources > Images**.

The Images page appears with a list of device images.

2. Select the device image that you want to delete and then click the delete icon (X).

The Confirm Delete page appears.

3. Click **Yes** to confirm.

**The Delete Success messages is displayed.**

The device image is deleted.

## RELATED DOCUMENTATION

| [About the Device Images Page](#) | 480

# Configuring Network Services in a Distributed Deployment

## IN THIS CHAPTER

- [Network Service Overview | 483](#)
- [About the Network Services Page | 484](#)
- [About the Service Overview Page | 486](#)
- [About the Service Instances Page | 488](#)
- [Configuring VNF Properties | 490](#)
- [vSRX VNF Configuration Settings | 490](#)
- [LxCiPtable VNF Configuration Settings | 496](#)
- [Cisco CSR-1000v VNF Configuration Settings | 498](#)
- [Riverbed Steelhead VNF Configuration Settings | 500](#)

## Network Service Overview

A *network service* is a final product offered to end users with a full description of its functionality and specified performance.

Administrative users deploy network services between two locations in a virtual network, so that traffic traveling in a specific direction on that link is subject to action from that service. The term *network service* is defined in the ETSI Network Functions Virtualization (NFV) standard.

A network service consists of a *service chain* of one or more linked network functions, which are provided by specific virtualized network functions (VNFs), with a defined direction for traffic flow and defined ingress and egress points. The term *service chain* refers to the structure of a network service, and although not defined in the ETSI NFV standard, this term is regularly used in NFV and software-defined networking (SDN).

A network service designer creates network services in Network Service Designer. When the designer publishes the service to the network service catalog from Network Service Designer, administrators can see the network service in Administration Portal.

RELATED DOCUMENTATION

<a href="#">About the Network Services Page   484</a>
<a href="#">About the Service Overview Page   486</a>
<a href="#">About the Service Instances Page   488</a>

## About the Network Services Page

To access this page, click **Configuration > Network Services**.

You can use the Network Services page to view the complete list of network services that service designers have published to the network service catalog from network service designer and to view information about the services. For an introduction to network services, see [“Network Service Overview” on page 483](#).

### Tasks You Can Perform

You can perform the following tasks from this page:

- Quickly view important data about network services and about instances of those services deployed at customers’ sites in the widgets that appear at the top of the page. See [Table 189 on page 484](#).
- View full information about a service and about instances of a service at customer sites. Click the name of a service in the list. See [“About the Service Instances Page” on page 488](#).

### Field Descriptions

[Table 189 on page 484](#) shows the descriptions of the widgets that appear at the top of the Network Services page.

Table 189: Widgets on the Network Services Page

Widget	Description
Top Network Services Instantiated	<p>View the numbers of instances of the three services that are most used by tenants in the network.</p> <p>This view helps you identify trends for network services, especially when you introduce a new service.</p>
Services with Critical Alerts	<p>View the top three network services receiving the maximum number of critical alerts.</p>

Table 189: Widgets on the Network Services Page (*continued*)

Widget	Description
Top Services by POP CPU Usage	View the top three network services using the largest percentage of CPU from the assigned CPU cores.

Table 190 on page 485 shows the descriptions of the fields on the Network Services page.

Table 190: Fields on the Network Services Page

Field	Description
Name	View the name of the service.  Click the name to view full information about a service.
Tenants	View the names of the tenants that have access to the network service.
Sites	View the total number of sites at which the service is deployed for the tenant.  Example: 2
Instances	View the total number of occurrences of the service that administrative users have activated for the tenant.  Example: 1
Last Update	View the date on which the network service designer last modified the service.

Table 191 on page 485 shows the descriptions of the fields on the Detail for *network service name* page.

Table 191: Fields on the Network Service Detail Page

Field	Description
<i>General</i>	
Configuration	View the settings that the network service designer or you have configured for this service.
Version	View the version number of the network service.  Example: 1.1
State	View the status of the network service.  Example: Published

Table 191: Fields on the Network Service Detail Page *(continued)*

Field	Description
Performance Goals	View performance parameters of the network service that include bandwidth, number of sessions, latency, and license cost.

## RELATED DOCUMENTATION

[Network Service Overview | 483](#)

[About the Service Overview Page | 486](#)

[About the Service Instances Page | 488](#)

## About the Service Overview Page

To access this page, click **Service > Service Name > Overview**.

You can use the Service Overview page to view information about a service that the service designer has published to the network service catalog from Network Service Designer.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View administrative details about the service. See *General Information* in [Table 192 on page 487](#).
- View resources required for the service and its performance specification. See *Service Requirements* and *Service Performance* in [Table 192 on page 487](#).
- View the service chain, with its constituent VNFs. See *Service Configuration* in [Table 192 on page 487](#).
- Configure VNFs. Click a VNF in the service chain graphic. See [“vSRX VNF Configuration Settings” on page 490](#).

### Field Descriptions

[Table 192 on page 487](#) provides guidelines on using the fields on the Service Overview page.

Table 192: Fields on the Service Overview Page

Field	Description
<i>General Information</i>	
Description	View a summary about the service's capabilities.  The network service designer provides this summary.
State	View the state of the network service: <ul style="list-style-type: none"> <li>• Discontinued—Service is no longer available for customers.</li> <li>• Published—Service designer has published service to network catalog, and it is available for customers.</li> </ul>
Tenants	View the number of tenants using this service.
<i>Service Requirements</i>	
CPU	View the number of CPUs that the service needs (cores).
Memory	View the amount of RAM that the service needs in gigabytes (GB).
<i>Service Performance</i>	
Sessions	View the number of sessions concurrently supported by one instance of the service.
Bandwidth	View the data rate for the service in megabytes per second (Mbps) or gigabytes per second (Gbps).
Latency	View the time a packet takes to traverse the service in milliseconds (ms) or nanoseconds (ns).
License cost	Specify the license cost for the network service in USD.
<i>Service Configuration (graphic of the service chain)</i>	
I	View the ingress point—the point at which packets enter the service.
E	View the egress point—the point at which packets exit the service.

Table 192: Fields on the Service Overview Page (continued)

Field	Description
One or more VNFs	<p>Click to view settings for the VNF. See <a href="#">“vSRX VNF Configuration Settings” on page 490</a>.</p> <p>The service designer can configure the VNF settings in Network Service Designer and the administrative user can configure the VNF settings in Customer Portal.</p> <p><b>BEST PRACTICE:</b> The network service designer configures settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and the administrative user configures settings for the service, such as policies. The service designer can also configure a few example settings for the service. These example settings should be generic and not network-specific.</p>

## RELATED DOCUMENTATION

[Network Service Overview | 483](#)

[About the Network Services Page | 484](#)

[About the Service Instances Page | 488](#)

## About the Service Instances Page

To access this page, click **Services** > *Service Name* > **Instances**

You can use the Service Instances page to view information about occurrences of the service at specific customer sites.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View details about a service instance. Click the details icon that appears when you hover over the name of a service. See [Table 194 on page 489](#).
- Enable or disable a network service or virtualized network function (VNF) recovery. Select a service instance and click **Enable Auto Healing** to enable automatic recovery of a network service or VNF in a centralized deployment. By default, automatic recovery of a network service or VNFs is enabled. See [“Configuring VNF Properties” on page 490](#).



## Field Descriptions

Table 193 on page 489 shows the descriptions of the fields on the Service Instances page.

**Table 193: Fields on the Service Instances Page**

Field	Description
Name	View the name of the occurrence of a service at a specific tenant site.
Tenant	View the name of the tenant.
Status	View the state of the service at the customer site: <ul style="list-style-type: none"> <li>Created—Administrative user for the tenant has enabled this service instance, which is active.</li> <li>Blank—Administrative user for the tenant has disabled this service instance.</li> </ul>
Site	View the name of the site at which service occurrence is available.
POP	View the POP in which the site is located.
Functions	View network functions that the service offers; for example, Network Address Translation (NAT) or firewall.

Table 194 on page 489 shows the descriptions of the fields on the Detail for *Service-Instance-Name* page.

**Table 194: Fields on the Service Instance Details Page**

Field	Description
<i>General</i>	
Description	View information about this service instance.  This information is generated from data in Customer Portal.

## RELATED DOCUMENTATION

[Network Service Overview](#) | 483

[About the Network Services Page](#) | 484

[About the Service Overview Page](#) | 486

## Configuring VNF Properties

You can specify whether to enable automatic recovery of a network service or virtualized network function (VNF) for a network service instance in a centralized deployment. Enabling automatic recovery of a network service or VNF improves reliability of the implementation.

Conversely, disabling automatic recovery of a network service or VNF allows you to quickly investigate a problem with a network service or VNF itself.

To enable or disable automatic recovery of a network service or VNF:

1. Select **Services** > *Services Name* > **Instances**.

The Services Instances page appears.

2. Select a service instance for which you want to enable or disable automatic recovery.

3. Click **Enable Auto Healing**.

The Service Properties page appears.

4. Select whether you want to enable or disable automatic recovery.

**NOTE:** By default, automatic recovery of a network service or VNF is enabled.

5. Click **Save**.

### RELATED DOCUMENTATION

| [About the Service Instances Page](#) | 488

## vSRX VNF Configuration Settings

You can configure the vSRX VNF from **Services** > *Service Name* > **Overview** > **Service Configuration**. Your service provider usually configures base settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and you configure settings for the service, such as policies.

**NOTE:** A vSRX firewall virtualized network function (VNF) is always part of a service chain for a network service on a CPE device.

Use the information in the following tables to provide values for the available settings:

- [Table 195 on page 491](#) shows the settings you can configure for the virtual machine (VM) that contains the VNF.

**NOTE:** Your service provider usually configures the base settings and you should not need to change them.

- [Table 196 on page 493](#) shows the firewall settings you can configure.

**Table 195: Fields for the vSRX Base Settings**

Field	Description
Host Name	<p>For a cloud site, specify the hostname of the VM that contains the vSRX VNF. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: vm-vsrx</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
Loopback Address	<p>Specify an IPv4 loopback address for the management interface of the VM.</p> <p>Example: 192.0.2.25</p>
DNS Servers	<p>Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers.</p> <p>Example: 192.0.2.35</p>
NTP Servers	<p>Specify the FQDNs or IP addresses of one or more NTP servers.</p> <p>Example: 192.0.2.45</p>
Syslog Servers	<p>Specify the FQDNs or IP addresses of one or more system log servers.</p> <p>Example: 192.0.2.55</p>

Table 195: Fields for the vSRX Base Settings (*continued*)

Field	Description
Enable Re-filter	<p>Select <b>True</b> to enable a stateless firewall filter that protects the Routing Engine from denial-of-service (DoS) attacks or <b>False</b> to allow DoS attacks.</p> <p>Example: True</p>
Enable Default Screens	<p>For a cloud site, select <b>True</b> to enable the default screens security profile for the destination zone or <b>False</b> to disable default screening.</p> <p>Example: False</p> <p>You cannot configure this setting for an on-premise site.</p>
Time Zone	<p>Specify the time zone for the VM.</p> <p>Example: UTC</p>
Right Interface	<p>Specify the identifier of the VM interface that transmits data.</p> <p>Example: ge-0/0/1</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
Left Interface	<p>Specify the identifier of the VM interface that receives data.</p> <p>Example: ge-0/0/0</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
SNMP Prefix List	<p>If you set the Enable Re-filter field to <b>True</b>, specify the routes that the Junos Space Virtual Appliance uses for SNMP operations when it discovers the vSRX VNF.</p> <p>Example: 10.0.2.0/24</p>
Ping Prefix List	<p>If you set the Enable Re-filter field to <b>True</b>, specify the routes that the Junos Space Virtual Appliance uses for ping operations when it discovers the vSRX VNF.</p> <p>Example: 10.0.2.1/24</p>
Space Servers	<p>If you set the Enable Re-filter field to <b>True</b>, specify the IP addresses of the VMs that contain the Junos Space Virtual Appliances.</p> <p>Example: 10.0.2.50</p>

Table 196: Fields for the vSRX Firewall Settings

Field	Description
Policy Name	<p>Specify the name of the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: policy-1</p>
Source Zone	<p>Select the security zone from which packets originate.</p> <ul style="list-style-type: none"> <li>• <b>left</b>—Interface that transmits data to the host</li> <li>• <b>right</b>—Interface that receives data transmitted from the host</li> </ul> <p>Zone policies are applied to traffic traveling from one security zone (source zone) to another security zone (destination zone). This combination of a source zone and a destination zone is called a <i>context</i>.</p> <p>Example: left</p>
Destination Zone	<p>Select the security zone to which packets are delivered.</p> <ul style="list-style-type: none"> <li>• <b>left</b>—Interface that transmits data to the host</li> <li>• <b>right</b>—Interface that receives data transmitted from the host</li> </ul> <p>Zone policies are applied to traffic traveling from one security zone (source zone) to another security zone (destination zone). This combination of a source zone and a destination zone is called a <i>context</i>.</p> <p>Example: right</p>
Source Address	<p>Specify the source IP address prefixes that the network service uses as match criteria for incoming traffic.</p> <p>To add source addresses:</p> <ol style="list-style-type: none"> <li>1. Click the <b>Source Address</b> column. The source-address page appears.</li> <li>2. Select <b>any</b> to match any source IP address of packets or <b>ipp</b> to match a specific prefix in the source IP address for which the application enforces the policy.</li> <li>3. If you select <b>ipp</b>, specify a prefix.</li> <li>4. Click <b>OK</b>.</li> </ol> <p>Example: 10.0.2.30</p>

Table 196: Fields for the vSRX Firewall Settings (*continued*)

Field	Description
Destination Address	<p>Specify the destination IP address prefixes that the network service uses as match criteria for outgoing traffic.</p> <p>To add a destination address:</p> <ol style="list-style-type: none"> <li>1. Click the <b>Destination Address</b> column. The destination-address page appears.</li> <li>2. Select <b>any</b> to match any source IP address of packets or <b>ipp</b> to match a specific prefix in the source IP address for which the application enforces the policy.</li> <li>3. If you select <b>ipp</b>, specify a prefix.</li> <li>4. Click <b>OK</b>.</li> </ol> <p>Example: 192.0.2.0/24</p>
Action	<p>Select <b>permit</b> to transmit packets that match the rule or <b>deny</b> to drop packets that match the rule.</p> <p>Example: permit</p>

Table 196: Fields for the vSRX Firewall Settings (continued)

Field	Description
Application	<p>Specify the applications to which the policy applies. The applications are based on protocols and ports.</p> <p>To specify applications:</p> <ol style="list-style-type: none"> <li>Click the <b>Application</b> column. The application page appears.</li> <li>In the allowed_apps field, select <b>any</b> to match any application or <b>app</b> to choose specific applications. If you select <b>app</b>, press and hold the Ctrl key and click the required applications from the drop-down list. <ul style="list-style-type: none"> <li>• junos-tcp-any</li> <li>• junos-udp-any</li> <li>• junos-ftp</li> <li>• junos-http</li> <li>• junos-https</li> <li>• junos-icmp-all</li> <li>• junos-icmp-ping</li> <li>• junos-telnet</li> <li>• junos-tftp</li> </ul> </li> <li>Click <b>OK</b>.</li> </ol> <p>Example:</p> <ul style="list-style-type: none"> <li>• junos-tcp-any</li> <li>• junos-udp-any</li> </ul>

## RELATED DOCUMENTATION

[About the Network Services Page | 484](#)

[About the Service Overview Page | 486](#)

[About the Service Instances Page | 488](#)

[Configuring VNF Properties | 490](#)

## LxCIPtable VNF Configuration Settings

Your service provider usually configures base settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and you configure settings for the service, such as policies.

Use the information in the following tables to provide values for the available settings:

- [Table 197 on page 496](#) shows the base settings you can configure for the Linux container.

**NOTE:** Your service provider usually configures the base settings and you should not need to change them.

- [Table 198 on page 496](#) shows the firewall settings you can configure.
- [Table 199 on page 498](#) shows the Network Address Translation (NAT) settings you can configure.

**Table 197: Fields for the LxCIP Base Settings**

Field	Description
Loopback Address	Specify a loopback IP address.  Example: 192.0.2.10
Operation	Select <b>add</b> to apply the policies to a specific route or <b>del</b> to prevent use of the policies on specific routes.  Example: add
Route	Specify the IP prefix of the route to which the policies should apply.  Example: 192.0.2.20/24
Next Hop	Specify the IP address of a Contrail gateway network to which the VM connects.  Example: 192.0.2.20

**Table 198: Fields for the LxCIP Firewall Policy Settings**

Field	Description
<i>Firewall Policies</i>	
Prevent SSH Brute	Select <b>True</b> to prevent SSH brute attacks or <b>False</b> to allow SSH brute attacks.  Example: False



Table 198: Fields for the LxCIP Firewall Policy Settings (*continued*)

Field	Description
Prevent Ping Flood	<p>Select <b>True</b> to prevent ping flood attacks or <b>False</b> to allow ping flood attacks.</p> <p>Example: False</p>
<i>Forwarding Rule Settings</i>	
Destination Address	<p>Specify the destination IP address prefix that the network service uses as a match criterion for outgoing traffic.</p> <p>Example: 192.0.2.25/24</p>
Operation	<p>Select the operation, which applies to a chain of rules of the same type, from the drop-down list. The following options are available:</p> <ul style="list-style-type: none"> <li>• <b>append</b>—Append the rule to a rule chain.</li> <li>• <b>insert-before</b>—Insert the rule before a rule with the same name.</li> <li>• <b>delete</b>—Replace an existing rule with this name.</li> </ul> <p>Example: append</p>
Source Address	<p>Specify the source IP address prefix that the network service uses as a match criterion for outgoing traffic.</p> <p>Example: 192.0.2.20/24</p>
Name	<p>Specify the name for the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: vsrx-fw-policy</p>
Action	<p>Select the action for the rule, which applies to all traffic that matches the specified criteria.</p> <ul style="list-style-type: none"> <li>• <b>accept</b>—Transmit packets that match the policy parameters.</li> <li>• <b>drop</b>—Drop packets that match the policy parameters.</li> <li>• <b>reject</b>—Reject packets that match the policy parameters.</li> </ul> <p>Example: accept</p>
Service	<p>Specify the service that you want the rule to match.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• http</li> <li>• smtp</li> </ul>

Table 198: Fields for the LxCIP Firewall Policy Settings (*continued*)

Field	Description
Type	<p>Select the type of packet that the rule matches.</p> <ul style="list-style-type: none"> <li>• <b>input</b>—Packets that the network service receives that are addressed to this VM</li> <li>• <b>forward</b>—Packets that the network service receives that are addressed to other VMs</li> <li>• <b>output</b>—Packets that the network service transmits</li> </ul> <p>The application creates a chain of all rules with a particular type.</p> <p>Example: input</p>

Table 199: Fields for the LxCIP NAT Policy Settings

Field	Description
Left Interface	<p>Specify the name of the interface on which the network service enforces NAT for incoming traffic.</p> <p>Example: Eth1</p>
Right Interface	<p>Specify the name of the interface on which the network service enforces NAT for outgoing traffic.</p> <p>Example: Eth2</p>

## RELATED DOCUMENTATION

| [Managing a Single Site](#) | 803

## Cisco CSR-1000v VNF Configuration Settings

Your service provider usually configures base settings for the virtual machine (VM) in which the virtualized network function (VNF) resides and you configure settings for the service, such as policies. Use the information in the following tables to provide values for the available settings:

- [Table 200 on page 499](#) shows the base settings you can configure for the virtual machine (VM) that contains the VNF.

**NOTE:** Your service provider usually configures the base settings and you should not need to change them.

- [Table 201 on page 499](#) shows the firewall settings you can configure.

**Table 200: Fields for the CSR-1000v Base Settings**

Field	Description
Host Name	Specify the hostname of the VM.  Example: host1
Loopback Address	Specify the IPv4 loopback IP address.  Example: 10.0.2.50
Name Servers	Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers.  Example: 10.0.2.15
NTP Servers	Specify the FQDNs or IP addresses of one or more NTP servers.  Example: ntp.example.net

**Table 201: Fields for the CSR-1000v Firewall Settings**

Field	Description
Left Interface	Specify the identifier of the interface that transmits data to the host.  Example: GigabitEthernet2
Right Interface	Specify the identifier of the interface receiving data transmitted by the host.  Example: GigabitEthernet3

Table 201: Fields for the CSR-1000v Firewall Settings *(continued)*

Field	Description
Left to Right Allowed Apps	<p>Select the applications from the drop-down list for which the policy is enforced in outgoing packets. The following applications are available:</p> <ul style="list-style-type: none"> <li>• http</li> <li>• https</li> <li>• telnet</li> <li>• ftp</li> <li>• tcp</li> <li>• udp</li> <li>• icmp</li> </ul> <p>Example: http, https</p>
Right to Left Allowed Apps	<p>Select the application from the drop-down list for which the policy is enforced for incoming packets. The following applications are available:</p> <ul style="list-style-type: none"> <li>• http</li> <li>• https</li> <li>• telnet</li> <li>• ftp</li> <li>• tcp</li> <li>• udp</li> <li>• icmp</li> </ul> <p>Example: ftp, udp</p>

RELATED DOCUMENTATION

| [Managing a Single Site](#) | 803

## Riverbed Steelhead VNF Configuration Settings

You configure the Riverbed Steelhead VNF through its own software. See the Riverbed Steelhead documentation for information about how to configure the application. You can view the following setting:

Management IP—IP address of the sxe0 interface on JDM for the NFX250. For example: 192.0.2.25.

RELATED DOCUMENTATION

| [Managing a Single Site](#) | 803

# Managing Firewall Policies

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## Firewall Policy Overview

Contrail Service Orchestration (CSO) provides the ability to create, modify, and delete firewall policy intents associated with a firewall policy. Firewall policies are presented as *intent-based policies*. A firewall policy intent controls transit traffic within a context that is derived out of the end-points defined in the intent. Intent-based firewall policies can incorporate both transport layer (Layer 4) and application layer (Layer 7) firewall constructs in a single intent. The underlying system, automatically analyzes the intent, translates them into the set of rules the devices understand. The choice of sequence and the assignment happens implicitly based on the endpoints in the intent definition. The intent consist of source and destination endpoints. Endpoints could be applications (L7), sites or site groups, IP address/address-groups, services, or departments.

**NOTE:** Intent based policies are not applicable for Hybrid WAN deployments.

Firewall policies provide security functionality by enforcing intents on traffic that passes through a device. Traffic is permitted or denied based on the action defined as the firewall policy intent.

A firewall policy provides the following features:

- Permits, rejects, or denies traffic based on the application in use.
- Identifies not only HTTP but also any application running on top of it, enabling you to properly enforce policies. For example, an application firewall intent could block HTTP traffic from Facebook but allow Web access to HTTP traffic from Microsoft Outlook.
- Provides the ability to perform threat management on permitted traffic using UTM profiles. For more information on UTM profiles, see [“UTM Overview” on page 567](#).

### RELATED DOCUMENTATION

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[About the Firewall Policy Page | 504](#)

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[Firewall Policy Examples | 521](#)

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[Creating Firewall Policy Intents | 505](#)

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[Editing, Cloning, and Deleting Firewall Policy Intents | 513](#)

# About the Firewall Policy Page

To access this page, select **Configuration > Firewall > Firewall Policy**.

Use this page to view and manage policy intents associated with your site or site groups. You can filter and sort this information to get a better understanding of what you want to configure.

## Tasks You Can Perform

You can perform the following tasks from this page:

- Create a firewall policy intent. See [“Creating Firewall Policy Intents” on page 505](#).
- Modify, clone or delete firewall policy intents. See [“Editing, Cloning, and Deleting Firewall Policy Intents” on page 513](#).
- Deploy a firewall policy. See [“Deploying Policies” on page 746](#).

**NOTE:** An orange line is displayed against all undeployed firewall policy intents.

- Search for a firewall policy intent. See [“Searching for Text in an Object Data Table” on page 385](#).
- Show or hide columns. Click the **Show Hide Columns** icon at the top right corner of the page.
- View undeployed intents. Click the **Show Hide Columns** icon at the top right corner of the page and select **Undeployed Intent** under **Quick Filters**.

## Field Descriptions

[Table 202 on page 504](#) provides guidelines on using the fields on the **Firewall Policy** page.

Table 202: Fields on the Firewall Policy Page

Field	Description
Source	Source endpoint to which a firewall policy intent applies. A source endpoint can be addresses, sites, site groups, departments, users, or Internet (all in-bound traffic).
Destination	Destination endpoint to which a firewall policy intent applies. A destination endpoint can be addresses, services, sites, application signatures and groups, services and groups, or departments.
Options	Displays whether scheduling, logging, and UTM options are enabled for the firewall policy intent.



Table 202: Fields on the Firewall Policy Page (*continued*)

Field	Description
Total	Number of intents associated with the firewall policy.
Undeployed	Number of intents associated with the firewall policy that are either created new or updated, but are not yet deployed.

## RELATED DOCUMENTATION

[Firewall Policy Overview | 503](#)

[Creating Firewall Policy Intents | 505](#)

[Firewall Policy Examples | 521](#)

[Editing, Cloning, and Deleting Firewall Policy Intents | 513](#)

[About the Deployments Page | 743](#)

[Deploying Policies | 746](#)

## Creating Firewall Policy Intents

Use this page to configure a firewall intent that controls transit traffic within a context (source zone to destination zone). The traffic is classified by matching its source and destination zones, the source and destination addresses, and the application that the traffic carries in its protocol headers with the policy database.

You can also enable protection against multiple threat types including spam and malware, and control access to unapproved websites and content by enabling the UTM option and selecting an appropriate UTM profile.

To configure a firewall policy intent:

1. Select **Configuration > Firewall > Firewall Policy**.

2. Click the add icon (+).

The **Firewall Policy** page appears.

3. Complete the configuration according to the guidelines provided in [Table 203 on page 506](#).

**NOTE:** When you create a site specific firewall policy intent, the intent will be deployed on the respective site. However, when you create an address based firewall policy intent, the intent will be deployed to all the sites associated with a tenant.

4. Click **Save** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **Save**, a new firewall policy intent with the provided configuration is created.

[Table 203 on page 506](#) provides guidelines on using the fields on the **Create Firewall Policy** page.

**Table 203: Fields on the Create Firewall Policy Page**

Field	Description
<b>General Information</b>	
Name	Enter a unique string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 255 characters. If you do not enter a name, the intent is saved with a default name assigned by CSO.
Description	Enter a description for the policy intent; maximum length is 1024 characters. Comments entered in this field are sent to the device.
<b>Identify the traffic that the intent applies to</b>	
Source	Click on the add icon (+) to select the source endpoints on which the firewall policy intent applies, from the displayed list of addresses, departments, sites, site groups, users, or the Internet. You can also select a source endpoint using the methods described in <a href="#">“Selecting Firewall Source” on page 514</a> .
Destination	Click on the add icon (+) to select the destination endpoints on which the firewall policy intent applies, from the displayed list of addresses, departments, sites, site groups, or the Internet. You can also select a destination endpoint using the methods described in <a href="#">“Selecting Firewall Destination” on page 518</a> .

Table 203: Fields on the Create Firewall Policy Page *(continued)*

Field	Description
Select Action	<p>Click the add icon (+) to choose whether you want to permit, deny, or reject traffic between the source and destination.</p> <ul style="list-style-type: none"> <li>• Allow—Device permits traffic using the type of firewall authentication you applied to the policy.</li> <li>• Deny—Device silently drops all packets for the session and does not send any active control messages such as TCP Resets or ICMP unreachable.</li> <li>• Reject—Device sends a TCP reset if the protocol is TCP, and device sends an ICMP reset if the protocols are UDP, ICMP, or any other IP protocol. This option is useful when dealing with trusted resources so that applications do not waste time waiting for timeouts and instead get the active message.</li> </ul>
<b>Options</b>	

Table 203: Fields on the Create Firewall Policy Page (*continued*)

Field	Description
Scheduling	<p>Policy schedules enable you to define when a policy is active, and thus are an implicit match criterion. You can define the day of the week and the time of the day when the policy is active. For instance, you can define a security policy that opens or closes access based on business hours. Select a pre-saved schedule and the schedule options are populated with the selected schedule's data.</p> <p>To add a schedule to a firewall policy:</p> <ol style="list-style-type: none"> <li>1. Click on <b>Scheduling</b>, to enable scheduling.</li> <li>2. Click the add icon (+), to add an existing schedule. If you want to view more results in the <b>End Points</b> pane, click <b>View more results</b>.  Alternately, you can add a schedule from the <b>End Points</b> panel, by selecting the schedule and clicking on the check mark icon (✓).</li> <li>3. The selected schedule is added to the firewall policy.</li> </ol> <p>You can also create new schedules and then associate the schedule to your firewall policy.</p> <p>To create a new schedule and then add it to a firewall policy:</p> <ol style="list-style-type: none"> <li>1. Click on <b>Scheduling</b>, to enable scheduling.</li> <li>2. Click the add icon (+), and then click <b>Add new schedule</b>.  The <b>Create Schedules</b> page appears.</li> <li>3. Alternately, click the lesser-than icon (&lt;) to open the <b>End Points</b> panel. Click on the add icon (+) on the top right of the panel and select <b>Schedule</b>.  The <b>Create Schedules</b> page appears.</li> <li>4. Create a new schedule. See <a href="#">“Creating Schedules” on page 562</a>.  The new schedule appears in the list of schedules when you click on <b>Scheduling</b> and in the <b>End Points</b> tab, under <b>Schedules</b>.</li> <li>5. Select the schedule and click on the add icon (+) to add it to the firewall policy.</li> </ol>

Table 203: Fields on the Create Firewall Policy Page (*continued*)

Field	Description
Logging	<p>Enable logging by selecting the <b>Logging</b> option. You can see the logged firewall events in the <b>Firewall Events</b> page by using <b>Monitor &gt; Security Events &gt; Firewall Events</b>.</p> <p>For more information on the <b>Firewall Events</b> page, see <a href="#">“About the Firewall Events Page” on page 403</a>.</p>
UTM	<p>Enable the <b>UTM</b> option for protection against multiple threat types including spam and malware, and control access to unapproved websites and content. Click <b>Select UTM profile</b> to select a UTM profile from the list of UTM profiles displayed.</p> <ul style="list-style-type: none"> <li>Click on <b>View more results</b> to see more UTM profile in the <b>Endpoints</b> panel on the right.</li> <li>Click <b>Add new profile</b> to create a new UTM profile. See <a href="#">“Creating UTM Profiles” on page 573</a> for more information on creating a new UTM profile.</li> </ul>
<b>Create source and destination endpoints</b>	

Table 203: Fields on the Create Firewall Policy Page (continued)

Field	Description
End Points	

Table 203: Fields on the Create Firewall Policy Page (*continued*)

Field	Description
	<p>To add an end point to the source or destination:</p> <ol style="list-style-type: none"> <li>Click on <b>Source</b> or <b>Destination</b> and then click the lesser-than icon on the right side of the page to open the <b>End Points</b> panel.</li> </ol> <p>The <b>End Points</b> panel displayed the end points relevant to the source or destination based on your selection.</p> <ul style="list-style-type: none"> <li>End points from addresses, departments, users, and sites are displayed for source.</li> </ul> <p><b>NOTE:</b> If JIMS is not configured for CSO, users will not be listed in the <b>Endpoints</b> panel. Instead you will be provided with an option to import users through the <b>Administration &gt; Identity Management</b> page. To import users, click <b>Set Up</b> and follow the steps provided in <a href="#">“About the Identity Management Page” on page 946</a>.</p> <ul style="list-style-type: none"> <li>End points from addresses, applications, departments, services, and sites are displayed for destination.</li> </ul> <p><b>NOTE:</b> You can also search for a specific end point using the search option.</p> <ol style="list-style-type: none"> <li>(Optional) Click on the edit icon (pencil symbol) to modify an end point.</li> <li>(Optional) Click on the details icon on the right of the endpoint, to view more information about a source or destination endpoint.</li> <li>Select the end point you want to add and click on the check mark icon (✓) to add it the source or destination.</li> </ol> <p>The selected end point is added to the source or destination.</p> <p>To create new source and destination endpoints:</p> <ol style="list-style-type: none"> <li>Click the less-than icon (&lt;) on the right side of the page, to open the <b>End Points</b> panel.</li> <li>Click on the add icon (+) on the top right of the <b>End Points</b> panel.</li> </ol> <p>A list of end points that you can create is displayed.</p> <ol style="list-style-type: none"> <li>Select the end point you want to create.</li> </ol> <p>You can create the following end points:</p> <ul style="list-style-type: none"> <li>Create an address. See <a href="#">“Creating Addresses or Address Groups” on page 717</a>.</li> </ul>

Table 203: Fields on the Create Firewall Policy Page (continued)

Field	Description
	<ul style="list-style-type: none"><li>• Create a site group. See <a href="#">“Creating Site Groups” on page 836</a>.</li><li>• Create a department. See <a href="#">“Adding a Department” on page 739</a>.</li><li>• Create a service. See <a href="#">“Creating Services and Service Groups” on page 724</a>.</li><li>• Create an application signature group. See <a href="#">“Creating Application Signature Groups” on page 735</a>.</li><li>• Create a schedule. See <a href="#">“Creating Schedules” on page 562</a>.</li></ul> <p>4. Click <b>Save</b> to create the new end point.</p> <p>The created end point is listed in the <b>End Points</b> panel.</p> <p>5. Select the end point you want to add to the source or destination, and click on the check mark icon (✓).</p> <p>The end point is added to the source or destination.</p>

RELATED DOCUMENTATION

Firewall Policy Overview	503
About the Firewall Policy Page	504
Firewall Policy Examples	521
Editing, Cloning, and Deleting Firewall Policy Intents	513
Creating Addresses or Address Groups	717
Creating Site Groups	836
About the Sites Page	749
Adding a Department	739
Creating Application Signature Groups	735
Creating Services and Service Groups	724



## Editing, Cloning, and Deleting Firewall Policy Intents

### IN THIS SECTION

- [Editing Firewall Policy Intents | 513](#)
- [Cloning Firewall Policy Intents | 513](#)
- [Deleting Firewall Policy Intents | 514](#)

You can edit, clone, and delete firewall policy intents from the **Firewall Policy** page.

### Editing Firewall Policy Intents

To modify the parameters configured for a firewall policy intent:

1. Select **Configuration > Firewall > Firewall Policy**.

The **Firewall Policy** page appears, displaying the intents associated with the policy.

2. Hover over the firewall policy intent that you want to edit, and then click on the edit icon (pencil symbol) that appears on the right side of the intent.

The **Firewall Policy** page displays the same options as those that appear when you create a new firewall policy intent.

3. Modify the parameters following the guidelines provided in [“Creating Firewall Policy Intents” on page 505](#).
4. Click **Save** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **Save**, the modified intent appears on the **Firewall Policy** page.

### Cloning Firewall Policy Intents

To clone a firewall policy intent:

1. Select **Configuration > Firewall > Firewall Policy**.

The **Firewall Policy** page appears, displaying the intents associated with the policy.

2. Hover over the firewall policy intent that you want to clone, and then click on the clone icon that appears on the right side of the intent.

The **Firewall Policy** page displays the same options as those that appear when you create a new firewall policy intent. Update the cloned intent as required.

3. Click **Save** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **Save**, the cloned intent is added to the firewall policy and appears on the **Firewall Policy** page.

## Deleting Firewall Policy Intents

To delete a firewall policy intent:

1. Select **Configuration > Firewall > Firewall Policy**.

The **Firewall Policy** page appears, displaying the intents associated with the policy.

2. Select the firewall policy intent you want to delete and then click the delete icon **(X)**.

An alert message appears, verifying that you want to delete the selected intent.

3. Click **Yes** to delete the selected intent. If you do not want to delete, click **Cancel** instead.

If you click **OK**, the selected intent is deleted from the policy.

## RELATED DOCUMENTATION

---

[Firewall Policy Overview | 503](#)

---

[About the Firewall Policy Page | 504](#)

---

[Firewall Policy Examples | 521](#)

---

[Creating Firewall Policy Intents | 505](#)

## Selecting Firewall Source

### IN THIS SECTION

- [Adding an End Point as Firewall Source | 515](#)
- [Selecting Firewall Source Using Abbreviations | 516](#)
- [Selecting a Firewall Source from the End Points Panel | 516](#)

- Creating and Selecting a Firewall Source from the End Points Panel | 517
- Creating Addresses from Source | 517

The following procedures provides various methods using which you can choose a firewall source end point:

### Adding an End Point as Firewall Source

View and select the source end point from the complete list of addresses, sites, site groups, or departments. You can also select the **Internet** option which denotes all in-coming traffic from outside your network.

**NOTE:** When you select **Any** address as a source, it implies traffic originating within the network.

**NOTE:**

The following conditions apply when you select **Internet** as a source end point:

- When **Internet** is not chosen as a source end point, it is implied that the traffic is originating within the network.
- If you chose **Internet** as a source, you cannot add other sites, site groups or departments as a source end point along with **Internet**.
- If you chose **Internet** as a source, the destination end point must be a site, site group, or department.

1. Click the **Source** field. A list of relevant endpoints are displayed.
2. Click on **View more results** link provided at the bottom of the source end points. The complete list of addresses, departments, users, sites, and site groups is displayed in the **End Points** panel on the right.
3. (Optional) Click the edit icon to edit the address, users, department, or site group end point. You cannot edit a site end point.
4. Click check mark icon (✓) to select the end point as a source.

## Selecting Firewall Source Using Abbreviations

Enter an abbreviation in the **Source** field to select the source end point from a filtered list of source endpoints.

- To view a filtered list of addresses, enter **ADDR** or **addr**.
- To view a filtered list of departments, enter **DEPT** or **dept**.
- To view a filtered list of sites, enter **SITE** or **site**.
- To view a filtered list of site groups, enter **STGP** or **stgp**.
- To view a filtered list of user ids, enter **USER** or **user**.

Click the endpoints in the filtered list to select them. You can also select the end point from the complete list of addresses, departments, users, sites, and site groups. See [“Adding an End Point as Firewall Source” on page 515](#).

## Selecting a Firewall Source from the End Points Panel

You can select a firewall source end point from the **End Points** panel. Alternately, you can create a new firewall source end point from the **End Points** panel, see [“Creating and Selecting a Firewall Source from the End Points Panel” on page 517](#)

To select an firewall source end point from the from the **End Points** panel:

1. Click on the **Source** field.
2. Click the lesser-than icon (<) on the right.

The **End Points** panel appears, displaying the list of available addresses, departments, users, sites, and site groups.

3. (Optional) To view more information about a source end point, click the details icon on the right of the end point. To edit the source end point, click the edit icon (pencil symbol) on the right of the end point.

**NOTE:** You can only edit or view details of a source end point if these options appear on right side of the end point when you hover over it. Not all endpoints provide these options.

4. Click the check mark icon (✓) to add the end point as a source.

## Creating and Selecting a Firewall Source from the End Points Panel

To create an new source end point from the **End Points** panel:

1. Click the add icon (+) on the top right of the panel and select the type of end point you want to create, among the options provided.

Based on the option you select, the respective page appears. Fill in the required details to create a new end point.

- To create a new address, see [“Creating Addresses or Address Groups” on page 717](#).
- To create a site or site group, see [“Creating Site Groups” on page 836](#).

After the end point is created, it appears in the **End Points** panel.

2. Click the check mark icon (✓) to add the new end point as a source.

## Creating Addresses from Source

You can use one of the following ways to create a new address from the **Source** field and use the newly created address as a source end point:

- Type the address directly in the **Source** field. If the address is valid, it is created immediately and added as a source end point.
- Create an address from the **Source** field, using the following steps:
  1. In the **Source** field, type **addr**. The **Add new address** link appears at the bottom of the list of addresses.
  2. Click **Add new address** to create a new address.  
The **Create Addresses** page appears.
  3. Configure the new address. See [“Creating Addresses or Address Groups” on page 717](#).
  4. Click **Save** to save the new address.

The new address is created, and will be listed as an option for the source. Select the new address to add it to the source.

## RELATED DOCUMENTATION

[Selecting Firewall Destination | 518](#)

[Creating Firewall Policy Intents | 505](#)

[Firewall Policy Overview | 503](#)[About the Firewall Policy Page | 504](#)[Editing, Cloning, and Deleting Firewall Policy Intents | 513](#)

## Selecting Firewall Destination

### IN THIS SECTION

- [Adding an End Point as Firewall Destination | 518](#)
- [Selecting Firewall Destination Using Abbreviations | 519](#)
- [Selecting a Firewall Destination from the End Points Panel | 519](#)
- [Creating and Selecting a Firewall Destination from the End Points Panel | 520](#)
- [Creating Addresses from Destination | 520](#)

The following procedures provides various methods using which you can choose a firewall destination end point:

### Adding an End Point as Firewall Destination

View and select the end point from the complete list of addresses, applications, departments, services, sites, or site groups.

#### NOTE:

- When you choose **Any** address or service as the destination, it implies that traffic is flowing outside the network unless a site or department is mentioned explicitly.
- Unless you choose a site, site group, or department as a destination end point, it is implied the traffic will flow outside your network.

1. Click on **Destination**. A list of relevant end points are displayed.
2. Click on **View more results** link provided at the bottom of the destination end points. The complete list of addresses, departments, sites, and site groups is displayed in the **End Points** panel on the right.

3. (Optional) Click the edit icon to edit the address, department, or site group end point. You cannot edit a site end point.
4. Click check mark icon (✓) to select the end point as a destination.

### Selecting Firewall Destination Using Abbreviations

Enter an abbreviation in the **Destination** field to select the destination end point from a filtered list of destination endpoints.

- To view a filtered list of addresses, enter **ADDR** or **addr**.
- To view a filtered list of addresses, enter **APPS** or **apps**.
- To view a filtered list of departments, enter **DEPT** or **dept**.
- To view a filtered list of services, enter **SVCS** or **svcs**.
- To view a filtered list of sites, enter **SITE** or **site**.
- To view a filtered list of site groups, enter **STGP** or **stgp**.

Click the endpoints in the filtered list to select them. You can also select the end point from the complete list of addresses, departments, sites, and site groups. See [“Adding an End Point as Firewall Destination” on page 518](#).

### Selecting a Firewall Destination from the End Points Panel

You can select a firewall destination end point from the **End Points** panel. Alternately, you can create a new firewall destination end point from the **End Points** panel, see [“Creating and Selecting a Firewall Destination from the End Points Panel” on page 520](#).

To select an firewall destination end point from the from the **End Points** panel:

1. Click on the **Destination** field.
2. Click the lesser-than icon (<) on the right.

The **End Points** panel appears, displaying the list of available addresses, departments, sites, and site groups.

3. (Optional) To view more information about a destination end point, click the details icon on the right of the end point. To edit the destination end point, click the edit icon (pencil symbol) on the right of the end point.

**NOTE:** You can only edit or view details of a destination end point if these options appear on right side of the end point when you hover over it. Not all endpoints provide these options.

4. Click the check mark icon (✓) to add the end point as a destination.

## Creating and Selecting a Firewall Destination from the End Points Panel

To create an new destination end point from the **End Points** panel:

1. Click the add icon (+) on the top right of the panel and select the type of end point you want to create, among the options provided.

Based on the option you select, the respective page appears. Fill in the required details to create a new end point.

- To create a new address, see [“Creating Addresses or Address Groups” on page 717](#).
- To create a site or site group, see [“Creating Site Groups” on page 836](#).

After the end point is created, it appears in the **Endpoints** panel.

2. Click the check mark icon (✓) to add the new end point as a destination.

## Creating Addresses from Destination

You can use one of the following ways to create a new address from the **Destination** and use the newly created address as a destination end point:

- Type the address directly in the **Destination** field. If the address is valid, it is created immediately and added as a destination end point.
- Create an address from the **Destination** field, using the following steps:
  1. In the **Destination** field, type **addr**. The **Add new address** link appears at the bottom of the list of addresses.
  2. Click **Add new address** to create a new address.

The **Create Addresses** page appears.

3. Configure the new address. See [“Creating Addresses or Address Groups” on page 717](#).
4. Click **Save** to save the new address.



The new address is created, and will be listed as an option for the destination. Select the new address to add it to the destination.

## RELATED DOCUMENTATION

[Creating Firewall Policy Intents | 505](#)

[Firewall Policy Overview | 503](#)

[About the Firewall Policy Page | 504](#)

[Editing, Cloning, and Deleting Firewall Policy Intents | 513](#)

## Firewall Policy Examples

### IN THIS SECTION

- [Example 1: Firewall Policy that Permits Traffic from Departments in Site A to the Departments in Site B | 523](#)
- [Example 2: Firewall Policy that Permits Internet Access for all Departments in Site A and Site B | 525](#)
- [Example 3: Firewall Policy that Permits Any Public Internet Address to Access the Sales Department in Site B | 528](#)
- [Example 4: Firewall Policy that Permits Social Media Access to all Departments in Site A | 529](#)
- [Example 5: Firewall Policy that Controls Access to Specific Applications for Various Departments | 531](#)
- [Example 6: Firewall Policy that Denies Access to Social Networking Sites | 539](#)
- [Example 7: Firewall Policy that Controls Access to an Address over the Internet \(HTTP\) | 542](#)
- [Example 8: Firewall Policy that Permits or Denies the Use of HTTP or FTP as a Service | 548](#)
- [Example 9: Firewall Policy that Denies Access to BitTorrent to the Finance Departments across both Site A and Site B | 550](#)
- [Example 10: Firewall Policy that Allows Access to Facebook for Users in User Group A | 553](#)
- [Example 11: Firewall Policy that Permits User B in Site A Access to YouTube with UTM Enabled | 557](#)

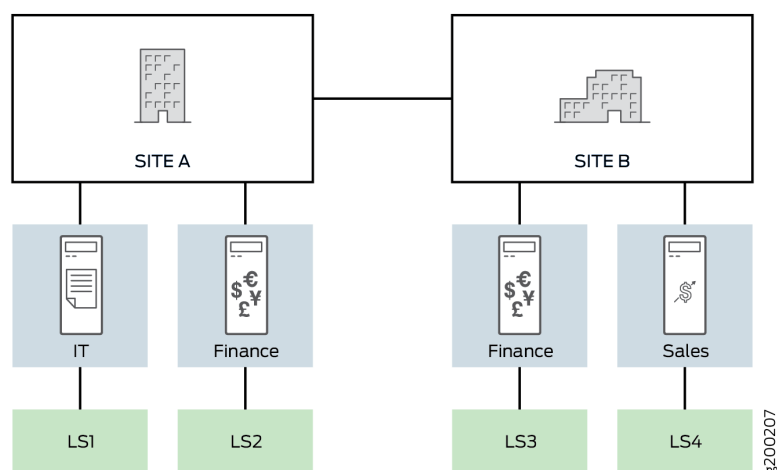
This topic provides information on how firewall policy intents that you define as part of your firewall policy is handled by Contrail Service Orchestration (CSO), using various examples. Each of the examples provide detailed explanation about how a firewall policy intent defined through the CSO GUI resolves into configuration in the system.

**NOTE:** For more information, see [“Firewall Policy Overview” on page 503](#) and [“Creating Firewall Policy Intents” on page 505](#).

For easier understanding, all the examples have been defined to use the topology in illustrated in [Figure 12 on page 522](#). In this topology, there are two sites—site A and site B. Each site has two departments defined as follows:

- Site A - IT (LAN segment LS1) and Finance (LAN segment LS2).
- Site B - Finance (LAN segment LS3) and Sales (LAN segment LS4).

**Figure 12: Topology Diagram**



The following definitions are applicable to all the examples:

- While creating a site, you can designate some of the WAN interfaces to be breakout interfaces. These WAN interfaces can carry both site-to-site traffic (through the trust zone) and breakout traffic (through the untrust zone). The WAN interfaces can also be designated exclusively for carrying breakout traffic.
- A trust zone refers to the overlay interface that contains all the GRE tunnel interfaces, such as gr-0/0/0.1, gr-0/0/0.2, and IPsec interfaces, such as st0.1, st0.2 created between the sites.
- An untrust zone refers to the underlay interfaces (underlying physical interfaces) such as ge-0/0/0, ge-0/0/1.
- If you select an address or a service as a destination endpoint, CSO considers it as an address or service hosted on the Internet, unless the selected address or service is associated with a site.
- [Table 204 on page 523](#) captures the addresses associated with the LAN segments used in the topology illustrated in [Figure 12 on page 522](#).

**Table 204: LAN Segments Definition**

Site	Department	LAN Segment	LAN Segment Address
site A	IT	LS1	192.0.2.0/24
site A	Finance	LS2	192.168.1.0/24
site B	Finance	LS3	198.51.100.0/24
site B	Sales	LS4	203.0.113.0/24

The following examples help you understand the creation of intent-based firewall policies for various traffic scenarios across sources and destinations.

### **Example 1: Firewall Policy that Permits Traffic from Departments in Site A to the Departments in Site B**

Define a firewall policy that permits traffic from the departments in site A to the departments in site B.

[Table 205 on page 523](#) shows the firewall policy intent that is defined:

**Table 205: Firewall Policy Intent Definition for Example - 1**

Source	Destination	Action
site A	site B	Permit

[Table 206 on page 523](#) shows how this firewall policy intent is resolved:

**Table 206: Firewall Policy Intent Resolution for Example - 1**

Site	Source Department	Source Address	Zone	Destination Address	Service	Intent Created
site A	Finance	[LS2]	Trust	[LS3, LS4]	Any	Intent 1__0
	IT	[LS1]	Trust	[LS3, LS4]	Any	Intent 1__1
site B	Trust	[LS3, LS4]	Sales	[LS2]	Any	Intent 1__0
	Trust	[LS3, LS4]	Finance	[LS1]	Any	Intent 1__1

### **Configuration Output Sample**

Sample of configuration that permits traffic from departments in site A to the departments in site B.

The hierarchy level for the following configuration sample is [\[edit security policies\]](#).

```

from-zone FINANCE to-zone trust {
  policy Intent_1__0 {
    match {
      source-address ls-192.168.1.0/24-SP50-L2;
      destination-address [ls-198.51.100.0/24-SP50-L3,
ls-203.0.113.0/24-SP50-L4];
      application any;
    }
  }
  then {
    permit;
  }
}

from-zone IT to-zone trust {
  policy Intent_1__1 {
    match {
      source-address ls-192.0.2.0/24-S42-L1;
      destination-address [ls-198.51.100.0/24-SP50-L3,
ls-203.0.113.0/24-SP50-L4];
      application any;
    }
  }
  then {
    permit;
  }
}

```

Sample of configuration that permits traffic from departments in site B to the departments in site A.

The hierarchy level for the following configuration sample is [\[edit security policies\]](#).

```

from-zone trust to-zone SALES {
  policy Intent_1__0 {
    match {
      source-address [ls-198.51.100.0/24-SP50-L3,
ls-203.0.113.0/24-SP50-L4];
      destination-address ls-192.0.2.0/24-S42-L1;
    }
  }
}

```

```

        application any;
    }
    then {
        permit;
    }
}

from-zone trust to-zone FINANCE {
    policy Intent_1__1 {
        match {
            source-address [ls-198.51.100.0/24-SP50-L3,
ls-203.0.113.0/24-SP50-L4];
            destination-address ls-192.168.1.0/24-SP50-L2;
            application any;
        }
        then {
            permit;
        }
    }
}
```

**Example 2: Firewall Policy that Permits Internet Access for all Departments in Site A and Site B**

Define a firewall policy that permits all the department in site A and site B access to Internet.

Table 207 on page 525 shows the firewall policy intent that is defined:

**Table 207: Firewall Policy Intent Definition for Example - 2**

Source	Destination	Action
site A	http, https, icmp-ping, dns	Permit
site B	http, https, icmp-ping, dns	Permit

Table 208 on page 526 shows how this firewall policy intent is resolved:

Table 208: Firewall Policy Intent Resolution for Example - 2

Site	Source Department	Source Address	Zone	Destination Address	Service	Intent Created
site A	Finance	[LS2]	Untrust	Any	http, https, icmp-ping, dns	Intent 1__0
	IT	[LSI]	Untrust	Any	http, https, icmp-ping, dns	Intent 1__1
site B	Sales	[LS4]	Untrust	Any	http, https, icmp-ping, dns	Intent 1__0
	Finance	[LS3]	Untrust	Any	http, https, icmp-ping, dns	Intent 1__1

### Configuration Output Sample

Sample of configuration that permits Internet access to all departments in site A.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Finance to-zone untrust {
  policy Intent_1__0 {
    match {
      source-address ls-192.168.1.0/24-SP50-L2;
      destination-address any;
      application [junos-http junos-dns-tcp junos-https
                  junos-icmp-ping];
    }
    then {
      permit;
    }
  }
}

from-zone IT to-zone untrust {
  policy Intent_1__1 {

```

```

        match {
            source-address ls-192.0.2.0/24-S42-L1;
            destination-address any;
            application [junos-http junos-dns-tcp junos-https
                        junos-icmp-ping];
        }
        then {
            permit;
        }
    }
}
policy-rematch;

```

Sample of configuration that permits Internet access to all departments in site B.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Sales to-zone untrust {
    policy Intent_1__0 {
        match {
            source-address ls-203.0.113.0/24-SP50-L4;
            destination-address any;
            application [junos-http junos-dns-tcp junos-https
                        junos-icmp-ping];
        }
        then {
            permit;
        }
    }
}
from-zone Finance1 to-zone untrust {
    policy Intent_1__1 {
        match {
            source-address ls-198.51.100.0/24-SP50-L3;
            destination-address any;
            application [junos-http junos-dns-tcp junos-https
                        junos-icmp-ping];
        }
        then {
            permit;
        }
    }
}

```

```

    }
}
policy-rematch;

```

### Example 3: Firewall Policy that Permits Any Public Internet Address to Access the Sales Department in Site B

Define a firewall policy that permits any public Internet address access to a sales application hosted by the Sales department in site B.

**NOTE:** For this example, breakout is not enabled and MPLS link type is used.

Table 209 on page 528 shows the firewall policy intent that is defined:

Table 209: Firewall Policy Intent Definition for Example - 3

Source	Destination	Action
Internet	Sales, site B	Permit

Table 210 on page 528 shows how this firewall policy intent is resolved:

Table 210: Firewall Policy Intent Resolution for Example - 3

Source Address	Zone	Destination Address	Service	Intent Created
Any public Internet address	Trust to Sales (No breakout)	[LS4]	Any	Intent 1__0

### Configuration Output Example

Sample of configuration that permits any public Internet address to access the Sales department in site B.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone untrust to-zone Sales {
    policy Intent_1__0 {

```



```
match {
    source-address any;
    destination-address ls-203.0.113.0/24-SP50-L4;
    application any;
}
then {
    permit;
}
}
```

**Example 4: Firewall Policy that Permits Social Media Access to all Departments in Site A**

Define a firewall policy that permits all departments in site A access to Facebook.

Table 211 on page 529 shows the firewall policy intent that is defined:

**Table 211: Firewall Policy Intent Definition for Example - 4**

Source	Destination	Action
site A	Facebook	Permit

Table 212 on page 529 shows how this firewall policy intent is resolved:

**Table 212: Firewall Policy Intent Resolution for Example - 4**

Site	Source Address	Zone	Destination Address	Service	Intent Created	Application Firewall Profile
site A	[LS2]	Untrust	Facebook	Any	Intent 1__0	AppFwProfile_0
site A	[LS1]	Untrust	Facebook	Any	Intent 1__1	AppFwProfile_0

**Configuration Output Example**

Sample of configuration that controls access to Facebook for site A.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Finance to-zone untrust {
  policy Intent_1__0 {
    match {
      source-address ls-192.168.1.0/24-SP50-L2;
      destination-address any;
      application any;
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_0;
          }
        }
      }
    }
  }
}

from-zone IT to-zone untrust {
  policy Intent_1__1 {
    match {
      source-address ls-192.0.2.0/24-S42-L1;
      destination-address any;
      application any;
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_0;
          }
        }
      }
    }
  }
}

policy-rematch;
```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```

application-firewall {
  rule-sets AppFwProfile_0 {
    rule rule-1 {
      match {
        dynamic-application junos:FACEBOOK-APP;
        ssl-encryption any;
      }
      then {
        permit;
      }
    }
    default-rule {
      deny;
    }
  }
}

```

### Example 5: Firewall Policy that Controls Access to Specific Applications for Various Departments

Define a firewall policy that controls access to specific applications from various departments, with the following intents:

- The finance departments located in site A and site B (which are in different geographical locations) are permitted to access the news applications BBC and CNN.
- The IT department located in site A is denied access to the news applications BBC and CNN.
- Access to Telnet and SSH applications is given only to the finance departments.
- Access to Telnet and SSH applications is denied to all departments, except for the finance department.

[Table 213 on page 531](#) shows the firewall policy intents that are to fulfil this requirement:

**Table 213: Firewall Policy Intent Definition for Example - 5**

Source	Destination	Action
Finance department, site A and Finance department, site B	BBC and CNN	Permit
IT department, site A	BBC and CNN	Deny
Finance department, site A and Finance department, site B	Telnet and SSH	Permit

Table 213: Firewall Policy Intent Definition for Example - 5 (continued)

Source	Destination	Action
Any (All addresses except the finance department)	Telnet and SSH	Deny

**NOTE:** The number of intents depends on the number of source sites within the given department and the number of destination sites.

Table 214 on page 532 shows how this firewall policy intent is resolved:

Table 214: Firewall Policy Intent Resolution for Example - 5

Source Department	Source Address	Zone	Destination Address	Service	Application Firewall Profile
Finance	[LS2]	Trust/Untrust	Any	Any	AppFwProfile_1  Permit: CNN/BBC  Def. Rule : Permit
Finance	[LS3]	Trust/Untrust	Any	Any	AppFwProfile_1  Permit: CNN/BBC  Def. Rule : Permit
IT	[LS1]	Trust/Untrust	Any	Any	AppFwProfile_3  Deny: CNN/BBC  Def. Rule : Deny
Finance department, site A and Finance department, site B	[LS2, LS3]	Trust/Untrust	Any	Telnet, SSH	AppFwProfile_1-1  Permit: Telnet/SSH  Def. Rule : Deny

Table 214: Firewall Policy Intent Resolution for Example - 5 (continued)

Source Department	Source Address	Zone	Destination Address	Service	Application Firewall Profile
IT department, site A	[LS1]	Trust/Untrust	Any	Telnet, SSH	AppFwProfile_3-1  Deny: Telnet/SSH  Def. Rule : Deny

### Configuration Output Example

Sample of configuration that controls access to specific applications for various departments in site A.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Finance to-zone trust {
  policy Intent_3 {
    match {
      source-address ls-192.168.1.0/24-SP50-L2;
      destination-address any;
      application [junos-telnet junos-ssh];
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_1-1;
          }
        }
      }
    }
  }
}
policy Intent_1 {
  match {
    source-address ls-192.168.1.0/24-SP50-L2;
    destination-address any;
    application any;
  }
  then {
    permit {

```

```

        application-services {
            application-firewall {
                rule-set AppFwProfile_1;
            }
        }
    }
}
policy Intent_4__0 {
    match {
        source-address any;
        destination-address any;
        application [junos-telnet junos-ssh];
    }
    then {
        permit;
    }
}
from-zone IT to-zone trust {
    policy Intent_4__1-1 {
        match {
            source-address ls-192.0.2.0/24-S42-L1;
            destination-address any;
            application [junos-telnet junos-ssh];
        }
        then {
            permit {
                application-services {
                    application-firewall {
                        rule-set AppFwProfile_3-1;
                    }
                }
            }
        }
    }
}
policy Intent_2 {
    match {
        source-address ls-192.0.2.0/24-S42-L1;
        destination-address any;
        application any;
    }
}

```



```

        match {
            dynamic-application [junos:BBC junos:CNN];
            ssl-encryption any;
        }
        then {
            deny;
        }
    }
    default-rule {
        deny;
    }
}

rule-sets AppFwProfile_1 {
    rule rule-3 {
        match {
            dynamic-application [junos:BBC junos:CNN];
            ssl-encryption any;
        }
        then {
            permit;
        }
    }
    default-rule {
        deny;
    }
}

rule-sets AppFwProfile_3-1 {
    rule rule-4 {
        match {
            dynamic-application [junos:BBC junos:CNN];
            ssl-encryption any;
        }
        then {
            deny;
        }
    }
    default-rule {
        deny;
    }
}

```



Sample of configuration that controls access to specific applications for various departments in site B.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Finance to-zone trust {
  policy appQoe-36600-Permit-rule {
    match {
      source-address any;
      destination-address any;
      application appQoe-36000;
    }
    then {
      permit;
    }
  }
  policy Intent_3 {
    match {
      source-address ls-198.51.100.0/24-SP50-L3;
      destination-address any;
      application [ junos-telnet junos-ssh ];
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_1-1;
          }
        }
      }
    }
  }
  policy Intent_1 {
    match {
      source-address ls-198.51.100.0/24-SP50-L3;
      destination-address any;
      application any;
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_1;
          }
        }
      }
    }
  }
}

```

```

        }
    }
}
policy Intent_4__1 {
    match {
        source-address any;
        destination-address any;
        application [junos-telnet junos-ssh];
    }
    then {
        deny;
    }
}
}
from-zone Sales to-zone trust {
    policy Intent_4__0 {
        match {
            source-address any;
            destination-address any;
            application [junos-telnet junos-ssh];
        }
        then {
            deny;
        }
    }
}
}
policy-rematch;

```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```

rule-sets AppFwProfile_1-1 {
    rule rule-ca2354d6-a7ba-488e-8c5a-91cbddfb9583-appFwRule {
        match {
            dynamic-application [junos:BBC junos:CNN];
            ssl-encryption any;
        }
        then {
            permit;
        }
    }
    default-rule {
        deny;
    }
}

```

```
    }
rule-sets AppFwProfile_1 {
  rule rule-ca2354d6-a7ba-488e-8c5a-91cbddfb9583-appFwRule {
    match {
      dynamic-application [junos:BBC junos:CNN];
      ssl-encryption any;
    }
    then {
      permit;
    }
  }
  default-rule {
    deny;
  }
}
```

**Example 6: Firewall Policy that Denies Access to Social Networking Sites**

Define a firewall policy that denies access to networking sites such as Facebook and Twitter (defined as application group Social Networking) to the IT and finance departments located in Site A.

Table 215 on page 539 shows the firewall policy intent that is needed to fulfil this requirement:

**Table 215: Firewall Policy Intent Definition for Example - 6**

Source	Destination	Action
IT and Finance, site A	Application group Social Networking (Facebook and Twitter)	Deny

**NOTE:** Add site A if the IT or finance departments are present in different sites, but you only want to apply this firewall policy intent to the IT or finance departments present in site A.

Table 216 on page 540 shows how this firewall policy intent is resolved:

Table 216: Firewall Policy Intent Resolution for Example - 6

Source Department	Source Address	Zone	Destination Address	Service	Application Firewall Profile
Finance	[LS2]	Trust/Untrust	Any	Any	AppFwProfile_0  Deny: Social Networking (Apps)  Def. Rule : Deny
IT	[LS1]	Trust/Untrust	Any	Any	AppFwProfile_1  Deny: Social Networking (Apps)  Def. Rule : Deny

### Configuration Output Example

Sample of configuration that denies access to social networking sites for departments in site A.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone IT to-zone untrust {
  policy Intent_1__0 {
    match {
      source-address ls-192.0.2.0/24-S42-L1;
      destination-address any;
      application any;
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_0;
          }
        }
      }
    }
  }
}

```

```

    }
  }
  from-zone Finance to-zone untrust {
    policy Intent_1__1 {
      match {
        source-address ls-192.168.1.0/24-SP50-L2;
        destination-address any;
        application any;
      }
      then {
        permit {
          application-services {
            application-firewall {
              rule-set AppFwProfile_0;
            }
          }
        }
      }
    }
  }
}

```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```

application-firewall {
  rule-sets AppFwProfile_0 {
    rule rule-b7e4ed02-e196-400a-88bf-f1de8973d30c-appFwRule {
      match {
        dynamic-application-group Socialnetwork;
        ssl-encryption any;
      }
      then {
        deny;
      }
    }
    default-rule {
      deny;
    }
  }
}

```

}

### Example 7: Firewall Policy that Controls Access to an Address over the Internet (HTTP)

Define a firewall policy that controls access to an address over the Internet (HTTP) for various sites or site groups with the following intents:

- IP address prefix of site A and site B are permitted to access example.com.
- IP address prefix of site group Q1 are denied access to example-one.com. Site group Q1 consists of site A and site B.

Table 217 on page 542 shows the firewall policy intents that are needed to fulfil this requirement:

Table 217: Firewall Policy Intent Definition for Example - 7

Source	Service	Destination	Action
IP address prefix, site A and IP-Prefix, site B	HTTP	www.example.com	Permit
IP address prefix, site group Q1	HTTP	www.example-one.com	Deny

Table 218 on page 542 shows how this firewall policy intent is resolved:

Table 218: Firewall Policy Intent Resolution for Example - 7

Source Department	Source Address	Zone	Destination Address	Service	Application Firewall Profile
IT, Finance departments in site A	[LS1, LS2]	Trust/Untrust	www.example.com	Any	AppFwProfile_0  Permit: HTTP  Def. Rule : Deny
Finance, Sales departments in site B	[LS3, LS4]	Trust/Untrust	www.example.com	Any	AppFwProfile_1  Permit: HTTP  Def. Rule : Deny

Table 218: Firewall Policy Intent Resolution for Example - 7 (continued)

Source Department	Source Address	Zone	Destination Address	Service	Application Firewall Profile
IT, Finance departments in site A	[LS1, LS2]	Trust/Untrust	www.example-one.com	Any	AppFwProfile_2  Deny: HTTP  Def. Rule : Deny
Finance, Sales departments in site B	[LS3, LS4]	Trust/Untrust	www.example-one.com	Any	AppFwProfile_3  Deny: HTTP  Def. Rule : Deny

### Configuration Output Example

Sample of configuration that controls access to an address over the Internet (HTTP) for site A.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Finance to-zone untrust {
  policy Intent_4__0 {
    match {
      source-address ls-192.168.1.0/24-SP50-L2;
      destination-address www.example.com;
      application junos-http;
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_0;
          }
        }
      }
    }
  }
}
policy Intent_1__0 {
  match {
    source-address ls-192.168.1.0/24-SP50-L2;

```

```

        destination-address addr2;
        application junos-http;
    }
    then {
        permit {
            application-services {
                application-firewall {
                    rule-set AppFwProfile_1;
                }
            }
        }
    }
}

from-zone IT to-zone untrust {
    policy Intent_4__1 {
        match {
            source-address ls-192.0.2.0/24-S42-L1;
            destination-address addr2;
            application junos-http;
        }
        then {
            permit {
                application-services {
                    application-firewall {
                        rule-set AppFwProfile_0;
                    }
                }
            }
        }
    }
}

policy Intent_1__1 {
    match {
        source-address ls-192.0.2.0/24-S42-L1;
        destination-address addr2;
        application junos-http;
    }
    then {
        permit {
            application-services {
                application-firewall {
                    rule-set AppFwProfile_1;
                }
            }
        }
    }
}

```



```

    }
  }
}
}
}
}
policy-rematch;

```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```

rule-sets AppFwProfile_1 {
  rule rule-ca2354d6-a7ba-488e-8c5a-91cbddfb9583-appFwRule {
    match {
      dynamic-application junos:YOUTUBE;
      ssl-encryption any;
    }
    then {
      deny;
    }
  }
  default-rule {
    deny;
  }
}
rule-sets AppFwProfile_0 {
  rule rule-00f3879c-f3d7-4cb3-89b6-78328e3bffa3-appFwRule {
    match {
      dynamic-application junos:CNN;
      ssl-encryption any;
    }
    then {
      permit;
    }
  }
}
rule rule-ca2354d6-a7ba-488e-8c5a-91cbddfb9583-appFwRule {
  match {
    dynamic-application junos:YOUTUBE;
    ssl-encryption any;
  }
  then {

```

```

        deny;
    }
}
default-rule {
    deny;
}
}

```

Sample of configuration that controls access to an address over the Internet (HTTP) for site B.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Finance to-zone untrust {
    policy Intent_4__1 {
        match {
            source-address ls-198.51.100.0/24-SP50-L3;
            destination-address addr2;
            application junos-http;
        }
        then {
            permit {
                application-services {
                    application-firewall {
                        rule-set AppFwProfile_0;
                    }
                }
            }
        }
    }
}
policy Intent_1__1 {
    match {
        source-address ls-198.51.100.0/24-SP50-L3;
        destination-address addr2;
        application junos-http;
    }
    then {
        permit {
            application-services {
                application-firewall {
                    rule-set AppFwProfile_1;
                }
            }
        }
    }
}

```

```

    }
  }
}
from-zone Sales to-zone untrust {
  policy Intent_4__0 {
    match {
      source-address ls-203.0.113.0/24-SP50-L4;
      destination-address addr2;
      application junos-http;
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_0;
          }
        }
      }
    }
  }
  policy Intent_1__0 {
    match {
      source-address ls-203.0.113.0/24-SP50-L4;
      destination-address addr2;
      application junos-http;
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_1;
          }
        }
      }
    }
  }
}
policy-rematch;

```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```

rule-sets AppFwProfile_1 {
  rule rule-ca2354d6-a7ba-488e-8c5a-91cbddfb9583-appFwRule {

```

```

        match {
            dynamic-application junos:YOUTUBE;
            ssl-encryption any;
        }
        then {
            deny;
        }
    }
    default-rule {
        deny;
    }
}

rule-sets AppFwProfile_0 {
    rule rule-00f3879c-f3d7-4cb3-89b6-78328e3bffa3-appFwRule {
        match {
            dynamic-application junos:CNN;
            ssl-encryption any;
        }
        then {
            permit;
        }
    }
    rule rule-ca2354d6-a7ba-488e-8c5a-91cbddfb9583-appFwRule {
        match {
            dynamic-application junos:YOUTUBE;
            ssl-encryption any;
        }
        then {
            deny;
        }
    }
    default-rule {
        deny;
    }
}

```

### Example 8: Firewall Policy that Permits or Denies the Use of HTTP or FTP as a Service

Define a firewall policy where a specific IP address that belongs to the IT department is permitted or denied the use of HTTP or FTP as a service.

[Table 219 on page 549](#) shows the firewall policy intents that are needed to fulfil this requirement:

Table 219: Firewall Policy Intent Definition for Example - 8

Source	Service	Destination	Action
192.0.2.0	HTTP	example.com	Permit
192.0.2.0	FTP	example.com	Deny

Table 220 on page 549 shows how this firewall policy intent is resolved:

Table 220: Firewall Policy Intent Resolution for Example - 8

Source Department	Source Address	Zone	Destination Address	Service
IT, site A	192.0.2.0	Trust/Untrust	example.com	FTP
IT, site A	192.0.2.0	Trust/Untrust	example.com	HTTP

### Configuration Output Example

Sample of configuration that allows access to HTTP

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone IT to-zone trust {
  policy Intent_1__1 {
    match {
      source-address 192.0.2.0;
      destination-address example.com;
      application junos-ftp;
    }
    then {
      deny;
    }
  }
}
policy Intent_4__1 {
  match {
    source-address 192.0.2.0;
    destination-address example.com;
    application junos-http;
  }
}

```

```

        then {
            permit;
        }
    }
}
policy-rematch;

```

### Example 9: Firewall Policy that Denies Access to BitTorrent to the Finance Departments across both Site A and Site B

Define a firewall policy that denies access to BitTorrent for the Finance departments in site A and Site B.

[Table 221 on page 550](#) shows the firewall policy intents that are needed to fulfil this requirement:

**Table 221: Firewall Policy Intent Definition for Example - 9**

Source	Destination	Action
site A, Finance department	BitTorrent	Deny
site B, Finance department	BitTorrent	Deny

[Table 222 on page 550](#) shows how this firewall policy intent is resolved:

**Table 222: Firewall Policy Intent Resolution for Example - 9**

Site	Source Address	Zone	Destination Application	Service	Application Firewall Profile
Finance department, site A	[LS2]	Trust/Untrust	BitTorrent	Any	AppFwProfile_0 Deny: BitTorrent Def. Rule : Deny
Finance department, site B	[LS3]	Trust/Untrust	BitTorrent	Any	AppFwProfile_0 Deny: BitTorrent Def. Rule : Deny

### Configuration Output Example

Sample of configuration that allows site A access to BitTorrent.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Finance to-zone untrust {
  policy appQoe-36600-Permit-rule {
    match {
      source-address any;
      destination-address any;
      application appQoe-36000;
    }
    then {
      permit;
    }
  }
  policy Intent_1 {
    match {
      source-address ls-192.168.1.0/24-SP50-L2;
      destination-address any;
      application any;
    }
    then {
      permit {
        application-services {
          application-firewall {
            rule-set AppFwProfile_0;
          }
        }
      }
      log {
        session-init;
        session-close;
      }
    }
  }
}
policy-rematch;

```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```
rule-sets AppFwProfile_0 {
  rule rule-2226740d-03a9-483c-b315-eddc9ae8619a-appFwRule {
    match {
      dynamic-application junos:BITTORRENT;
      ssl-encryption any;
    }
    then {
      deny;
    }
  }
  default-rule {
    deny;
  }
}
```

Sample of configuration that allows site B to access to BitTorrent.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```
from-zone Financel to-zone untrust {
  policy appQoe-36600-Permit-rule {
    match {
      source-address any;
      destination-address any;
      application appQoe-36000;
    }
    then {
      permit;
    }
  }
  policy Intent_4 {
    match {
      source-address ls-198.51.100.0/24-SP50-L3;
      destination-address any;
      application any;
    }
    then {
      permit {
        application-services {
          application-firewall {
```



```

        rule-set AppFwProfile_0;
    }
}
}
log {
    session-init;
    session-close;
}
}
}
}
policy-rematch;

```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```

rule-sets AppFwProfile_0 {
    rule rule-00f3879c-f3d7-4cb3-89b6-78328e3bff38-appFwRule {
        match {
            dynamic-application junos:BITTORRENT;
            ssl-encryption any;
        }
        then {
            deny;
        }
    }
    default-rule {
        deny;
    }
}

```

### Example 10: Firewall Policy that Allows Access to Facebook for Users in User Group A

Define a firewall policy where the users that are a part of user group A are provided access only to Facebook, and no other applications. User group A consists of users located in site A.

[Table 223 on page 553](#) shows the firewall policy intent that is needed to fulfil this requirement:

**Table 223: Firewall Policy Intent Definition for Example - 10**

Source	Destination	Action
user group A, site A	Facebook	Permit

Table 224 on page 554 shows how this firewall policy intent is resolved:

**Table 224: Firewall Policy Intent Resolution for Example - 10**

Site	User/User Group	Source Address Range	Destination Address	Application
site A	user group A	192.0.2.0 to 192.0.2.20	Any	Facebook

### Configuration Output Example

Sample of configuration that allows users in user group A access to Facebook.

The hierarchy level for the following configuration sample is [\[edit security policies\]](#).

```

from-zone Finance to-zone untrust {
  policy appQoe-36600-Permit-rule {
    match {
      source-address any;
      destination-address any;
      application appQoe-36000;
    }
    then {
      permit;
    }
  }
}
policy Intent_4__0 {
  match {
    source-address ls-192.168.1.0/24-SP50-L2;
    destination-address any;
    application any;
    source-identity "USERFW.LOCAL\Cert Publishers";
  }
  then {
    permit {
      application-services {
        application-firewall {
          rule-set AppFwProfile_0;
        }
      }
    }
  }
}

```

```

        log {
            session-init;
            session-close;
        }
    }
}

from-zone IT to-zone untrust {
    policy appQoe-36600-Permit-rule {
        match {
            source-address any;
            destination-address any;
            application appQoe-36000;
        }
        then {
            permit;
        }
    }
    policy Intent_4__1 {
        match {
            source-address ls-192.0.2.0/24-S42-L1;
            destination-address any;
            application any;
            source-identity "USERFW.LOCAL\Cert Publishers";
        }
        then {
            permit {
                application-services {
                    application-firewall {
                        rule-set AppFwProfile_0;
                    }
                }
            }
            log {
                session-init;
                session-close;
            }
        }
    }
}

policy-rematch;

```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```
rule-sets AppFwProfile_0 {
  rule rule-00f3879c-f3d7-4cb3-89b6-78328e3bff38-appFwRule {
    match {
      dynamic-application junos:FACEBOOK-APP;
      ssl-encryption any;
    }
    then {
      permit;
    }
  }
  default-rule {
    deny;
  }
}
```

The hierarchy level for the following configuration sample is **[edit services user-identification identity-management]**.

```
connection {
  connect-method https;
  port 443;
  primary {
    address 10.213.50.50;
    client-id 1234;
    client-secret "$ABC123"; ## SECRET-DATA
  }
  token-api oauth_token/oauth;
  query-api user_query/v2;
}
batch-query {
  items-per-batch 200;
  query-interval 5;
}
ip-query {
  query-delay-time 15;
}
```

### Example 11: Firewall Policy that Permits User B in Site A Access to YouTube with UTM Enabled

Define a firewall policy where the User B located in Site A is provided access only to YouTube with UTM enabled. The user does not have permission to access any other applications.

Table 225 on page 557 shows the firewall policy intent that is needed to fulfil this requirement:

Table 225: Firewall Policy Intent Definition for Example - 11

Source	Destination	Action
user B, site A	YouTube	Permit

Table 226 on page 557 shows how this firewall policy intent is resolved:

Table 226: Firewall Policy Intent Resolution for Example - 11

Site	Source Address	User/User Group	Destination Address	UTM	Application
site A	192.0.2.22	user B	Any	Enabled	Facebook

### Configuration Output Example

Sample of configuration that allows user B in site A access to YouTube, with UTM enabled.

The hierarchy level for the following configuration sample is **[edit security policies]**.

```

from-zone Finance to-zone untrust {
  policy Intent_4__0 {
    match {
      source-address ls-192.168.1.0/24-SP50-L2;
      destination-address any;
      application any;
      source-identity "userfw.local\CS01";
    }
    then {
      permit {
        application-services {
          utm-policy testUTM;
          application-firewall {
            rule-set AppFwProfile_0;
          }
        }
      }
    }
  }
}

```

```

    }
  }
  log {
    session-init;
    session-close;
  }
}
}
}
from-zone IT to-zone untrust {
  policy Intent_4__1 {
    match {
      source-address ls-192.0.2.0/24-S42-L1;
      destination-address any;
      application any;
      source-identity "userfw.local\CS01";
    }
    then {
      permit {
        application-services {
          utm-policy testUTM;
          application-firewall {
            rule-set AppFwProfile_0;
          }
        }
      }
      log {
        session-init;
        session-close;
      }
    }
  }
}
policy-rematch;

```

The hierarchy level for the following configuration sample is **[edit security utm]**.

```

feature-profile {
  web-filtering {
    type juniper-local;
  }
}

```

```

    }
  }
  utm-policy testUTM {
    web-filtering {
      http-profile junos-wf-local-default;
    }
    anti-spam {
      smtp-profile junos-as-defaults;
    }
  }
  traffic-options {
    sessions-per-client {
      over-limit log-and-permit;
    }
  }
}

```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```

rule-sets AppFwProfile_0 {
  rule rule-00f3879c-f3d7-4cb3-89b6-78328e3bff38-appFwRule {
    match {
      dynamic-application junos:FACEBOOK-APP;
      ssl-encryption any;
    }
    then {
      permit;
    }
  }
  default-rule {
    deny;
  }
}

```

The hierarchy level for the following configuration sample is **[edit services user-identification identity-management]**.

```

connection {
  connect-method https;
  port 443;
  primary {
    address 10.213.50.50;
  }
}

```

```

    client-id 1234;
    client-secret "$ABC123"; ## SECRET-DATA
  }
  token-api oauth_token/oauth;
  query-api user_query/v2;
}
batch-query {
  items-per-batch 200;
  query-interval 5;
}
ip-query {
  query-delay-time 15;
}

```

## RELATED DOCUMENTATION

[Firewall Policy Overview | 503](#)

[Creating Firewall Policy Intents | 505](#)

## Firewall Policy Schedules Overview

A schedule allows a policy to be active for a specified duration. If you want a policy to be active during a scheduled time, you must first create a schedule for that policy or link the policy to an existing schedule. When a schedule timeout expires, the associated policy is deactivated and all sessions associated with the policy are also timed out.

If a policy contains a reference to a schedule, that schedule determines when the policy is active. When a policy is active, it can be used as a possible match for traffic. A schedule lets you restrict access to, or remove a restriction from a resource, for a period of time.

A schedule uses the following guidelines:

- A schedule can have multiple policies associated with it; however, a policy cannot be associated with multiple schedules.
- A policy remains active as long as the schedule it refers to is also active.

A schedule can be active during a single time slot, as specified by a start date and time, and a stop date and time.

- A schedule can be active forever (recurrent), but only as specified by the daily schedule. The schedule on a specific day (time slot) takes priority over the daily schedule.



- A scheduler can be active during a time slot, as specified by the weekday schedule.
- A scheduler be active within two different time slots (daily or for a specified duration).

## RELATED DOCUMENTATION

<a href="#">About the Firewall Policy Schedules Page   561</a>
<a href="#">Firewall Policy Examples   521</a>
<a href="#">Creating Schedules   562</a>
<a href="#">Editing, Cloning, and Deleting Schedules   564</a>

## About the Firewall Policy Schedules Page

To access this page, select **Configuration > Firewall > Schedules**.

The **Firewall Policy Schedules** page enables you to create, modify, clone, and delete schedules. A schedule allows you to restrict access to a resource, or remove a restriction to a resource, for a specified period of time.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a firewall policy schedule. See [“Creating Schedules” on page 562](#).
- Modify, clone, or delete a firewall policy schedule. See [“Editing, Cloning, and Deleting Schedules” on page 564](#).
- View the configured parameters of a schedule. Click the details icon that appears when you hover over the name of an image or click **More > Detailed View**. See [“Viewing Object Details” on page 385](#).
- Show or hide columns about the firewall policy schedule. See [“Sorting Objects” on page 384](#).
- Search for a specific firewall policy schedule. See [“Searching for Text in an Object Data Table” on page 385](#).

### Field Descriptions

[Table 227 on page 562](#) provides guidelines on using the fields on the **Firewall Policy Schedules** page.

Table 227: Fields on the Firewall Policy Schedules Page

Field	Description
Name	Name of the schedule; maximum length is 63 characters.
Description	Description for the schedule; maximum length is 900 characters.
Start Date	The date and time from when the schedule comes into effect.
End Date	The date and time from when the schedule ends.
Second Start Date	The second date and time from when the schedule comes into effect.
Second End Date	The second date and time from when the schedule ends.

#### RELATED DOCUMENTATION

[Firewall Policy Schedules Overview | 560](#)

[Firewall Policy Examples | 521](#)

[Creating Schedules | 562](#)

[Editing, Cloning, and Deleting Schedules | 564](#)

## Creating Schedules

Use the **Create Schedules** page to create schedules. A schedule allows you to restrict access to a resource, or remove a restriction to a resource, for a specified period of time.

To configure a schedule:

1. Select **Configuration > Firewall > Schedules**.

The **Firewall Policy Schedules** page appears.

2. Click the add icon (+).

The **Create Schedules** page appears.

3. Complete the configuration of the schedule according to the guidelines provided in [Table 228 on page 563](#).

4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

A new schedule is created. You can use this schedule to activate firewall policies for the times and dates configured in your schedules.

[Table 228 on page 563](#) provides guidelines on using the fields to create a schedule.

**Table 228: Fields on the Create Schedules Page**

Field	Description
<b>General Information</b>	
Name	Required. Enter a unique name for the service. It must begin with an alphanumeric character and cannot exceed 63 characters. Dashes and underscores are allowed.
Description	Enter a description for your service. You should make this description as useful as possible for all administrators.
<b>Dates</b>	
Date Range	<p>Select <b>Ongoing</b> if you want your schedules to always be active.</p> <p>Select <b>Custom</b> to configure two sets of start and end dates for a single schedule. For the first set, enter dates in the <b>Start Date</b> and <b>End Date</b> fields. You must enter the days in MM/DD/YYYY format.</p> <p>For the second set of the schedule, enter the start date in the <b>Second Start Date</b> field and enter the end date in the <b>Second End Date</b> field.</p>
<b>Times</b>	
Time Ranges	Create a schedule to be active daily or for any specific times of the day.
Daily Options	<p>Select <b>Daily</b> to make the schedule applicable daily.</p> <p>Select <b>Custom</b> to enter specific days and times. Click on a specific day to specify time options for an entire day, to exclude a specific day, or to enter time ranges for the selected day. You must enter the time in HH:MM:SS format.</p> <p>For example, if you click on Monday, you get a dialog box that allows you to specify whether you want the schedule to be active all day Monday, exclude Monday from the schedule, or have the schedule be active at specific times.</p> <p>Select <b>Specify the same time for all days</b> to enter a date and time that is applicable for all days.</p>

## RELATED DOCUMENTATION

---

[Firewall Policy Schedules Overview | 560](#)

---

[About the Firewall Policy Schedules Page | 561](#)

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[Firewall Policy Examples | 521](#)

---

[Editing, Cloning, and Deleting Schedules | 564](#)

---

## Editing, Cloning, and Deleting Schedules

### IN THIS SECTION

- [Editing Schedules | 564](#)
- [Cloning Schedules | 565](#)
- [Deleting Schedules | 565](#)

You can edit, clone, and delete schedules from the **Firewall Policy Schedules** page.

### Editing Schedules

To modify the parameters configured for a schedule:

1. Select **Configuration > Firewall > Schedules**.

The **Firewall Policy Schedules** page appears.

2. Select the schedule that you want to edit, and then click on the edit icon (pencil symbol) on the right top corner of the table, or right-click and select **Edit Schedule**.

The **Edit Schedules** page appears, showing the same options as when creating a new schedule.

3. Modify the parameters according to the guidelines provided in [“Creating Schedules” on page 562](#).
4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, the modified schedule appears on the **Firewall Policy Schedules** page.

## Cloning Schedules

To clone a schedule:

1. Select **Configuration > Firewall Policy > Schedules**.

The **Firewall Policy Schedules** page appears.

2. Right-click on the schedule that you want to clone and then click **Clone**, or select **More > Clone**.

The **Clone Schedules** page appears with editable fields. You can modify the parameters according to the guidelines provided in [“Creating Schedules” on page 562](#).

3. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, the cloned schedule appears under the scheduled it is cloned from, in the **Firewall Policy Schedules**.

## Deleting Schedules

To delete a schedule:

1. Select **Configuration > Firewall Policy > Schedules**.

The **Firewall Policy Schedules** page appears.

2. Select the schedule you want to delete and then click the delete icon **(X)**.

An alert message appears, verifying that you want to delete the schedule.

3. Click **Yes** to delete the selection. If you do not want to delete, click **Cancel** instead.

If you click **Yes**, the selected schedule is deleted.

## RELATED DOCUMENTATION

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[Firewall Policy Schedules Overview | 560](#)

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[About the Firewall Policy Schedules Page | 561](#)

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[Creating Schedules | 562](#)

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[Firewall Policy Examples | 521](#)

# Unified Threat Management

## IN THIS CHAPTER

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## UTM Overview

### IN THIS SECTION

- [UTM Licensing | 568](#)
- [UTM Components | 568](#)

Unified threat management (UTM) is a term used to describe the consolidation of several security features to protect against multiple threat types. The advantage of UTM is a streamlined installation and management of multiple security capabilities.

The following security features are provided as part of the UTM solution:

- **Antispam**—This feature examines transmitted messages to identify e-mail spam. E-mail spam consists of unwanted messages usually sent by commercial, malicious, or fraudulent entities. When the device detects an e-mail message deemed to be spam, it either drops the message or tags the message header or subject field with a preprogrammed string. The antispam feature uses a constantly updated Spamhaus Block List (SBL). Sophos updates and maintains the IP-based SBL.
- **Full file-based antivirus**—A virus is an executable code that infects or attaches itself to other executable code to reproduce itself. Some malicious viruses erase files or lock up systems. Other viruses merely infect files and overwhelm the target host or network with bogus data. The full file-based antivirus feature provides file-based scanning on specific application layer traffic, checking for viruses against a virus signature database. The antivirus feature collects the received data packets until it has reconstructed the original application content, such as an e-mail file attachment, and then scans this content.
- **Express antivirus**—Express antivirus scanning is offered as a less CPU-intensive alternative to the full file-based antivirus feature. The express antivirus feature is similar to the antivirus feature in that it scans specific application layer traffic for viruses against a virus signature database. However, unlike full antivirus, express antivirus does not reconstruct the original application content. Rather, it just sends (streams) the received data packets, as is, to the scan engine. With express antivirus, the virus scanning is executed by a hardware pattern-matching engine. This improves performance while scanning is occurring, but the level of security provided is lessened. Juniper Networks provides the scan engine.
- **Content filtering**—Content filtering blocks or permits certain types of traffic based on the MIME type, file extension, protocol command, and embedded object type.
- **Web filtering**—Web filtering enables you to manage Internet usage by preventing access to inappropriate Web content. The following types of Web filtering solutions are available:

- Integrated Web filtering—Blocks or permits Web access after the device identifies the category for a URL either from user-defined categories or from a category server (Websense provides the SurfControl Content Portal Authority (CPA) server).
- Redirect Web filtering—Intercepts HTTP requests and forwards the server URL to an external URL filtering server to determine whether to block or permit the requested Web access. Websense provides the URL filtering server.

## UTM Licensing

All UTM components require licenses with the exception of content filtering, which uses the parameters defined in the content filtering profile. This is because Juniper Networks leverages third-party technology that is constantly updated to provide the most up-to-date inspection capabilities.

## UTM Components

UTM components include custom objects, feature profiles, and UTM profiles that can be configured on SRX Series devices. From a high level, feature profiles specify how a feature is configured and then applied to UTM profiles, which in turn is applied to firewall policies, as shown in [Figure 13 on page 568](#).

Figure 13: UTM Components



UTM profiles do not have their own seven-tuple rulebase; in a sense they inherit the rules from the firewall rule. The strength of the UTM feature comes from URL filtering, where you can have a separate configuration for different users or user groups.

- Custom objects—Although SRX Series devices support predefined feature profiles that can handle most typical use cases, there are some cases where you might need to define your own objects, specifically for URL filtering, antivirus filtering, and content filtering.
- Feature profiles—Feature profiles specify how components of each profile should function. You can configure multiple feature profiles that can be applied through different UTM profiles to firewall rules.
- UTM profiles—UTM profiles function as a logical container for individual feature profiles. UTM profiles are then applied to specific traffic flows based on the classification of rules in the firewall policy, thereby enabling you to define separate UTM profiles per firewall rule to differentiate the enforcement per



firewall rule. Essentially, the firewall rulebase acts as the match criteria, and the UTM profile is the action to be applied.

- Firewall policy—You can predefine feature profiles for the UTM profile that are then applied to the firewall rules. This gives you the advantage of using the predefined UTM profile for that one UTM technology (for example, antivirus or URL filtering), not both.

RELATED DOCUMENTATION

<a href="#">Configuring UTM Settings   569</a>
<a href="#">About the UTM Profiles Page   571</a>
<a href="#">Creating UTM Profiles   573</a>

## Configuring UTM Settings

Use the Edit UTM Settings page to configure unified threat management (UTM) antispam, antivirus, and Web filtering settings for a tenant.

These settings are applicable to all the sites belonging to a tenant. The settings are pushed to all those sites where a firewall policy intent with UTM enabled is applicable.

To configure UTM settings:

1. Select **Configuration > Unified Threat Mgmt > UTM Settings** in Customer Portal.  
The Edit UTM Settings page appears.
2. Complete the configuration according to the guidelines provided in [Table 229 on page 569](#).
3. Do one of the following:
  - Click **Reset** to reset the settings to the previously saved configured.
  - Click **OK** to save the settings.

The settings are saved and a confirmation message is displayed.

Table 229: UTM Settings

Setting	Guideline
<b>Antispam Settings</b>	

Table 229: UTM Settings (*continued*)

Setting	Guideline
<b>Address Whitelist</b>	<p>Select the URL pattern to be used as the antispam allowlist.</p> <p>Alternatively, click <b>Create a New Pattern</b> to create a new URL pattern to use as an allowlist.</p> <p>The Create URL Patterns page appears. For more information, see <a href="#">“Creating URL Patterns” on page 607</a> for an explanation of the fields on this page.</p>
<b>Address Blacklist</b>	<p>Select the URL pattern to be used as the antispam blocklist.</p> <p>Alternatively, click <b>Create a New Pattern</b> to create a new URL pattern to use as a blocklist.</p>
<b>Antivirus Settings</b>	
<b>MIME Whitelist</b>	Enter one or more MIME types (separated by commas) to exclude from antivirus scanning.
<b>Exception MIME Whitelist</b>	Enter one or more MIME types (separated by commas) that are to be excluded from the list of MIME types specified as part of the MIME allowlist. This list is a subset of the MIME types that you specified in the MIME allowlist. For example, if you specify <b>video/</b> in the allowlist and <b>video/x-shockwave-flash</b> in the exception allowlist, all objects of MIME type <b>video/</b> except MIME type <b>video/x-shockwave-flash</b> are excluded from antivirus scanning.
<b>URL Whitelist</b>	Select the list of URLs the antivirus settings can allow.
<b>Web Filtering Settings</b>	
<b>URL Whitelist</b>	Select the list of URLs the Web filtering settings can allow; these URLs are excluded from Web filtering.
<b>URL Blacklist</b>	Select the list of URLs the Web filtering settings can block; these URLs are blocked from Web access.

## RELATED DOCUMENTATION

| [About the UTM Profiles Page](#) | 571

## About the UTM Profiles Page

To access this page, select **Configuration > Unified Threat Mgmt > UTM Profiles** in Customer Portal.

Use this page to view and manage unified threat management (UTM) profiles. UTM profiles enable you to consolidate several security features into one system to protect against multiple threat types.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a UTM profile—See [“Creating UTM Profiles” on page 573](#).
- Edit, clone, or delete a UTM profile—See [“Editing, Cloning, and Deleting UTM Profiles” on page 576](#).
- Clear the selected UTM profiles—Click **Clear All Selections** to clear any UTM profiles that you might have selected.
- View the details of a UTM profile—Select the UTM profile for which you want to view the details and from the More or right-click menu, select **Detailed View**. The UTM Profile Details page appears. [Table 231 on page 572](#) describes the fields on this page.
- Search for UTM profiles using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.

### Field Descriptions

[Table 230 on page 571](#) describes the fields on the UTM Profiles page.

Table 230: UTM Profiles Page Fields

Field	Description
<b>Name</b>	Name of the UTM profile.
<b>Antispam</b>	Information about the antispam profile associated with the UTM profile.
<b>Antivirus</b>	Information about the antivirus profiles associated with the UTM profile.
<b>Content Filtering</b>	Information about the content filtering profiles associated with the UTM profile.
<b>Web Filtering</b>	Information about the Web filtering profile associated with the UTM profile.
<b>Description</b>	Description of the UTM profile.

Table 231: UTM Profile Details Page Fields

Field	Description
<b>General Information</b>	
<b>Name</b>	Name of the UTM profile.
<b>Description</b>	Description of the UTM profile.
<b>Traffic Options-</b>	
<b>Action When Connection Limit Is Reached</b>	Action to be taken when the configured connection limit per client is reached.
<b>Web Filtering Profile</b>	
<b>HTTP</b>	Web filtering profile to be used for HTTP traffic.
<b>Antivirus Profile</b>	
<b>HTTP</b>	Antivirus profile to be used for HTTP traffic.
<b>FTP Upload</b>	Antivirus profile to be used for FTP upload traffic.
<b>FTP Download</b>	Antivirus profile to be used for FTP download traffic.
<b>IMAP</b>	Antivirus profile to be used for IMAP traffic.
<b>SMTP</b>	Antivirus profile to be used for SMTP traffic.
<b>POP3</b>	Antivirus profile to be used for POP3 traffic.
<b>Antispam Profile</b>	
<b>SMTP</b>	Antispam profile to be used for SMTP traffic.

## RELATED DOCUMENTATION

[Creating UTM Profiles](#) | 573

# Creating UTM Profiles

Use the Create UTM Profiles page to configure UTM profiles. Unified threat management (UTM) consolidates several security features to protect against multiple threat types. The Create UTM Profiles wizard provides step-by-step procedures to create a UTM profile. You can configure antispam, antivirus, Web filtering, and content filtering profiles by launching the respective wizards from the wizard.

To create a UTM profile:

1. Select **Configuration > Unified Threat Mgmt > UTM Profiles** in Customer Portal.

The UTM Profiles page appears.

2. Click the add icon (+) to create a new UTM profile.

The Create UTM Profiles wizard appears, displaying brief instructions about creating a UTM profile.

3. Click **Next** to navigate to the next page.

4. Complete the configuration according to the guidelines provided in [Table 232 on page 573](#).

**NOTE:** Fields marked with \* are mandatory.

5. Click **Finish**.

A UTM profile is created. You are returned to the UTM Profiles page where a confirmation message is displayed. After you create a UTM profile, you can assign it to a firewall policy intent on the Firewall Policy page.

Table 232: UTM Profile Settings

Setting	Guideline
<b>General</b>	
<b>Name</b>	Enter a unique name for the UTM profile. The maximum length is 29 characters.
<b>Description</b>	Enter a description for the UTM profile. The maximum length is 255 characters.
<b>Traffic Options</b>	
<p><b>NOTE:</b> In an attempt to consume all available resources, a malicious user might generate a large amount of traffic all at once. To prevent such activity from succeeding, you can impose traffic options.</p>	

Table 232: UTM Profile Settings (*continued*)

Setting	Guideline
<b>Connection Limit per Client</b>	Specify the connection limit per client for client connections on the device. The default is 2000 and a value of 0 means that there is no connection limit.
<b>Action when connection limit is reached</b>	Specify the action that must be taken when the connection limit is reached. The available actions are No action (default), Log and permit, and Block.  Click <b>Next</b> to continue.
<b>Web Filtering</b>	
<b>HTTP</b>	Select the Web filtering profile to be applied for HTTP traffic.  Alternatively, click <b>Create Another Profile</b> to create a Web filtering profile. The Create Web Filtering Profiles wizard appears. See <a href="#">“Creating Web Filtering Profiles” on page 580</a> for an explanation of the fields on this wizard.  Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.
<b>Antivirus</b>	
<b>Apply to all protocols</b>	Select this check box to apply a single antivirus profile to all traffic protocols. and then specify the profile in the <b>Default Profile</b> field.  Clear the check box if you want to apply traffic-specific profiles.
<b>Default Profile</b>	Select the antivirus profile to be applied to all traffic protocols.  Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.
<b>NOTE:</b> Click <b>Create Another Profile</b> to create an antivirus profile that you can then assign. The Create Antivirus Profiles wizard appears. See <a href="#">“Creating Antivirus Profiles” on page 588</a> for an explanation of the fields on this wizard.	
<b>HTTP</b>	Select the antivirus profile to be applied to HTTP traffic.
<b>FTP Upload</b>	Select the antivirus profile to be applied to FTP upload traffic.
<b>FTP Download</b>	Select the antivirus profile to be applied to FTP download traffic.
<b>IMAP</b>	Select the antivirus profile to be applied to IMAP traffic.
<b>SMTP</b>	Select the antivirus profile to be applied to SMTP traffic.

Table 232: UTM Profile Settings (*continued*)

Setting	Guideline
<b>POP3</b>	<p>Select the antivirus profile to be applied to POP3 traffic.</p> <p>Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.</p>
<b>Antispam</b>	
<b>SMTP</b>	<p>Select the antispam profile to be applied for SMTP traffic.</p> <p>Alternatively, click <b>Create Another Profile</b> to create an antispam profile. The Create Antispam Profiles wizard appears. See <a href="#">“Creating Antispam Profiles” on page 594</a> for an explanation of the fields on this wizard.</p> <p>Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.</p>
<b>Content Filtering</b>	
<b>Apply to all protocols</b>	<p>Select this check box to apply a single content filtering profile to all traffic protocols, and then specify the profile in the <b>Default Profile</b> field.</p> <p>Clear the check box if you want to apply traffic-specific profiles.</p>
<b>Default Profile</b>	<p>Select the content filtering profile to be applied to all traffic protocols.</p> <p>Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.</p>
<p><b>NOTE:</b> Click <b>Create Another Profile</b> to create a content filtering profile that you can then assign. The Create Content Filtering Profiles wizard appears. See <a href="#">“Creating Content Filtering Profiles” on page 600</a> for an explanation of the fields on this wizard.</p>	
<b>HTTP</b>	Select the content filtering profile to be applied to HTTP traffic.
<b>FTP Upload</b>	Select the content filtering profile to be applied to FTP upload traffic.
<b>FTP Download</b>	Select the content filtering profile to be applied to FTP download traffic.
<b>IMAP</b>	Select the content filtering profile to be applied to IMAP traffic.
<b>SMTP</b>	Select the content filtering profile to be applied to SMTP traffic.
<b>POP3</b>	<p>Select the content filtering profile to be applied to POP3 traffic.</p> <p>Click <b>Back</b> to go the preceding step.</p>

## RELATED DOCUMENTATION

[About the UTM Profiles Page | 571](#)

[Configuring UTM Settings | 569](#)

## Editing, Cloning, and Deleting UTM Profiles

### IN THIS SECTION

- [Editing UTM Profiles | 576](#)
- [Cloning UTM Profiles | 577](#)
- [Deleting UTM Profiles | 577](#)

You can edit, clone, and delete UTM profiles from the UTM Profiles page. This topic has the following sections:

### Editing UTM Profiles

To modify the parameters configured for a UTM profile:

**NOTE:** You cannot modify the default profiles already present in the system.

1. Select **Configuration > Unified Threat Mgmt > UTM Profiles** in Customer Portal.

The UTM Profiles page appears, displaying the existing UTM profiles.

2. Select the UTM profile that you want to edit and click the edit icon (pencil). Alternatively, right-click a profile and select **Edit Profile**.

The Edit UTM Profiles page appears, displaying the same fields that are presented when you create a UTM profile.

3. Modify the UTM profile fields as needed.

4. Click **OK** to save your changes.



You are taken to the UTM Profiles page. A confirmation message appears indicating the status of the edit operation.

## Cloning UTM Profiles

Cloning enables you to easily create a new UTM profile based on an existing one.

To clone a UTM profile:

1. Select **Configuration > Unified Threat Mgmt > UTM Profiles** in Customer Portal.

The UTM Profiles page appears, displaying the existing UTM profiles.

2. Select the UTM profile that you want to clone and then select **More > Clone**. Alternatively, right-click a profile and select **Clone**.

The Clone UTM Profiles page appears, displaying the same fields that are presented when you create a UTM profile.

3. Modify the UTM profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the UTM Profiles page. A confirmation message appears, indicating the status of the clone operation.

## Deleting UTM Profiles

**NOTE:** Before deleting a UTM profile, ensure that the profile is not used in a firewall policy intent. If you try to delete a profile that is used in a firewall policy intent, an error message is displayed.

To delete one or more UTM profiles:

1. Select **Configuration > Unified Threat Mgmt > UTM Profiles** in Customer Portal.

The UTM Profiles page appears, displaying the existing UTM profiles.

2. Select one or more UTM profiles that you want to delete and click the delete icon (X). Alternatively, right-click a profile and select **Delete Profile**.

An alert message appears, asking you to confirm the delete operation.

- Click **Yes** to delete the selected UTM profiles.

A confirmation message appears, indicating the status of the delete operation.

## RELATED DOCUMENTATION

[Creating UTM Profiles | 573](#)

[About the UTM Profiles Page | 571](#)

## About the Web Filtering Profiles Page

To access this page, select **Configuration > Unified Threat Mgmt > Web Filtering Profiles** in Customer Portal.

Use the Web Filtering Profiles page to view and manage Web filtering profiles. Web filtering profiles enable you to manage Internet usage by preventing access to inappropriate Web content over HTTP. [Table 233 on page 578](#) lists the Web filtering solutions that are supported and the license requirements.

**Table 233: Web Filtering Solutions Supported**

Type	Description	License Requirement
Integrated Web Filtering	Blocks or permits Web access after the device identifies the category for a URL, either from user-defined categories or from a category server (SurfControl Content Portal Authority provided by Websense).	A separately licensed subscription service
Redirect Web Filtering	Intercepts HTTP requests and forwards the server URL to an external URL filtering server to determine whether to block or permit the requested Web access. Websense provides the URL filtering server.	Does not require a license.
Juniper Local Web Filtering	Intercepts every HTTP request in a TCP connection. In this case, the decision making is done on the device after it looks up a URL to determine whether it is in the allowlist or blocklist based on its user-defined category.	Does not require a license or a remote category server

## Tasks You Can Perform

You can perform the following tasks from this page:

- Create a Web filtering profile—See [“Creating Web Filtering Profiles” on page 580](#).
- Edit, clone, or delete a Web filtering profile—See [“Editing, Cloning, and Deleting Web Filtering Profiles” on page 584](#).
- Clear the selected Web filtering profiles—Click **Clear All Selections** to clear any Web filtering profiles that you might have selected.
- View the details of a Web filtering profile—Select the Web filtering profile for which you want to view the details and from the More or right-click menu, select **Detailed View**. The Web Filtering Profile Details page appears. [Table 235 on page 579](#) describes the fields on this page.
- Search for Web filtering profiles using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.

## Field Descriptions

[Table 234 on page 579](#) describes the fields on the Web Filtering Profiles page.

**Table 234: Web Filtering Profiles Page Fields**

Field	Description
<b>Name</b>	Name of the Web filtering profile.
<b>Profile Type</b>	Type of engine used for the profile: Juniper-enhanced or Websense redirect.
<b>Default Action</b>	Default action taken when the specified connection limit per client is reached.
<b>Timeout</b>	
<b>Description</b>	Description of the Web filtering profile.

**Table 235: Web Filtering Profile Details Page Fields**

Field	Description
<b>General Information</b>	
<b>Name</b>	Name of the Web filtering profile.
<b>Description</b>	Description of the Web filtering profile.
<b>Engine Type</b>	Type of engine used for the profile: Juniper-enhanced or Websense redirect.
<b>Default Action</b>	Default action taken when the specified connection limit per client is reached.

Table 235: Web Filtering Profile Details Page Fields (continued)

Field	Description
<b>Fallback Options</b>	
<b>Default Action</b>	Action taken for URL categories with no assigned action and for uncategorized URLs. This action is taken only if no reputation action is assigned.
<b>Global Reputation Actions</b>	<p>Actions taken for the following site reputations:</p> <ul style="list-style-type: none"> <li>• <b>Very Safe</b></li> <li>• <b>Moderately Safe</b></li> <li>• <b>Fairly Safe</b></li> <li>• <b>Suspicious</b></li> <li>• <b>Harmful</b></li> </ul>
<b>URL Categories</b>	URL categories associated with the Web filtering profile.

#### RELATED DOCUMENTATION

- [Creating Web Filtering Profiles | 580](#)
- [Editing, Cloning, and Deleting Web Filtering Profiles | 584](#)

## Creating Web Filtering Profiles

Web filtering profiles enable you to manage Internet usage by preventing access to inappropriate Web content over HTTP.

To create a Web filtering profile:

1. Select **Configuration > Unified Threat Mgmt > Web Filtering Profiles** in Customer Portal.  
The Web Filtering Profiles page appears.
2. Click the add icon (+) to create a new Web filtering profile.  
The Create Web Filtering Profiles wizard appears, displaying brief instructions about creating a Web filtering profile.
3. Click **Next** to navigate to the next page.

4. Complete the configuration according to the guidelines provided in [Table 236 on page 581](#).

**NOTE:** Fields marked with \* are mandatory.

5. Click **Finish**.

A Web filtering profile is created, which you can associate with a UTM profile. You are returned to the Web Filtering Profiles page where a confirmation message is displayed.

**Table 236: Creating Web Filtering Profiles Settings**

Setting	Guideline
<b>General Information</b>	
<b>Name</b>	Enter a unique name for the Web filtering profile. The maximum length is 29 characters.
<b>Description</b>	Enter a description for the Web filtering profile. The maximum length is 255 characters.
<b>Timeout</b>	Enter a timeout (in seconds) to wait for a response from the Websense server. The default is 15 seconds and the maximum is 1000 seconds.
<b>Engine Type</b>	Select an engine type for Web filtering: <ul style="list-style-type: none"> <li>• (Default) Juniper Enhanced—UTM-enhanced Web filtering.</li> <li>• Websense Redirect—Redirect Web filtering profile.</li> </ul>
<b>Safe Search</b>	Select the check box (default) to ensure that embedded objects, such as images on the URLs received from the search engines, are safe and that undesirable content is not returned to the client.  Clear the check box to disable safe search redirects.  <b>NOTE:</b> This option is available only for the Juniper Enhanced engine type. Safe search redirect supports only HTTP and you cannot extract the URL for HTTPS. Therefore, it is not possible to generate a redirect response for HTTPS search URLs.
<b>Custom Block Message/URL</b>	Specify the redirect URL or a custom message to be sent when HTTP requests are blocked. The maximum length is 512 characters.  <b>NOTE:</b> If a message begins with http: or https:, the message is considered a block message URL. Messages that begin with values other than http: or https: are considered custom block messages.  Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.

Table 236: Creating Web Filtering Profiles Settings (*continued*)

Setting	Guideline
<b>Custom Quarantine Message</b>	<p>Define a custom message to allow or deny access to a blocked site based on a user's response to the message. The maximum length is 512 characters.</p> <p>The quarantine message contains the following information:</p> <ul style="list-style-type: none"> <li>• URL name</li> <li>• Quarantine name</li> <li>• Category (if available)</li> <li>• Site reputation (if available)</li> </ul> <p>For example, if you set the action for Enhanced_Search_Engines_and_Portals to quarantine, and you try to access www.search.yahoo.com, the quarantine message is as follows: <b>***The requested webpage is blocked by your organization's access policy***</b>.</p> <p>Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.</p>
<b>Account</b>	Specify the user account associated with the Websense Web filtering profile.
<b>Server</b>	Specify the hostname or IP address for the Websense server.
<b>Port</b>	Enter the number of sockets used for communication between the client and the server. The default value is 8.
<b>Sockets</b>	<p>Specify the port number to use to communicate with the Websense server. The default port value is 15968.</p> <p>Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.</p>
<b>URL Categories</b>	
<b>Deny Action List</b>	<p>Click the <b>Add URL Categories</b> button to specify a list of URL categories that should be denied access.</p> <p>The Select URL Categories page appears. Complete the configuration according to the guidelines provided in <a href="#">Table 237 on page 584</a>,</p> <p>The list of URL categories selected is displayed in a text box.</p>
<b>Log &amp; Permit Action List</b>	<p>Specify a list of URL categories that are logged and then permitted.</p> <p>The Select URL Categories page appears. Complete the configuration according to the guidelines provided in <a href="#">Table 237 on page 584</a>.</p> <p>The list of URL categories selected is displayed in a text box.</p>

Table 236: Creating Web Filtering Profiles Settings (*continued*)

Setting	Guideline
<b>Permit Action List</b>	<p>Specify a list of URL categories that should be permitted access.</p> <p>The Select URL Categories page appears. Complete the configuration according to the guidelines provided in <a href="#">Table 237 on page 584</a></p> <p>The list of URL categories selected is displayed in a text box.</p>
<b>Quarantine Action List</b>	<p>Specify a list of URL categories that should be quarantined.</p> <p>The Select URL Categories page appears. Complete the configuration according to the guidelines provided in <a href="#">Table 237 on page 584</a>.</p> <p>The list of URL categories selected is displayed in a text box.</p> <p>Click <b>Back</b> to go the preceding step or click <b>Next</b> to go to the next step.</p>
<b>Fallback Options</b>	
<b>Global Reputation Actions</b>	<p>Select this check box (default) if you want to apply global reputation actions.</p> <p>Enhanced Web filtering intercepts HTTP and HTTPS requests and sends the HTTP URL or the HTTPS source IP to the Websense ThreatSeeker Cloud (TSC). The TSC categorizes the URL into one of the predefined categories and also provides site reputation information for the URL to the device. The device determines if it can permit or block the request based on the information provided by the TSC.</p> <p>The URLs can be processed using their reputation score if there is no category available. Select the action that you want to take for the uncategorized URLs based on their reputation score:</p> <ul style="list-style-type: none"> <li>● <b>Very Safe</b>—Permit, log and permit, block, or quarantine a request if a site reputation of 90 through 100 is returned. By default, Permit is selected.</li> <li>● <b>Moderately Safe</b>—Permit, log and permit, block, or quarantine a request if a site reputation of 80 through 89 is returned. By default, Log and Permit is selected.</li> <li>● <b>Fairly Safe</b>—Permit, log and permit, block or quarantine a request if a site-reputation of 70 through 79 is returned. By default, Log and Permit is selected.</li> <li>● <b>Suspicious</b>—Permit, log and permit, block, or quarantine a request if a site reputation of 60 through 69 is returned. By default, Quarantine is selected.</li> <li>● <b>Harmful</b>—Permit, log and permit, block, or quarantine a request if a site reputation of zero through 59 is returned. By default, Block is selected.</li> </ul>
<b>Default Action</b>	<p>Choose the actions to be taken for URL categories with no assigned action and for uncategorized URLs. This is used only if no reputation action is assigned.</p>

Table 236: Creating Web Filtering Profiles Settings (continued)

Setting	Guideline
<b>Fallback Action</b>	<p>Select the fallback action, which is used when:</p> <ul style="list-style-type: none"> <li>• The ThreatSeeker Websense Cloud servers are unreachable.</li> <li>• A timeout occurs for requests to ThreatSeeker Cloud.</li> <li>• There are too many requests to be handled by the device.</li> </ul>

Table 237: Select URL Categories Settings

Setting	Guideline
<b>Show</b>	<p>Choose which URL categories should be displayed for selection: <b>All categories</b>, <b>Custom URL categories</b>, or <b>Websense URL categories</b>.</p> <p>The <b>Available</b> column of the <b>URL Categories</b> field displays URL categories based on your selection.</p>
<b>URL Categories</b>	<p>Select one or more URL categories in the <b>Available</b> column and click the forward arrow to confirm your selection. The selected URL categories are displayed in the <b>Selected</b> column.</p> <p>Alternatively, click <b>Create New URL Category</b> to create a URL category and assign it to the URL category. The Create URL Categories page appears; for more information, see <a href="#">“Creating URL Categories” on page 611</a>.</p> <p>Click <b>OK</b> to confirm your selection. You are returned to the Create Web Filtering Profiles page.</p>

## RELATED DOCUMENTATION

| [Creating UTM Profiles | 573](#)

## Editing, Cloning, and Deleting Web Filtering Profiles

### IN THIS SECTION

- [Editing Web Filtering Profiles | 585](#)
- [Cloning Web Filtering Profiles | 585](#)
- [Deleting Web Filtering Profiles | 586](#)



You can edit, clone, and delete Web filtering profiles from the Web Filtering Profiles page. This topic has the following sections:

## Editing Web Filtering Profiles

To modify the parameters configured for a Web filtering profile:

**NOTE:** You cannot modify the default profiles already present in the system.

1. Select **Configuration > Unified Threat Mgmt > Web Filtering Profiles** in Customer Portal.

The Web Filtering Profiles page appears, displaying the existing Web filtering profiles.

2. Select the Web filtering profile that you want to edit and click the edit icon (pencil). Alternatively, right-click a profile and select **Edit Profile**.

The Edit Web Filtering Profiles page appears, displaying the same fields that are presented when you create a Web filtering profile.

3. Modify the Web filtering profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the Web Filtering Profiles page. A confirmation message appears, indicating the status of the edit operation.

## Cloning Web Filtering Profiles

Cloning enables you to easily create a new Web filtering profile based on an existing one.

To clone a Web filtering profile:

1. Select **Configuration > Unified Threat Mgmt > Web Filtering Profiles** in Customer Portal.

The Web Filtering Profiles page appears, displaying the existing Web filtering profiles.

2. Select the Web filtering profile that you want to clone and then select **More > Clone**. Alternatively, right-click a profile and select **Clone**.

The Clone Web Filtering Profiles page appears, displaying the same fields that are presented when you create a Web filtering profile.

3. Modify the Web filtering profile fields as needed.
4. Click **OK** to save your changes.

You are taken to the Web Filtering Profiles page. A confirmation message appears, indicating the status of the clone operation.

## Deleting Web Filtering Profiles

Before deleting a Web filtering profile, ensure that the profile is not used in a UTM profile that is, in turn, used in a firewall policy intent. If you try to delete a Web filtering profile that is used in a firewall policy intent, an error message is displayed.

To delete one or more Web filtering profiles:

1. Select **Configuration > Unified Threat Mgmt > Web Filtering Profiles** in Customer Portal.

The Web Filtering Profiles page appears, displaying the existing Web filtering profiles.

2. Select one or more Web filtering profiles that you want to delete and click the delete icon (X).  
Alternatively, right-click a profile and select **Delete Profile**.

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected Web filtering profiles.

A confirmation message appears, indicating the status of the delete operation.

## RELATED DOCUMENTATION

[Creating Web Filtering Profiles | 580](#)

[About the Web Filtering Profiles Page | 578](#)

## About the Antivirus Profiles Page

To access this page, select **Configuration > Unified Threat Mgmt > Antivirus Profiles** in Customer Portal.

Use the Antivirus Profiles page to view and manage antivirus profiles. Antivirus profiles enable you to inspect files transmitted over several protocols (HTTP, FTP upload and download, IMAP, SMTP, and POP3) to determine whether the files exchanged are known malicious files, similar to how desktop antivirus software scans files for the same purpose.

Tasks You Can Perform

You can perform the following tasks from this page:

- Create an antivirus profile—See [“Creating Antivirus Profiles” on page 588](#).
- Edit, clone, or delete an antivirus profile—See [“Editing, Cloning, and Deleting Antivirus Profiles” on page 591](#).
- Clear the selected antivirus profiles—Click **Clear All Selections** to clear any antivirus profiles that you might have selected.
- View the details of an antivirus profile—Select the antivirus profile for which you want to view the details and from the More or right-click menu, select **Detailed View**. The Antivirus Profile Details page appears. [Table 239 on page 587](#) describes the fields on this page.
- Search for antivirus profiles by using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.

Field Descriptions

[Table 238 on page 587](#) describes the fields on the Antivirus Profiles page.

Table 238: Antivirus Profiles Page Fields

Field	Description
Name	Name of the antivirus profile.
Profile Type	Type of engine used for the profile.
Content Size Limit	Content size limit, in kilobytes, refers to accumulated TCP payload size.
Trickling Timeout	Number of seconds to wait for a response from the server.
Description	Description of the antivirus profile.

Table 239: Antivirus Profiles Details Page Fields

Field	Description
General Information	
Name	Name of the antivirus profile.
Description	Description of the antivirus profile.

Table 239: Antivirus Profiles Details Page Fields (*continued*)

Field	Description
Engine Type	Type of engine used for the profile.
Scan Options	
Content Size Limit	Content size limit, in kilobytes, refers to accumulated TCP payload size.
Fallback Options	
Default Action	Displays the default fallback action taken when the antivirus system encounters errors.
Content Size	Displays the actions taken if the content size exceeds a set limit.
Engine Error	Displays the action taken when an engine error occurs.

## RELATED DOCUMENTATION

| [Creating UTM Profiles](#) | 573

## Creating Antivirus Profiles

Use the Create Antivirus Profiles page to configure antivirus profiles. The antivirus profile defines the content to scan for any malware and the action to be taken when malware is detected. After you create a profile, you can assign it to UTM profiles.

To create an antivirus profile:

1. Select **Configuration > Unified Threat Mgmt > Antivirus Profiles** in Customer Portal.

The Antivirus Profiles page appears.

2. Click the add icon (+) to create a new antivirus profile.

The Create Antivirus Profiles wizard appears, displaying brief instructions about creating an antivirus profile.

3. Click **Next** to navigate to the next page.

- Complete the configuration according to the guidelines provided in [Table 240 on page 589](#).

**NOTE:** Fields marked with \* are mandatory.

- Click **Finish**.

A summary page is displayed. Review the settings, and if you need to make any modifications, click the **Edit** link or the **Back** button.

- Click **OK** to save the settings and create the profile.

A message indicating the status of the create operation is displayed.

- Click **Close**.

You are returned to the Antivirus Profiles page.

**Table 240: Antivirus Profile Settings**

Setting	Guideline
<b>General Information</b>	
Name	Enter a unique name for the antivirus profile. The maximum length is 29 characters.
Description	Enter a description for the antivirus profile. The maximum length is 255 characters.
Engine Type	Displays the engine type used for scanning. Currently, <b>Sophos</b> is the only antivirus engine supported.  Sophos antivirus is an in-the-cloud antivirus solution. The virus and malware database is located on external servers maintained by Sophos (Sophos Extensible List) servers, thus there is no need to download and maintain large pattern databases on the Juniper Networks device.
<b>Fallback Options</b>	

Table 240: Antivirus Profile Settings (*continued*)

Setting	Guideline
	<p>Fallback options are used when the antivirus system experiences errors and must fall back to one of the previously configured actions to either deny (block) or permit the object.</p> <p>Specify the fallback options to use when there is a failure, or select the default action if no specific options are to be configured:</p> <ul style="list-style-type: none"> <li>• <b>Content Size</b>—Select an option to specify whether the content should be blocked (default) or logged and permitted if the content size the previously defined limit.</li> <li>• <b>Content Size Limit</b>—Enter the content size limit in kilobytes (KB) based on which action is taken. The range is 20 through 40,000 KB. The content size limit check occurs before the scan request is sent. The content size refers to accumulated TCP payload size.</li> <li>• <b>Engine Error</b>—Select the action to take (<b>Block</b> [default] or <b>Log and Permit</b>) when an engine error occurs.  The term <i>engine error</i> refers all engine errors, including engine not ready, timeout, too many requests, password protected, corrupt file, decompress layer, and out of resources.</li> <li>• <b>Default Action</b>—Select the default action (<b>Block</b> [default] or <b>Log and Permit</b>) to take when an error occurs.</li> </ul>
<b>Notification Options</b>	
	<p>Use the notification options to configure a method of notifying the user when a fallback occurs or a virus is detected:</p> <ul style="list-style-type: none"> <li>• <b>Fallback Deny</b>—Select this option to notify mail senders that their messages were blocked.</li> <li>• <b>Fallback Non-Deny</b>—Select this option to warn mail recipients that they received unblocked messages despite problems.</li> <li>• <b>Virus Detected</b>—Select this option to notify mail recipients that their messages were blocked.</li> </ul>

## RELATED DOCUMENTATION

| [Creating UTM Profiles](#) | 573

## Editing, Cloning, and Deleting Antivirus Profiles

### IN THIS SECTION

- [Editing Antivirus Profiles | 591](#)
- [Cloning Antivirus Profiles | 591](#)
- [Deleting Antivirus Profiles | 592](#)

You can edit, clone, and delete antivirus profiles from the Antivirus Profiles page. This topic has the following sections:

### Editing Antivirus Profiles

To modify the parameters configured for an antivirus profile:

**NOTE:** You cannot modify the default profiles already present in the system.

1. Select **Configuration > Unified Threat Mgmt > Antivirus Profiles** in Customer Portal.

The Antivirus Profiles page appears, displaying the existing antivirus profiles.

2. Select the antivirus profile that you want to edit and then select the edit icon (pencil). Alternatively, right-click a profile and select **Edit Antivirus Profile**.

The Edit Antivirus Profiles page appears, displaying the same fields that are presented when you create an antivirus profile.

3. Modify the antivirus profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the Antivirus Profiles page. A confirmation message appears, indicating the status of the edit operation.

### Cloning Antivirus Profiles

Cloning enables you to easily create a new antivirus profile based on an existing one.

To clone an antivirus profile:

1. Select **Configuration > Unified Threat Mgmt > Antivirus Profiles** in Customer Portal.

The Antivirus Profiles page appears, displaying the existing antivirus profiles.

2. Select the antivirus profile that you want to clone and then select **More > Clone**. Alternatively, right-click a profile and select **Clone**.

The Clone Antivirus Profiles page appears, displaying the same fields that are presented when you create an antivirus profile.

3. Modify the antivirus profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the Antivirus Profiles page. A confirmation message appears, indicating the status of the clone operation.

## Deleting Antivirus Profiles

Before deleting an antivirus profile, ensure that the profile is not used in a UTM profile that is, in turn, used in a firewall policy intent. If you try to delete an antivirus profile that is used in a firewall policy intent, an error message is displayed.

To delete one or more antivirus profiles:

1. Select **Configuration > Unified Threat Mgmt > Antivirus Profiles** in Customer Portal.

The Antivirus Profiles page appears, displaying the existing antivirus profiles.

2. Select one or more antivirus profiles that you want to delete and then select the delete icon (X). Alternatively, right-click a profile and select **Delete Antivirus Profiles**.

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected antivirus profiles.

A confirmation message appears, indicating the status of the delete operation.

## RELATED DOCUMENTATION

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[Creating Antivirus Profiles | 588](#)

[About the Antivirus Profiles Page | 586](#)



# About the Antispam Profiles Page

To access this page, select **Configuration > Unified Threat Mgmt > Antispam Profiles** in Customer Portal.

Use the Antispam Profiles page to view and manage antispam profiles. An antispam profile is used to examine transmitted e-mail messages to identify e-mail spam by using a constantly updated spam block list.

## Tasks You Can Perform

You can perform the following tasks from this page:

- Create an antispam profile—See [“Creating Antispam Profiles” on page 594](#).
- Edit, clone, or delete an antispam profile—See [“Editing, Cloning, and Deleting Antispam Profiles” on page 596](#).
- Clear the selected antispam profiles—Click **Clear All Selections** to clear any antispam profiles that you might have selected.
- View the details of an antispam profile—Select the antispam profile for which you want to view the details and from the More or right-click menu, select **Detailed View**. The Antispam Profile Details page appears. [Table 242 on page 594](#) describes the fields on this page.
- Search for antispam profiles using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.

## Field Descriptions

[Table 241 on page 593](#) describes the fields on the Antispam Profiles page.

Table 241: Antispam Profiles Page Fields

Field	Description
Name	Name of the antispam profile.
Blacklist	Indicates whether server-based spam filtering or local spam filtering is used.
Action	Action to be taken when spam is detected.
Custom Tag	Custom-defined tag that identifies an e-mail message as spam.
Description	Description of the antispam profile.

Table 242: Antispam Profile Details Page Fields

Field	Description
<b>Name</b>	Name of the antispam profile.
<b>Description</b>	Description of the antispam profile.
<b>Sophos Blacklist</b>	Indicates whether Sophos Blacklist is enabled (server-based filtering) or disabled (local filtering).
<b>Default Action</b>	Action to be taken when spam is detected.
<b>Custom Tag</b>	Custom-defined tag that identifies an e-mail message as spam.

## RELATED DOCUMENTATION

[Creating UTM Profiles](#) | 573

## Creating Antispam Profiles

Use the Create Antispam Profiles page to configure antispam profiles.

E-mail spam consists of unwanted e-mail messages usually sent by commercial, malicious, or fraudulent entities. When the device detects an e-mail message deemed to be spam, it either blocks the message or tags the message header or subject field with a preprogrammed string. Antispam filtering allows you to use a third-party server-based spam block list (SBL) and to optionally create your own local allowlists (benign) and blocklists (malicious) for filtering against e-mail messages.

**NOTE:** Sophos updates and maintains the IP-based SBL. Antispam is a separately licensed subscription service.

After you create an antispam profile, you can assign it to UTM profiles.

To create an antispam profile:

1. Select **Configuration > Unified Threat Mgmt > Antispam Profiles** in Customer Portal.

The Antispam Profiles page appears.

2. Click the add icon (+) to create a new antispam profile.

The Create Antispam Profiles wizard appears, displaying brief instructions about creating an antispam profile.

3. Complete the configuration according to the guidelines provided in [Table 243 on page 595](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK** save the settings and create the profile.

A message indicating the status of the create operation is displayed. You are returned to the Antispam Profiles page.

**Table 243: Antispam Profile Settings**

Setting	Guideline
<b>General Information</b>	
<b>Name</b>	Enter a unique name for the antispam profile. The maximum length is 29 characters.
<b>Description</b>	Enter a description for the antispam profile. The maximum length is 255 characters.
<b>Sophos Blacklist</b>	<p>Select this check box (the default) to use server-based spam filtering. If you clear the check box, local spam filtering is used.</p> <p>Server-based antispam filtering requires Internet connectivity with the spam block list (SBL) server. Domain Name Service (DNS) is required to access the SBL server. The firewall performs SBL lookups through the DNS protocol.</p> <p><b>NOTE:</b> Server-based spam filtering supports only IP-based spam block list blocklist lookup. Sophos updates and maintains the IP-based spam block list. Server-based antispam filtering is a separately licensed subscription service.</p>
<b>Action</b>	

Table 243: Antispam Profile Settings (continued)

Setting	Guideline
Default Action	Select the action to be taken when spam is detected: <ul style="list-style-type: none"><li>• Tag Email Subject Line</li><li>• Tag SMTP Header</li><li>• Block Email</li><li>• None</li></ul>
Custom Tag	Enter a custom string for identifying a message as spam. The maximum length is 512 characters and the default is <b>***SPAM***</b> .

RELATED DOCUMENTATION

| [Creating UTM Profiles](#) | 573

## Editing, Cloning, and Deleting Antispam Profiles

IN THIS SECTION

- [Editing Antispam Profiles](#) | 597
- [Cloning Antispam Profiles](#) | 597
- [Deleting Antispam Profiles](#) | 598

You can edit, clone, and delete antispam profiles from the Antispam Profiles page. This topic has the following sections:

## Editing Antispam Profiles

To modify the parameters configured for an antispam profile:

**NOTE:** You cannot modify the default profiles already present in the system.

1. Select **Configuration > Unified Threat Mgmt > Antispam Profiles** in Customer Portal.

The Antispam Profiles page appears, displaying the existing antispam profiles.

2. Select the antispam profile that you want to edit and click the edit icon (pencil). Alternatively, right-click a profile and select **Edit Antispam Profile**.

The Edit Antispam Profiles page appears, displaying the same fields that are presented when you create an antispam profile.

3. Modify the antispam profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the Antispam Profiles page. A confirmation message appears, indicating the status of the edit operation.

## Cloning Antispam Profiles

Cloning enables you to easily create a new antispam profile based on an existing one.

To clone an antispam profile:

1. Select **Configuration > Unified Threat Mgmt > Antispam Profiles** in Customer Portal.

The Antispam Profiles page appears displaying the existing antispam profiles.

2. Select the antispam profile that you want to clone and then select **More > Clone**. Alternatively, right-click a profile and select **Clone**.

The Clone Antispam Profiles page appears, displaying the same fields that are presented when you create an antispam profile.

3. Modify the antispam profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the Antispam Profiles page. A confirmation message appears, indicating the status of the clone operation.

## Deleting Antispam Profiles

Before deleting an antispam profile, ensure that the profile is not used in a UTM profile that is, in turn, used in a firewall policy intent. If you try to delete an antispam profile that is used in a firewall policy intent, an error message is displayed.

To delete one or more antispam profiles:

1. Select **Configuration > Unified Threat Mgmt > Antispam Profiles** in Customer Portal.

The Antispam Profiles page appears, displaying the existing antispam profiles.

2. Select one or more antispam profiles that you want to delete and click the delete icon (X). Alternatively, right-click a profile and select **Delete Antispam Profiles**.

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected antispam profiles.

A confirmation message appears, indicating the status of the delete operation.

## RELATED DOCUMENTATION

| [About the Antispam Profiles Page](#) | 593

## About the Content Filtering Profiles Page

To access this page, select **Configuration > Unified Threat Mgmt > Content Filtering Profiles** in Customer Portal.

Use the Content Filtering Profiles page to view and manage content filtering profiles. Content filtering profiles enable you to block or permit certain types of traffic over several protocols (HTTP, FTP upload and download, IMAP, SMTP, and POP3) based on the MIME type, file extension, protocol command, and embedded object type.

## Tasks You Can Perform

You can perform the following tasks from this page:

- Create a content filtering profile—See [“Creating Content Filtering Profiles” on page 600](#).
- Edit, clone, or delete a content filtering profile—See [“Editing, Cloning, and Deleting Content Filtering Profiles” on page 604](#).
- Clear the selected content filtering profiles—Click **Clear All Selections** to clear any content filtering profiles that you might have selected.
- View the details of a content filtering profile—Select the content filtering profile for which you want to view the details and from the More or right-click menu, select **Detailed View**. The Content Filtering Profile Details page appears. [Table 245 on page 599](#) describes the fields on this page.
- Search for content filtering profiles by using keywords—Click the search icon, enter the search term in the text box, and press Enter. The search results are displayed on the same page.

### Field Descriptions

[Table 244 on page 599](#) describes the fields on the Content Filtering Profiles page.

**Table 244: Content Filtering Profiles Page Fields**

Field	Description
<b>Name</b>	Name of the content filtering profile.
<b>Permit Command List</b>	List of protocol commands permitted by the content filtering profile.
<b>Block Command List</b>	List of protocol commands blocked by the content filtering profile.
<b>Notification Type</b>	Type of notification that is sent when content is blocked.
<b>Description</b>	Description of the content filtering profile.

**Table 245: Content Filtering Profiles Details Page Fields**

Field	Description
<b>General Information</b>	
<b>Name</b>	Name of the content filtering profile.
<b>Description</b>	Description of the content filtering profile.
<b>General Information</b>	
<b>Notify Mail Sender</b>	Specifies whether the option to notify the e-mail sender is enabled or disabled.

Table 245: Content Filtering Profiles Details Page Fields (*continued*)

Field	Description
Notification Type	Type of notification that is sent when content is blocked.
Custom Notification Message	Custom notification message that is sent when content is blocked.
Protocol Commands	
Command Block List	List of protocol commands permitted by the content filtering profile.
Command Permit List	List of protocol commands blocked by the content filtering profile.
Content Types	
Block Content Types	List of harmful content types to be blocked.
File Extensions	
Extension Block List	File extensions to be blocked.
MIME	
MIME Block List	List of MIME types to be blocked.
MIME Permit List	List of MIME types to be permitted.

## RELATED DOCUMENTATION

| [Creating UTM Profiles](#) | 573

## Creating Content Filtering Profiles

Use the Create Content Filtering Profiles page to configure content filtering profiles. Content filtering blocks or permits certain types of traffic based on the MIME type, file extension, and protocol command. The content filter controls file transfers across the device by checking traffic against configured filter lists. [Table 246 on page 601](#) displays the types of content filters that you can configure as part of a content filtering profile.



**NOTE:** The content filtering profile evaluates traffic before all other UTM profiles. Therefore, if traffic meets criteria configured in the content filter, the content filter acts first upon this traffic.

**Table 246: Supported Content Filter Types**

Type	Description
MIME pattern filter	<p>MIME patterns are used to identify the type of traffic in HTTP and MAIL protocols. There are two lists of MIME patterns that are used by the content filter to determine the action to be taken. The block MIME list contains a list of MIME type traffic that is to be blocked. The MIME exception list contains MIME patterns that are not to be blocked by the content filter and are generally subsets of items on the block list.</p> <p><b>NOTE:</b> The exception list has a higher priority than the block list.</p>
Block Extension List	<p>Because the name of a file is available during the transfers, using file extensions is a highly practical way to block or allow file transfers. All protocols support the use of the block extension list.</p>
Protocol Command Block and Permit Lists	<p>Different protocols use different commands to communicate between servers and clients. By blocking or allowing certain commands, traffic can be controlled on the protocol command level. The block or permit command lists are intended to be used in combination, with the permit list acting as an exception list to the block list.</p> <p><b>NOTE:</b> If a protocol command appears on both the permit list and the block list, the command is permitted.</p>

To create a content filtering profile:

1. Select **Configuration > Unified Threat Mgmt > Content Filtering Profiles** in Customer Portal.

The Content Filtering Profiles page appears.

2. Click the add icon (+) to create a new content filtering profile.

The Create Content Filtering Profiles wizard appears, displaying brief instructions about creating a content filtering profile.

3. Click **Next** to navigate to the next page.

4. Complete the configuration according to the guidelines provided in [Table 247 on page 602](#).

**NOTE:** Fields marked with \* are mandatory.

5. Click **Finish**.

A summary page is displayed. Review the settings and if you need to make any modifications click the **Edit** link or the **Back** button.

6. Click **OK** save the settings and create the profile.

A message indicating the status of the create operation is displayed.

7. Click **Close**.

You are returned to the Content Filtering Profiles page.

**Table 247: Content Filtering Profile Settings**

Setting	Guideline
<b>General Information</b>	
Name	Enter a unique name for the content filtering profile. The maximum length is 29 characters.
Description	Enter a description for the content filtering profile. The maximum length is 255 characters.
<b>Notification Options</b>	
Notify Mail Sender	Select this check box if you want to notify the sender when a failure occurs or a virus is detected. This check box is cleared by default.
Notification Type	Select the type of notification ( <b>Protocol</b> or <b>Message</b> ) from the drop-down list.
Custom Notification Message	Enter a custom notification message. The maximum length is 512 characters.
<b>Protocol Commands</b>	
Command Block List	<p>Enter the protocol commands to be blocked for the HTTP, FTP, SMTP, IMAP, and POP3 protocols. Use commas to separate each command.</p> <p>Protocol commands allow you to control traffic at the protocol-command level.</p>

Table 247: Content Filtering Profile Settings (*continued*)

Setting	Guideline
<b>Command Permit List</b>	Enter specific commands to be permitted for the HTTP, FTP, SMTP, IMAP, and POP3 protocols. Use commas to separate each command.
<b>Content Types</b>	
<b>Block Content Type</b>	<p>Use the content filter to block other types of harmful files that the MIME type or the file extension cannot control. Select from the following types of content blocking (supported only for HTTP):</p> <ul style="list-style-type: none"> <li>• Active X</li> <li>• Windows executables (.exe)</li> <li>• HTTP cookie</li> <li>• Java applet</li> <li>• ZIP files</li> </ul>
<b>File Extensions</b>	
<b>Extension Block List</b>	<p>Use a file extension list to define a set of file extensions to block over HTTP, FTP, SMTP, IMAP, and POP3.</p> <p>Enter file extensions to block separated by commas. For example, exe, pdf, js, and so on.</p>
<b>MIME Types</b>	
<b>MIME Block List</b>	Enter the MIME types you want to block over HTTP, FTP, SMTP, IMAP, and POP3 connections. Use commas to separate each MIME type.
<b>MIME Permit List</b>	Enter the MIME types you want to permit over HTTP, FTP, SMTP, IMAP, and POP3 connections. Use commas to separate each MIME type.

## RELATED DOCUMENTATION

[Creating UTM Profiles](#) | 573

## Editing, Cloning, and Deleting Content Filtering Profiles

### IN THIS SECTION

- [Editing Content Filtering Profiles | 604](#)
- [Cloning Content Filtering Profiles | 604](#)
- [Deleting Content Filtering Profiles | 605](#)

You can edit, clone, and delete content filtering profiles from the Content Filtering Profiles page. This topic has the following sections:

### Editing Content Filtering Profiles

To modify the parameters configured for a content filtering profile:

**NOTE:** You cannot modify the default profiles already present in the system.

1. Select **Configuration > Unified Threat Mgmt > Content Filtering Profiles** in Customer Portal.

The Content Filtering Profiles page appears, displaying the existing content filtering profiles.

2. Select the content filtering profile that you want to edit and click the edit icon (pencil). Alternatively, right-click a profile and select **Edit Profile**.

The Edit Content Filtering Profiles page appears, displaying the same fields that are presented when you create a content filtering profile.

3. Modify the content filtering profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the Content Filtering Profiles page. A confirmation message appears, indicating the status of the edit operation.

### Cloning Content Filtering Profiles

Cloning enables you to easily create a new content filtering profile based on an existing one.

To clone a content filtering profile:

1. Select **Configuration > Unified Threat Mgmt > Content Filtering Profiles** in Customer Portal.

The Content Filtering Profiles page appears, displaying the existing content filtering profiles.

2. Select the content filtering profile that you want to clone and then select **More > Clone**. Alternatively, right-click a profile and select **Clone**.

The Clone Content Filtering Profiles page appears, displaying the same fields that are presented when you create a content filtering profile.

3. Modify the content filtering profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the Content Filtering Profiles page. A confirmation message appears, indicating the status of the clone operation.

## Deleting Content Filtering Profiles

Before deleting a content filtering profile, ensure that the profile is not used in a UTM profile that is, in turn, used in a firewall policy intent. If you try to delete a content filtering profile that is used in a firewall policy intent, an error message is displayed.

To delete one or more content filtering profiles:

1. Select **Configuration > Unified Threat Mgmt > Content Filtering Profiles** in Customer Portal.

The Content Filtering Profiles page appears, displaying the existing content filtering profiles.

2. Select one or more content filtering profiles that you want to delete and click the delete icon (X). Alternatively, right-click a profile and select **Delete Profile**.

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected content filtering profiles.

A confirmation message appears, indicating the status of the delete operation.

## RELATED DOCUMENTATION

| [Creating Content Filtering Profiles](#) | 600

## About the URL Patterns Page

To access this page, select **Configuration > Unified Threat Mgmt > URL Patterns** in Customer Portal.

Use this page to view, create, edit, clone, and delete URL patterns. A URL pattern contains a list of URLs.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a URL pattern—See [“Creating URL Patterns” on page 607](#).
- Edit, clone, or delete a URL pattern—See [“Editing, Cloning, and Deleting URL Patterns” on page 608](#).
- Clear the selected URL patterns—Click **Clear All Selections** to clear any URL patterns that you might have selected.
- View the details of a URL pattern—Select the URL pattern for which you want to view the details and from the More or right-click menu, select **Detailed View**. The URL Pattern Details page appears displaying the fields shown in [Table 248 on page 606](#).
- Search for URL patterns using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.

### Field Descriptions

[Table 248 on page 606](#) describes the fields on the URL Patterns page.

Table 248: URL Patterns Page Fields

Field	Description
Name	Name of the URL pattern.
URLs	List of URLs in the URL pattern.
Description	Description of the URL pattern.

### RELATED DOCUMENTATION

[About the URL Categories Page](#) | [610](#)

# Creating URL Patterns

Use this page to create URL patterns. You can also assign URL patterns to a URL category.

To create a URL pattern:

1. Select **Configuration > Unified Threat Mgmt > URL Patterns** in Customer Portal.

The URL Patterns page appears.

2. Click the add icon (+) to create a URL pattern.

The Create URL Patterns page is displayed.

3. Complete the configuration according to the guidelines provided in [Table 249 on page 607](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK**.

A new URL pattern is created and you are returned to the URL Patterns page.

Table 249: Create URL Patterns Settings

Settings	Guidelines
Name	Enter a unique name for the URL pattern.  The name must begin with a letter or an underscore (_) and can contain alphanumeric characters and some special characters (_ -). The maximum length is 29 characters.
Description	Enter a description for the URL pattern. The maximum length is 255 characters.
URL Category	Select the URL category to which you want to assign the URL pattern. Alternatively, click <b>Create New URL Category</b> to create a URL category, enter the URL category name in the text box, and click <b>Save</b> to assign the URL pattern to the new category.

Table 249: Create URL Patterns Settings (continued)

Settings	Guidelines
Add URLs	<p>Enter one or more URLs (separated by commas) in the text box, and click <b>Add</b>. The URLs are displayed in the URL List table.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"><li>• The following wildcard characters are supported:<ul style="list-style-type: none"><li>• asterisk (*)</li><li>• period (.)</li><li>• square brackets ([])</li><li>• question mark (?)</li></ul></li><li>• Precede all wildcard characters with http://.</li><li>• The asterisk (*) can only be used at the beginning of a URL and must be followed by a period (.).</li><li>• The question mark (?) can only be used at the end of a URL.</li><li>• The following are examples of wildcard syntaxes that are supported: http://*.example.net, http://www.example.ne?, and http://www.example.n??.</li><li>• The following are examples of wildcard syntaxes that are not supported: *.example.???, http://*example.net, http://?, and www.example.ne?.</li></ul>

RELATED DOCUMENTATION

| [Creating URL Categories](#) | 611

Editing, Cloning, and Deleting URL Patterns

IN THIS SECTION

- [Editing URL Patterns](#) | 609
- [Cloning URL Patterns](#) | 609
- [Deleting URL Patterns](#) | 610



You can edit, clone, and delete URL patterns from the URL Patterns page. This topic has the following sections:

## Editing URL Patterns

To modify the parameters configured for a URL pattern:

1. Select **Configuration > Unified Threat Mgmt > URL Patterns** in Customer Portal.

The URL Patterns page appears, displaying the existing URL patterns.

2. Select the URL pattern that you want to edit and click the edit icon (pencil). Alternatively, right-click a pattern and select **Edit URL Patterns**.

The Edit URL Patterns page appears, displaying the same fields that are presented when you create a URL pattern.

3. Modify the URL pattern fields as needed.

4. Click **OK** to save your changes.

You are taken to the URL Patterns page. A confirmation message appears, indicating the status of the edit operation.

## Cloning URL Patterns

Cloning enables you to easily create a new URL pattern based on an existing one.

To clone a URL pattern:

1. Select **Configuration > Unified Threat Mgmt > URL Patterns** in Customer Portal.

The URL Patterns page appears, displaying the existing URL patterns.

2. Select the URL pattern that you want to clone and then select **More > Clone**. Alternatively, right-click a pattern and select **Clone**.

The Clone URL Patterns page appears, displaying the same fields that are presented when you create a URL pattern.

3. Modify the URL pattern fields as needed.

4. Click **OK** to save your changes.

You are taken to the URL Patterns page. A confirmation message appears, indicating the status of the clone operation.

## Deleting URL Patterns

Before deleting a URL pattern, ensure that the URL pattern is not referenced in any UTM profiles that are, in turn, used in firewall policy intents or in URL categories referenced in the UTM settings. If you try to delete such a URL pattern, an error message is displayed.

To delete one or more URL patterns:

1. Select **Configuration > Unified Threat Mgmt > URL Patterns** in Customer Portal.

The URL Patterns page appears, displaying the existing URL patterns.

2. Select one or more URL patterns that you want to delete and click the delete icon (X). Alternatively, right-click a pattern and select **Delete URL Pattern**.

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected URL patterns.

A confirmation message appears, indicating the status of the delete operation.

### RELATED DOCUMENTATION

| [Creating URL Patterns](#) | 607

## About the URL Categories Page

To access this page, select **Configuration > Unified Threat Mgmt > URL Categories** in Customer Portal.

Use this page to view, create, edit, clone, and delete URL categories. A URL category is a list of URL patterns grouped under a single title.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a URL category—See [“Creating URL Categories”](#) on page 611.
- Edit, clone, or delete a URL category—See [“Editing, Cloning, and Deleting URL Categories”](#) on page 613.
- Clear the selected URL categories—Click **Clear All Selections** to clear any URL categories that you might have selected.

- View the details of a URL category—Select the URL category for which you want to view the details and from the More or right-click menu, select **Detailed View**. The URL Category Details page appears, displaying the details of the selected URL category; see [Table 250 on page 611](#) for an explanation of the fields.
- Search for URL categories by using keywords—Click the search icon, enter the search term in the text box, and press Enter. The search results are displayed on the same page.

Field Descriptions

[Table 250 on page 611](#) describes the fields on the URL Categories page.

Table 250: URL Categories Page Fields

Field	Description
Name	Name of the URL category.
URL Patterns	List of URL patterns in the URL category.
Definition Type	Indicates the type of URL category: <ul style="list-style-type: none"><li>• Predefined—URL categories that are loaded by default.</li><li>• Custom—URL categories that are created by the user.</li></ul>
Description	Description of the URL category.

RELATED DOCUMENTATION

| [About the URL Patterns Page](#) | 606

Creating URL Categories

Use this page to create URL categories. A URL category is a list of URL patterns grouped under a single title.

To create a URL category:

1. Select **Configuration > Unified Threat Mgmt > URL Categories** in Customer Portal.

The URL Categories page appears.

2. Click the add icon (+) to create a URL category.

The Create URL Categories page is displayed.

3. Complete the configuration according to the guidelines provided in [Table 251 on page 612](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK**.

A new URL category is created and you are returned to the URL Categories page.

**Table 251: Create URL Categories Settings**

Settings	Guidelines
Name	<p>Enter a unique name for the URL category.</p> <p>The name must begin with a letter or an underscore (_) and can contain alphanumeric characters and some special characters ( _ -). The maximum length is 59 characters.</p>
Description	<p>Enter a description for the URL pattern. The maximum length is 255 characters.</p>
URL Patterns	<p>Select one or more URL patterns in the <b>Available</b> column and click the forward arrow to confirm your selection. The selected URL patterns are displayed in the <b>Selected</b> column.</p> <p>Alternatively, click <b>Create a New Pattern</b> to create a URL pattern and assign it to the URL category. The Create URL Patterns page appears. For more information, see <a href="#">“Creating URL Patterns” on page 607</a></p> <p><b>NOTE:</b> You must select at least one URL pattern.</p>

**RELATED DOCUMENTATION**

## Editing, Cloning, and Deleting URL Categories

### IN THIS SECTION

- [Editing URL Categories | 613](#)
- [Cloning URL Categories | 613](#)
- [Deleting URL Categories | 614](#)

You can edit, clone, and delete URL categories from the URL Categories page. This topic has the following sections:

### Editing URL Categories

To modify the parameters configured for a URL category:

1. Select **Configuration > Unified Threat Mgmt > URL Categories** in Customer Portal.

The URL Categories page appears, displaying the existing URL categories.

2. Select the URL category that you want to edit and click the edit icon (pencil). Alternatively, right-click a category and select **Edit URL Categories**.

The Edit URL Categories page appears, displaying the same fields that are presented when you create a URL category.

3. Modify the URL category fields as needed.

4. Click **OK** to save your changes.

You are taken to the URL Categories page. A confirmation message appears, indicating the status of the edit operation.

### Cloning URL Categories

Cloning enables you to easily create a new URL category based on an existing one.

To clone a URL category:

1. Select **Configuration > Unified Threat Mgmt > URL Categories** in Customer Portal.

The URL Categories page appears, displaying the existing URL categories.

2. Select the URL category that you want to clone and then select **More > Clone**. Alternatively, right-click a category and select **Clone**.

The Clone URL Categories page appears, displaying the same fields that are presented when you create a URL category.

3. Modify the URL category fields as needed.

4. Click **OK** to save your changes.

You are taken to the URL Categories page. A confirmation message appears, indicating the status of the clone operation.

## Deleting URL Categories

Before deleting a URL category, ensure that the URL category is not referenced in any UTM profiles that are, in turn, used in firewall policy intents or in the UTM settings. If you try to delete such a URL category, an error message is displayed.

To delete one or more URL categories:

1. Select **Configuration > Unified Threat Mgmt > URL Categories** in Customer Portal.

The URL Categories page appears, displaying the existing URL categories.

2. Select one or more URL categories that you want to delete and click the delete icon (X). Alternatively, right-click a category and select **Delete URL Category**.

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected URL categories.

A confirmation message appears, indicating the status of the delete operation.

## RELATED DOCUMENTATION

| [Creating URL Categories](#) | 611

# Managing SD-WAN

## IN THIS CHAPTER

- [SLA Profiles and SD-WAN Policies Overview | 615](#)
- [About the SD-WAN Policy Page | 619](#)
- [Creating SD-WAN Policy Intents | 620](#)
- [Editing and Deleting SD-WAN Policy Intents | 628](#)
- [About the Application SLA Profiles Page | 630](#)
- [Creating SLA Profiles | 631](#)
- [Editing and Deleting SLA Profiles | 634](#)
- [Breakout and Breakout Profiles Overview | 635](#)
- [About the Breakout Profiles Page | 638](#)
- [Adding Breakout Profiles | 641](#)
- [Adding Cloud Breakout Settings | 643](#)
- [Assigning Cloud Breakout Settings to Sites | 645](#)
- [Configuring Breakout on SD-WAN Sites | 646](#)
- [Editing Breakout Profiles and Cloud Breakout Settings | 648](#)
- [Deleting Breakout Profiles and Cloud Breakout Settings | 650](#)

## SLA Profiles and SD-WAN Policies Overview

### IN THIS SECTION

- [SLA Profiles | 616](#)
- [SD-WAN Policies | 617](#)

Contrail Service Orchestration (CSO) enables you to create service-level agreement (SLA) profiles and map them to software-defined WAN (SD-WAN) policies for traffic management.

## SLA Profiles

SLA profiles are created for applications or groups of applications for all tenants. An SLA profile consists of a set of configurable constraints that can be defined in the unified portal for both the Administration and Customer Portals. [Table 252 on page 616](#) lists the categories of configurable constraints that are defined in an SLA profile.

**Table 252: SLA Profile Categories**

Category	Description
Path preference and priority	<p>Paths are the WAN links to be used for the SLA profile. You can select an MPLS or Internet link as the preferred path. For SLA profiles you must select a path preference or configure at least one SLA parameter. MPLS is more latency-sensitive than Internet.</p> <p>You can define priority or precedence for the SLA profile. A value of one (1) indicates highest priority. SLA profiles with higher priorities are given precedence over SLA profiles with lower priorities. Priority is used when SLA requirements are not met on a WAN link and the site switches WAN links to meet the SLA requirements.</p>
SLA parameters	<p>You can also define one or more than one of the following SLA parameters:</p> <ul style="list-style-type: none"> <li>• Throughput—Amount of data (in Mbps) that is sent upstream and received downstream by the site during the selected time period</li> <li>• Latency—Amount of time (in ms) that a packet of data takes to travel from one designated point to another</li> <li>• Packet loss—Percentage of data packets dropped by the network to manage congestion</li> <li>• Jitter—Difference between the maximum and minimum round-trip times (in ms) of a packet of data</li> </ul> <p>SLA parameters have precedence over path preference. Even if one SLA parameter is defined, then it is given a higher priority and will override the path preference. SD-WAN policies mapped to an SLA profile with defined SLA parameters are called dynamic policies. Dynamic policies applied to sites enable the site to override the path preference and switch WAN links when the preferred WAN link is not meeting SLA requirements as defined in the SLA parameters.</p>
Class of service	<p>Class of service (CoS) provides different levels of service assurances to various forms of traffic. CoS enables you to divide traffic into classes and offer an assured service level for each class. The classes of service listed in increasing order of priority and sensitivity to latency are best effort, voice, interactive video, streaming audio or video, control, and business essential. The default CoS is voice.</p>



Table 252: SLA Profile Categories (*continued*)

Rate limiters	<p>Rate limiters are defined for traffic shaping and efficient bandwidth utilization. You can define the following rate limiters:</p> <ul style="list-style-type: none"> <li>• Maximum upstream and downstream rates—The maximum upstream and downstream rate for all applications associated with the SLA profile.</li> <li>• Maximum upstream and downstream burst sizes—The maximum size of a steady stream of traffic sent at average rates that exceed the upstream and downstream rate limits for short periods.</li> </ul>
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**NOTE:** You must define at least one of the SLA parameters or path preference. You cannot leave both path preference and SLA parameters fields blank at the same time.

## SD-WAN Policies

SD-WAN policy intents help in optimum utilization of the WAN links and efficient load distribution of traffic. SD-WAN policy intents are applied to source endpoints (such as sites and departments) and destination endpoints (applications or application groups) and can be defined for site-to-site traffic (by using SLA profiles) or for breakout traffic (by using breakout profiles).

Applications are classified into the following categories:

- Cacheable applications, which refer to applications or application groups that are stored in the application cache when they are recognized by the device. After they are stored in the application cache, subsequent sessions are routed directly through the correct WAN link.
- Non-cacheable applications, which refer to applications or application groups that are not stored in the application cache and all sessions are first routed through the default path, and then routed to the correct WAN link based on the SD-WAN policy.

Policy intents consist of the following parameters:

- Source—A source endpoint that you can choose from a list of sites, site groups, and departments or a combination of all of these. The SD-WAN policy intent is applied to the selected source endpoint.
- Destination—A destination endpoint that you can choose from a list of applications and predefined or custom application groups. You can select a maximum of 32 applications or application groups as destination endpoints. The SD-WAN policy intent is applied to the selected destination endpoint.
- SLA profile or breakout profile—Depending on whether you want to apply the policy intent to site-to-site traffic or breakout traffic, you can associate an SLA profile or a breakout profile with the policy intent.
- Intent name—A unique name for the SD-WAN policy intent.

SD-WAN supports advanced policy-based routing (APBR). APBR enables you to dynamically define the routing behavior of the SD-WAN network based on applications. Dynamic application-based routing makes it possible to define policies and to switch WAN links on the fly based on the application's defined SLA parameters. The APBR mechanism classifies sessions based on applications and application signatures and uses policy intents to identify the best possible route for the application. When the best possible route does not meet the application's defined SLA requirements, the SD-WAN network finds the next best possible route to meet SLA requirements.

For example, consider an application in a site. If you want the application group to use custom throughput, latency, or jitter, you can create an SLA profile with these custom values. You can then create an intent and configure the intent with the application and apply the custom SLA profile. When the intent is deployed, CSO determines the best suited WAN link to route traffic based in the application. If the WAN link fails to meet SLA requirements in runtime, the SD-WAN network switches WAN links to the next best suited path.

On the basis of the configured SLA profile constraints, you can categorize SD-WAN policies into two types:

- **Static policy**—If only the path preference is defined and none of the SLA parameters are defined in the SLA profile, then the policy is called a static policy. In static policies, if the defined WAN link under path preference is unable to meet the SLA requirements, link switching cannot occur and SLA performance deteriorates.
- **Dynamic policy**—If one or more SLA parameters in the SLA profile are defined, then the policy is called a dynamic policy.

In dynamic policies, because SLA parameters override the path preference, the SD-WAN network chooses the best possible WAN link for traffic management. When an intent is deployed on a site, if the WAN link chosen by the SD-WAN network does not meet the SLA requirements and the network performance deteriorates, then the site switches WAN links to meet the SLA requirements. The link switching is recorded as an SD-WAN event and displayed in the SD-WAN Events page in the customer portal and the *Tenant\_name* SLA Performance pages in the administration and customer portals. Link switching occurs only when the SD-WAN policy is dynamic because SLA parameters override the path preference and the site is able to switch WAN links.

## RELATED DOCUMENTATION

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[About the Application SLA Profiles Page | 630](#)

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[About the SD-WAN Policy Page | 619](#)

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[Breakout and Breakout Profiles Overview | 635](#)

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[SD-WAN Events Overview | 426](#)

## About the SD-WAN Policy Page

To access this page, select **Configuration > SD-WAN > SD-WAN Policy** in the Customer Portal.

SD-WAN policy intents help in optimum utilization of the WAN links and efficient load distribution of traffic. SD-WAN policy intents are applied to source endpoints (such as sites and departments) and destination endpoints (applications or application groups) and can be defined for site-to-site traffic (by using SLA profiles) or for breakout traffic (by using breakout profiles).

You can use the SD-WAN Policy page to view, create, edit, and deploy SD-WAN policy intents. SD-WAN policy intents use SLA profiles for traffic management. SD-WAN policies help in optimum utilization of the WAN links and efficient distribution of traffic. Every tenant has an SD-WAN policy and intents are created in the SD-WAN policy.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View existing SD-WAN policy intents.
- Create SD-WAN policy intents. See [“Creating SD-WAN Policy Intents” on page 620](#).
- Edit or delete SD-WAN policy intents. See [“Editing and Deleting SD-WAN Policy Intents” on page 628](#).
- Deploy SD-WAN policy intents. See [“Deploying Policies” on page 746](#).
- View the number of undeployed SD-WAN policy intents.
- Search for SD-WAN policy intents using keywords. Click the search icon. Enter partial text or full text of the keyword in the search bar and press Enter. The search results are displayed.

### Field Descriptions

[Table 253 on page 619](#) describes the fields on the SD-WAN Policy page.

**Table 253: Fields on the SD-WAN Policy Page**

Field	Description
Source	Displays the source endpoints that are configured for the policy intents. A source endpoint is chosen from sites, site groups, and departments or a combination of all of these to which the policy intent is applied.
Application	Displays the application destination endpoints that are configured for the policy intents. An application destination endpoint is chosen from a list of applications and predefined or custom application groups to which the policy intent is applied.

Table 253: Fields on the SD-WAN Policy Page (continued)

Field	Description
Profile	Displays the breakout profile or the SLA profile associated with the policy intent.
Options	Displays the name and description (if available) of the SD-WAN policy intent.

## RELATED DOCUMENTATION

[SLA Profiles and SD-WAN Policies Overview | 615](#)

[Creating SD-WAN Policy Intents | 620](#)

[Editing and Deleting SD-WAN Policy Intents | 628](#)

## Creating SD-WAN Policy Intents

You can create policy intents for SD-WAN policies from the **SD-WAN Policy** page.

To create an SD-WAN policy intent:

1. Select **Configuration > SD-WAN > SD-WAN Policy** in Customer Portal.

The SD-WAN Policy page appears.

2. Click the add icon (+).

The options to create policy intents appear inline on the SD-WAN Policy page.

3. Enter the policy intent information according to the guidelines provided in [Table 254 on page 621](#).

4. Click **Save** to create the policy intent.

The SD-WAN policy intent is saved and a confirmation message is displayed.

**NOTE:** After the policy intent is created, you must deploy the policy to ensure that the changes take effect on the applicable sites, departments, or applications. When an SD-WAN policy intent is created, the Undeployed field is incremented by one indicating that intents are pending deployment.

Table 254: Create SD-WAN Policy Intent Settings

Field	Guidelines
Source	

Table 254: Create SD-WAN Policy Intent Settings (*continued*)

Field	Guidelines
	<p>You can select the source endpoints in one of the following ways:</p> <ul style="list-style-type: none"> <li>• Select source endpoints from the displayed list of departments, sites, or site groups, or a combination of these. Click the source endpoints to select them.</li> <li>• Select the source endpoints from the complete list of departments, sites, and site groups. To view the complete list of departments, sites, and site groups. <ol style="list-style-type: none"> <li>1. Click <b>View more results</b>. The complete list of departments, sites, and site groups is displayed in the <b>End Points</b> pane on the right.</li> <li>2. (Optional) Hover over a department or site group and click the edit icon to edit the department or site group. You cannot edit a site.</li> <li>3. Click the add icon (+) to select the endpoint.</li> </ol> </li> <li>• Enter an abbreviation in the <b>Source</b> field to select the endpoint from a filtered list of departments, sites, or site groups. To view a filtered list of departments, sites, or site groups, enter DEPT, SITE, or STGP, respectively. The abbreviation is not case-sensitive. You can select the source endpoint in one of the following ways: <ul style="list-style-type: none"> <li>• Click the endpoints in the filtered list to select them.</li> <li>• Click <b>View more results</b> to select the endpoint from the complete list of departments, sites, and site groups.</li> <li>• Click <b>Add new department</b> or <b>Add new sitegroup</b> to create new departments or site groups and select them. The Create Site Group page or Add Department page appears based on your selection. See <a href="#">“Adding a Department” on page 739</a> and <a href="#">“Creating Site Groups” on page 836</a> for information about creating site groups and departments.</li> </ul> </li> <li>• Create site groups or departments to select the source endpoint from the newly created site group or department. To create site groups or departments: <ol style="list-style-type: none"> <li>1. Click anywhere within the <b>Source</b> field.</li> <li>2. Click the lesser-than icon (&lt;) on the right.  The list of available departments, sites, and site groups is displayed in the <b>End Points</b> pane on the right.</li> <li>3. (Optional) To view more information about a source endpoint, hover over the endpoint click the details icon.</li> <li>4. Click the add icon (+) on the top right of the pane.</li> </ol> </li> </ul>

Table 254: Create SD-WAN Policy Intent Settings (continued)

Field	Guidelines
	<div>5. Click <b>Department</b> or <b>Site Group</b> as needed. The Add Department page or Create Site Group page appears based on your selection. See <a href="#">“Adding a Department” on page 739</a> and <a href="#">“Creating Site Groups” on page 836</a> for information about creating departments and site groups.</div> <div>6. Click the check mark icon (✓) if you want to save the department or site group to the policy intent. Alternatively, if you want to discard your updates, click <b>Cancel</b> instead.</div>

Table 254: Create SD-WAN Policy Intent Settings (continued)

Field	Guidelines
Application	



Table 254: Create SD-WAN Policy Intent Settings (*continued*)

Field	Guidelines
	<p>You can select the application endpoints in one of the following ways:</p> <p><b>NOTE:</b> You can select <b>Any</b> as an application endpoint only if you are creating an SD-WAN policy intent that references a breakout profile.</p> <ul style="list-style-type: none"> <li>• Select application endpoints from the displayed list of applications and application groups. Click the endpoints to select them.</li> <li>• Select the application endpoints from the complete list of applications and application groups. To view the complete list of applications and applications groups. <ol style="list-style-type: none"> <li>1. Click <b>View more results</b>. The complete list of applications and applications groups is displayed in the <b>End Points</b> pane on the right.</li> <li>2. (Optional) Hover over an application group and click the edit icon to edit the application group.</li> <li>3. (Optional) Hover over an application and click the details icon to view details about the application.</li> <li>4. Click the add icon (+) to select the endpoint.</li> </ol> </li> <li>• Enter an abbreviation in the <b>Application</b> field to select the endpoint from a filtered list of applications and application groups. To view a filtered list of applications and application groups, enter apps or APPS. You can select the application endpoint in one of the following ways: <ul style="list-style-type: none"> <li>• Click the endpoints in the filtered list to select them.</li> <li>• Click <b>View more results</b> to select the endpoint from the complete list of applications and applications groups.</li> <li>• Click <b>Add new application</b> to create a new application group and select the application group. The Create Application Signature Group page appears. See <a href="#">“Creating Application Signature Groups” on page 735</a> for information about creating application groups.</li> </ul> </li> <li>• Create custom application groups to select the application endpoint from the newly created application group. To create an application group: <ol style="list-style-type: none"> <li>1. Click anywhere within the <b>Application</b> field.</li> <li>2. Click the lesser-than icon (&lt;) on the right.  The list of available applications, departments, sites, and site groups is displayed in the <b>End Points</b> pane on the right.</li> <li>3. Click the add icon (+) on the top right of the pane.</li> </ol> </li> </ul>

Table 254: Create SD-WAN Policy Intent Settings (continued)

Field	Guidelines
	<div>4. Click <b>Application</b>. The Create Application Signature Group page appears. See <a href="#">“Creating Application Signature Groups” on page 735</a> for information about creating application groups.</div> <div>5. Click the check mark icon (✓) if you want to save the application signature group to the policy intent.</div> <div>Alternatively, if you want to discard your updates, click <b>Cancel</b> instead.</div>

Table 254: Create SD-WAN Policy Intent Settings (*continued*)

Field	Guidelines
Profile	<p>Select a breakout profile or an SLA profile to apply to the source and application endpoints. You can select the profile in one of the following ways:</p> <ul style="list-style-type: none"> <li>• Select the breakout or the SLA profile from the displayed list of SLA profiles. Click the profile to select it.</li> <li>• Select the profile from the complete list of breakout or SLA profiles: To view the complete list of breakout or SLA profiles. <ol style="list-style-type: none"> <li>1. Click <b>View more results</b>. The complete list of profiles is displayed in the <b>End Points</b> pane on the right.</li> <li>2. Click the add icon (+) to select the profile.</li> </ol> </li> <li>• Select the profile by creating a custom SLA or breakout profile: <ul style="list-style-type: none"> <li>• To create an SLA profile: <ol style="list-style-type: none"> <li>1. Click anywhere within the Profile field.</li> <li>2. Click the lesser-than icon (&lt;) on the right. The list of SLA profiles is displayed in the <b>End Points</b> pane on the right.</li> <li>3. Click the add icon (+) on the top right of the pane and select <b>SLA</b>. The Create SLA Profile Page appears. See <a href="#">“Creating SLA Profiles” on page 631</a> for information about creating SLA profiles.</li> <li>4. Click <b>SLA Profile</b>. The Create SLA Profile Page appears. See <a href="#">“Creating SLA Profiles” on page 631</a> for information about creating SLA profiles.</li> <li>5. Click the check mark icon (✓) if you want to use the SLA profile for the policy intent.</li> </ol> </li> <li>• To create a breakout profile: <ol style="list-style-type: none"> <li>1. Click anywhere within the Profile field.</li> <li>2. Click the lesser-than icon (&lt;) on the right. The list of breakout profiles is displayed in the <b>End Points</b> pane on the right.</li> <li>3. Click the add icon (+) on the top right of the pane and select <b>BRKT</b>. The Add Breakout Profile page appears. For more information, see <a href="#">“Adding Breakout Profiles” on page 641</a></li> </ol> </li> </ul> </li> </ul>

Table 254: Create SD-WAN Policy Intent Settings (continued)

Field	Guidelines
Options	
Name	Enter a name for the policy intent.
Description	Enter a description for the policy intent.

RELATED DOCUMENTATION

- [SLA Profiles and SD-WAN Policies Overview | 615](#)
- [About the SD-WAN Policy Page | 619](#)
- [Editing and Deleting SD-WAN Policy Intents | 628](#)
- [Deploying Policies | 746](#)

## Editing and Deleting SD-WAN Policy Intents

IN THIS SECTION

- [Editing SD-WAN Policy Intents | 628](#)
- [Deleting SD-WAN Policy Intents | 629](#)

You can edit or delete SD-WAN policy intents from the SD-WAN Policy page.

### Editing SD-WAN Policy Intents

You can edit SD-WAN policy intents from the SD-WAN Policy page.

To edit an SD-WAN policy intent:

1. Hover over the SD-WAN policy intent that you want to edit, and then click the edit icon that appears on the right side of the policy intent.

The options to create policy intents appear within the SD-WAN Policy page showing the same options that you see when you create a new SD-WAN policy intent.

2. Modify the parameters according to the guidelines provided in [“Creating SD-WAN Policy Intents” on page 620](#).
3. Click **Save** to save your changes.

Alternatively, click **Cancel** to discard your changes.

**NOTE:** After you modify an SD-WAN policy intent, you must redeploy the policy to ensure that the changes take effect on the applicable sites, departments, or applications.

## Deleting SD-WAN Policy Intents

If an SD-WAN intent is no longer needed, you can delete the SD-WAN policy intent from the SD-WAN Policy page.

To delete one or more SD-WAN policy intents:

1. Select one or more policy intents that you want to delete and click the delete icon (trash can).

A page appears asking you to confirm the delete operation.

2. Click **Yes** to confirm that you want to delete the selected policy intents.

A confirmation message appears indicating the status of the delete operation.

**NOTE:** After you delete one or more SD-WAN policy intents, you must redeploy the policy to ensure that the changes take effect on the applicable sites, departments, or applications.

## RELATED DOCUMENTATION

[SLA Profiles and SD-WAN Policies Overview | 615](#)

[About the SD-WAN Policy Page | 619](#)

[Creating SD-WAN Policy Intents | 620](#)

## About the Application SLA Profiles Page

To access this page, select **Configuration > SD-WAN > Application SLA Profiles** in the Customer Portal.

You can use the Application SLA Profiles page to view information about service-level agreement (SLA) profiles for the tenant profile in which you are logged in.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View details of SLA profiles for all tenants.
- Create an SLA profile for the tenant. See [“Creating SLA Profiles” on page 631](#).
- Edit the configuration of or delete an existing SLA profile. See [“Editing and Deleting SLA Profiles” on page 634](#).
- Show or hide columns that contain information about SLA profiles. See [“Sorting Objects” on page 384](#).
- Search for SLA profiles using keywords. Click the search icon. Enter partial text or full text of the keyword in the search bar and press Enter. The search results are displayed.

### Field Descriptions

[Table 255 on page 630](#) shows the descriptions of the fields on the Application SLA Profiles page.

**Table 255: Fields on the Application SLA Profiles Page**

Field	Description
Priority	Displays the SLA profile priority.
Name	Displays the SLA profile name.
Traffic Type Profile	Displays the traffic type profile associated with the SLA profile.
Path Preference	Displays whether there is a preferred path for the SLA profile.
Failover	Indicates whether failover is enabled for the SLA profile.
Packet Loss (%)	Displays the target packet loss for the SLA profile.
Jitter (ms)	Displays the target jitter for the SLA profile.
RTT	Displays the target round-trip time (RTT) for the SLA profile.

Table 255: Fields on the Application SLA Profiles Page (continued)

Field	Description
Throughput (Mbps)	Displays the target throughput for the SLA profile.
SLA Probe Match	Displays whether the profile requires the SLA probe to match all SLA criteria (All) or not (Any) .
Created by	Displays the name of the user that created the SLA profile.

RELATED DOCUMENTATION

<a href="#">SLA Profiles and SD-WAN Policies Overview   615</a>
<a href="#">Creating SLA Profiles   631</a>
<a href="#">Editing and Deleting SLA Profiles   634</a>

Creating SLA Profiles

You can use the Create SLA Profile page to create a new service-level agreement (SLA) profile for the current tenant and configure target metrics for the SLA profile.

To add an SLA Profile to the tenant:

1. Click the add icon (+) on the **Configuration > Application SLA Profiles** page in the Customer Portal.  
The Create SLA Profile page appears.
2. Enter the general SLA profile information according to the guidelines provided in [Table 256 on page 631](#).
3. Click **OK** to create the SLA profile. The Application SLA Profile page appears with the new SLA profile information.  
Alternatively, if you want to discard your updates, click **Cancel** instead.

Table 256: Fields on the Create SLA Profile page

Field	Guidelines
<i>General</i>	

Table 256: Fields on the Create SLA Profile page (continued)

Field	Guidelines
Name	<p>Enter a name for the SLA profile.</p> <p>Can be a unique string of not more than 15 characters that contains alphanumeric characters and hyphen (-).</p>
SLA Configuration	
Traffic Type Profile	Choose a traffic type profile to apply the class-of-service configuration and priority to the SLA profile. You can select a traffic type profile only when it is in the <b>Enabled</b> state.
Path Preference	Select the preferred WAN link type to associate with the SLA profile. The options are Any, MPLS, and Internet. Any is the default value. You must select a path preference or configure at least one SLA parameter.
Failover	<p>Enable failover to switch links when the active links fail to meet the SLA criteria. In such cases, the traffic is routed to links that meet SLA criteria. Failover is supported only for MPLS or Internet links.</p> <p><b>NOTE:</b> The Failover option is supported only for bandwidth-optimized SD-WAN networks.</p>
Path Failover Criteria	<p>Choose one of the following options:</p> <ul style="list-style-type: none"> <li>• <b>Does not meet one or more SLA parameters</b>—This triggers the path failover if any of the SLA parameters is violated.</li> <li>• <b>Does not meet all SLA parameters</b>—This triggers the path failover only when all the SLA parameters are violated.</li> </ul>
SLA Parameters	
Throughput	Enter the target throughput (in Mbps) for the SLA profile. Throughput is the amount of data that is sent upstream and received downstream by the site during the selected time period.
Latency	Enter the target latency (in ms) for the SLA profile. Latency is the amount of time that a packet of data takes to travel from one designated point to another. Target delay is calculated as two times the target latency.
Packet Loss	Enter the target packet loss (in %) for the SLA profile. Packet loss is the percentage of data packets dropped by the network to manage congestion.
Jitter	Enter the target jitter (in ms) for the SLA profile. Jitter is the difference between the maximum and minimum round-trip times of a packet of data.



Table 256: Fields on the Create SLA Profile page (continued)

Field	Guidelines
<i>Advanced Configuration-SLA Sampling</i>	
Session-sampling %	Specify the matching percentage of sessions for which you want to run the passive probes.
SLA-violation-count	Specify the number of SLA violations after which you want CSO to switch paths. The range is 1 through 32.
Sampling-period	Specify the sampling period, in milliseconds, for which the SLA violations are counted. The range is 2000 through 60000.
Switch-cool-off-period	Specify the waiting period, in milliseconds, only after which you want the link switch to happen if an active link comes back online. This parameter helps prevent frequent switching of traffic between active and backup links. The range is 5 through 300.
<i>Advanced Configuration-Rate Limiting</i>	
Maximum Upstream Rate	Enter the maximum upstream rate (in Kbps) for all applications associated with the SLA profile. The rate is in the range 64 through 10,485,760 Kbps.
Maximum Upstream Burst Size	Enter the maximum burst size (in bytes). The burst size is in the range 1 through 1,342,177,280 bytes.
Maximum Downstream Rate	Enter the maximum downstream rate (in Kbps) for all applications associated with the SLA profile. The rate is in the range 64 through 10,485,760 Kbps.
Maximum Downstream Burst Size	Enter the maximum burst size (in bytes). The burst size is in the range 1 through 1,342,177,280 bytes.
Loss Priority	Select a loss priority based on which packets can be dropped or retained when network congestion occurs. The chances of a packet getting dropped is the highest when the loss priority is set to <b>High</b> . Other available values are <b>Medium High</b> , <b>Medium Low</b> , and <b>Low</b> .

**NOTE:** You can also create SLA profiles from the **Configuration > SD-WAN > SD-WAN Policies** page in the Customer Portal.

## RELATED DOCUMENTATION

[SLA Profiles and SD-WAN Policies Overview | 615](#)

[About the Application SLA Profiles Page | 630](#)

[Editing and Deleting SLA Profiles | 634](#)

## Editing and Deleting SLA Profiles

### IN THIS SECTION

● [Editing an SLA Profile | 634](#)

● [Deleting SLA Profiles | 635](#)

You can use the Applications SLA Profiles page to edit and delete SLA profiles.

### Editing an SLA Profile

To edit an SLA Profile:

1. Select the check box for the SLA profile that you want to edit, and click the Edit icon on the **Configuration** > **Application SLA Profiles** page in the Customer Portal.

The Edit Application SLA Profile page appears.

2. Update the general SLA profile information as needed according to the guidelines provided in [“Creating SLA Profiles” on page 631](#). You cannot edit the SLA profile name.

3. Click **Next**.

The Configuration tab appears.

4. Update the configuration parameters as needed according to the guidelines provided in [“Creating SLA Profiles” on page 631](#).

5. Click **OK** to save the updated SLA profile configuration.

The SLA profile information that you updated appears on the Application SLA Profiles page.

## Deleting SLA Profiles

You can delete the SLA profile if it is no longer needed. To delete an SLA profile:

1. Select the check box for the SLA profile that you want to delete and click the delete icon (X) on the **Configuration > Application SLA Profiles** page in the Customer Portal. You can also select multiple SLA profiles.

A page requesting confirmation for the deletion appears.

2. Click **Yes** to confirm that you want to delete the SLA profile.

The SLA profile is deleted.

## RELATED DOCUMENTATION

[SLA Profiles and SD-WAN Policies Overview | 615](#)

[About the Application SLA Profiles Page | 630](#)

[Creating SLA Profiles | 631](#)

## Breakout and Breakout Profiles Overview

### IN THIS SECTION

- [Breakout Profiles | 636](#)
- [SD-WAN Policy Intents for Breakout and Precedence | 636](#)
- [Benefits of Breakout Profiles | 637](#)

Site-to-site traffic between spoke sites of a tenant is sent (on overlay tunnels) directly from one site to another depending on the tenant topology or through the hub or gateway site. However, for Internet-bound or Software as a Service (SaaS) traffic, you can break out the traffic in different ways:

- **Local breakout**—The traffic exits the VPN directly at the site and goes to the destination.
- **Backhaul or central breakout**—The traffic exits the VPN at the cloud hub or at the gateway site (if a gateway site is associated with the spoke site) and then goes to the destination.

- Cloud breakout—The traffic is sent from the site to a designated cloud-based security platform instead of traffic being sent over an underlay.

**NOTE:** In CSO Release 4.1.0, Zscaler is the only cloud-based security platform supported.

In CSO Release 4.0, only local breakout and central breakout (backhaul) are supported and the breakout option is enabled only at the site level. However, from CSO Release 4.1.0 onward, breakout is supported at the site, department, and application (cacheable only) levels by using breakout profiles that are applied using SD-WAN policy intents. Non-cacheable applications follow the site-specific or department-specific behavior as configured in the SD-WAN policy intent.

**NOTE:** For sites added in CSO Release 4.1.0 onward, you cannot configure breakout *directly* at the site level and must use breakout profiles referenced in SD-WAN policy intents for this purpose.

## Breakout Profiles

The following three types of breakout profiles are supported in CSO:

- Local breakout (underlay)
- Backhaul (central breakout)
- Cloud breakout

After you add a breakout profile, you must create an SD-WAN policy intent specifying the source (site, site group, or department) and application and the applicable breakout profile.

## SD-WAN Policy Intents for Breakout and Precedence

For SD-WAN policy intents configured at different source endpoints, the following is applicable:

- Site—A policy intent configured at the site level applies to all the departments within the site. In addition, by default, the site-level configuration is also applicable to all applications because the default configuration for applications is **Any**.
- Department—A policy intent configured at the department level (for tenants with network segmentation enabled) overrides the policy intent configured at the site level. Similar to the behavior for the site-level policy intent, by default, a department-level policy intent is also applicable to all applications because the default configuration for applications is **Any**.

- Application (cacheable only)—A policy intent (at the application level) where you specify one or more cacheable applications overrides the policy intent specified at either the department level or the site level *only* for the specified applications.

An example of the precedence of SD-WAN policy intents for breakout (from highest precedence to lowest precedence) is provided in [Table 257 on page 637](#). The SD-WAN policy intent number 1 has the highest priority and SD-WAN policy intent number 7 has the lowest priority.

**Table 257: Precedence (Highest to Lowest) of SD-WAN Policy Intents for Breakout**

Intent Number	Site	Department (Network Segmentation Enabled)	Application
1	Sunnyvale	Finance	Outlook
2	Any	Finance	Outlook
3	Sunnyvale	Any	Outlook
4	Sunnyvale	Finance	Any
5	Any	Finance	Any
6	Sunnyvale	Any	Any
7	Any	Any	Any

## Benefits of Breakout Profiles

- Breakout profiles used in intent-based Internet breakout policies (through SD-WAN policy intents) give users granular control over the Internet breakout behavior for specific applications.

## RELATED DOCUMENTATION

[Adding Breakout Profiles | 641](#)

[Adding Cloud Breakout Settings | 643](#)

[Creating SD-WAN Policy Intents | 620](#)

## About the Breakout Profiles Page

### IN THIS SECTION

- [Tasks You Can Perform | 638](#)
- [Breakout Profiles Field Descriptions | 639](#)
- [Cloud Breakout Settings Field Descriptions | 640](#)

To access this page, click **Configuration > SD-WAN > Breakout Profiles**.

You can use the Breakout Profiles page to view existing breakout profiles, add local, backhaul, and cloud breakout profiles, edit breakout profiles, and delete breakout profiles. You can also add settings for cloud breakout, edit cloud breakout settings, assign the settings to one or more sites, and delete the settings.

The breakout profiles are displayed on the Breakout Profiles tab and the cloud breakout settings are displayed on the Cloud Breakout Settings tab.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View existing breakout profiles—See [Table 258 on page 639](#) for a description of the fields.
- View the details of a breakout profile—On the Breakout Profiles tab, select a breakout profile and from the More menu, select **Detail View**. The Detail for *Breakout-Profile-Name* pane appears on the right-hand side of the page. See [Table 258 on page 639](#) for a description of the fields on this pane.
- View existing cloud breakout settings—See [Table 259 on page 640](#) for a description of the fields.
- View the details of cloud breakout settings—On the Cloud Breakout Settings tab, select a cloud breakout setting and from the More menu, select **Detail View**. The Detail for *Cloud-Breakout-Setting-Name* pane appears on the right-hand side of the page. See [Table 259 on page 640](#) for a description of the fields on this pane.
- Add a breakout profile—See [“Adding Breakout Profiles” on page 641](#).
- Edit a breakout profile—See [“Editing Breakout Profiles and Cloud Breakout Settings” on page 648](#).
- Delete a breakout profile—See [“Deleting Breakout Profiles and Cloud Breakout Settings” on page 650](#).
- Add cloud breakout settings—See [“Adding Cloud Breakout Settings” on page 643](#).
- Edit cloud breakout settings—See [“Editing Breakout Profiles and Cloud Breakout Settings” on page 648](#).

- Delete cloud breakout settings—See [“Deleting Breakout Profiles and Cloud Breakout Settings”](#) on page 650.
- Assign cloud breakout settings to one or more sites—See [“Assigning Cloud Breakout Settings to Sites”](#) on page 645.

## Breakout Profiles Field Descriptions

Table 258: Breakout Profiles Field Descriptions

Field	Description	Displayed On
Name	Name of the breakout profile.	Breakout Profiles page (Breakout Profiles tab)  Detail for <i>Breakout-Profile-Name</i> pane
Type	Indicates whether the breakout profile is for local breakout (underlay) or backhaul (central breakout) or cloud breakout.	Breakout Profiles page (Breakout Profiles tab)  Detail for <i>Breakout-Profile-Name</i> pane
Description	Description of the breakout profile.	Breakout Profiles page (Breakout Profiles tab)
Path Preference	Indicates the preferred path to be used for breakout traffic: <ul style="list-style-type: none"> <li>• MPLS</li> <li>• Internet</li> <li>• Any, which indicates no preference.</li> </ul>	Breakout Profiles page (Breakout Profiles tab)
Created By	Username of the user who added the breakout profile.	Breakout Profiles page (Breakout Profiles tab)
FqName	Internal name of the breakout profile.	Breakout Profiles page (Breakout Profiles tab)
Rate Limiting	Indicates whether rate limiting is enabled or disabled for the breakout profile.	Detail for <i>Breakout-Profile-Name</i> pane
Downstream Rate	Indicates the maximum downstream rate (in Kbps) for all cacheable applications associated with the breakout profile.	Detail for <i>Breakout-Profile-Name</i> pane

Table 258: Breakout Profiles Field Descriptions (*continued*)

Field	Description	Displayed On
Downstream Burst Size	Indicates the maximum downstream burst size (in bytes) for all cacheable applications associated with the breakout profile.	Detail for <i>Breakout-Profile-Name</i> pane
Upstream Rate	Indicates the maximum upstream rate (in Kbps) for all cacheable applications associated with the breakout profile.	Detail for <i>Breakout-Profile-Name</i> pane
Upstream Burst Size	Indicates the maximum upstream burst size (in bytes) for all cacheable applications associated with the breakout profile.	Detail for <i>Breakout-Profile-Name</i> pane
Loss Priority	Indicates the loss priority associated with the breakout profile. The loss priority determines which packets are dropped or retained when network congestion occurs.	Detail for <i>Breakout-Profile-Name</i> pane

## Cloud Breakout Settings Field Descriptions

Table 259: Cloud Breakout Settings Field Descriptions

Field	Description	Displayed On
Name or Profile-Name	Name of the cloud breakout setting.	Breakout Profiles page (Cloud Breakout Settings tab)  Detail for <i>Cloud-Breakout-Setting-Name</i> pane
Primary Gateway IP	IPv4 address of the primary cloud breakout node.	Breakout Profiles page (Cloud Breakout Settings tab)  Detail for <i>Cloud-Breakout-Setting-Name</i> pane
Primary Link Type	Preferred type of WAN link to be used for breaking out the traffic to the primary cloud breakout node.  If a WAN link type that matches the preferred path is enabled for breakout, then that WAN link type is used for breakout traffic.	Breakout Profiles page (Cloud Breakout Settings tab)  Detail for <i>Cloud-Breakout-Setting-Name</i> pane



Table 259: Cloud Breakout Settings Field Descriptions (*continued*)

Field	Description	Displayed On
Secondary Gateway IP	IPv4 address of the secondary cloud breakout node.	Breakout Profiles page (Cloud Breakout Settings tab)  Detail for <i>Cloud-Breakout-Setting-Name</i> pane
Secondary Type	Preferred type of WAN link to be used for breaking out the traffic to the secondary cloud breakout node.	Breakout Profiles page (Cloud Breakout Settings tab)  Detail for <i>Cloud-Breakout-Setting-Name</i> pane
Sites	If the cloud breakout settings are assigned to one or more sites, the names of the sites are displayed; if not, this field is blank.	Breakout Profiles page (Cloud Breakout Settings tab)
Created By	Username of the user who added the cloud breakout settings.	Breakout Profiles page (Cloud Breakout Settings tab)
Provider	Name of the cloud service provider.	Detail for <i>Cloud-Breakout-Setting-Name</i> pane
Tunnel Type	Type of overlay tunnel.	Detail for <i>Cloud-Breakout-Setting-Name</i> pane

## RELATED DOCUMENTATION

[Breakout and Breakout Profiles Overview](#) | 635

## Adding Breakout Profiles

You use the Add Breakout Profile page to add a local breakout (underlay), backhaul, or a cloud breakout profile. A cloud breakout profile is added by Contrail Service Orchestration (CSO) by default.

To add a breakout profile:

1. Select **Configuration > SD-WAN > Breakout Profiles**.

The Breakout Profiles page appears.

2. On the **Breakout Profiles** tab, click the add icon (+).

The Add Breakout Profile page appears.

3. Complete the configuration according to the guidelines provided in [Table 260 on page 642](#).

**NOTE:** Fields marked with an asterisk (\*) are mandatory.

4. Click **OK**.

You are returned to the Breakout Profiles page (Breakout Profiles tab) and a confirmation message indicating that the breakout profile was added is displayed. The page refreshes to display the breakout profile that you added.

**NOTE:** After you add a breakout profile, you must add an SD-WAN policy intent that references the breakout profile in order to enable breakout traffic.

**Table 260: Fields on the Add Breakout Profile Page**

Field	Description
<b>Type</b>	<p>Select the type of breakout profile that you want to add:</p> <ul style="list-style-type: none"> <li>• <b>Local Breakout (Underlay)</b>—Select this option if you want traffic to break out locally (on the underlay) from the site.</li> <li>• <b>Backhaul</b>—Select this option if you want traffic to break out through a hub or a gateway site (if configured).</li> <li>• <b>Local Breakout (Cloud)</b>—Select to break out traffic through a cloud-based security platform. Currently, Zscaler is the only cloud-based security platform supported.</li> </ul>
<b>Name</b>	Enter a unique name for the breakout profile. You can use alphanumeric characters and hyphens (-); the maximum length is 15 characters.
<b>Description</b>	Enter a description for the breakout profile.
<b>Traffic Type Profile</b>	Select a traffic type profile to apply class of service parameters to the breakout traffic. You can select only a traffic type profile that is enabled.
<b>Preferred Path</b>	<p>Select the preferred path (MPLS, Internet, or Any) to be used for breaking out the traffic.</p> <p>If a WAN link type that matches the preferred path is enabled for breakout, then that WAN link type is used for breakout traffic.</p> <p>If you specify that any path can be used, then there is no preference and all breakout-enabled links are used in a load-balancing mode.</p>

Table 260: Fields on the Add Breakout Profile Page (*continued*)

Field	Description
Advanced Configuration	
<b>Rate Limiting</b>	<p>Click the toggle button to enable rate limiting of breakout traffic for cacheable applications. By default, rate limiting is disabled.</p> <p>If you enable rate limiting, you must specify the upstream and downstream parameters, and the loss priority.</p>
<b>Upstream Rate</b>	Specify the maximum upstream rate (in Kbps) for all cacheable applications associated with the breakout profile.
<b>Upstream Burst Size</b>	Specify the maximum size (in bytes) of a steady stream of traffic sent at average rates that exceed the upstream rate limit for short periods.
<b>Downstream Rate</b>	Specify the maximum downstream rate (in Kbps) for all cacheable applications associated with the breakout profile.
<b>Downstream Burst Size</b>	Specify the maximum size (in bytes) of a steady stream of traffic sent at average rates that exceed the downstream rate limit for short periods.
<b>Loss Priority</b>	Select a loss priority based on which packets are dropped or retained when network congestion occurs. Packet drops are most likely when the loss priority is High and least likely when the loss priority is Low.

## RELATED DOCUMENTATION

[Breakout and Breakout Profiles Overview](#) | 635

[Creating SD-WAN Policy Intents](#) | 620

## Adding Cloud Breakout Settings

You use the Add Cloud Breakout Settings page to add cloud breakout settings that you can then apply to sites.

To add cloud breakout settings:

1. Select **Configuration > SD-WAN > Breakout Profiles**.

The Breakout Profiles page appears.

2. On the **Cloud Breakout Settings** tab, click the add icon (+).

The Add Cloud Breakout Settings page appears.

3. Complete the configuration according to the guidelines provided in [Table 261 on page 644](#).

**NOTE:** Fields marked with an asterisk (\*) are mandatory.

4. Click **OK**.

You are returned to the Breakout Profiles page (Cloud Breakout Settings tab) and a confirmation message indicating that the breakout settings are added is displayed.

After you add cloud breakout settings, you can assign the settings to one or more sites. Assigning cloud breakout settings to sites provisions the cloud breakout node (Zscaler) overlay. For traffic to flow, you must reference the cloud breakout profile in an SD-WAN policy intent.

**Table 261: Fields on the Add Cloud Breakout Settings Page**

Field	Description
<b>Name</b>	Enter a unique name for the cloud breakout settings. You can use alphanumeric characters and hyphens (-); the maximum length is 15 characters.
<b>Primary Gateway IP Address</b>	Enter the IPv4 address of the primary cloud breakout node. Currently, Zscaler is the only cloud-based security platform supported.
<b>Primary Preferred Link Type</b>	Select the preferred type of WAN link (MPLS or Internet) to be used for breaking out the traffic to the primary cloud breakout node.  If a WAN link type that matches the preferred path is enabled for breakout, then that WAN link type is used for breakout traffic.
<b>Primary Preshared Key</b>	Enter the preshared key used for IKE authentication with the primary cloud breakout node.  The key that you enter is masked.

Table 261: Fields on the Add Cloud Breakout Settings Page (*continued*)

Field	Description
<b>Secondary Gateway IP Address</b>	Enter the IPv4 address of the secondary cloud breakout node. Currently, Zscaler is the only cloud-based security platform supported.
<b>Secondary Preferred Link Type</b>	<p>Select the preferred type of WAN link (MPLS or Internet) to be used for breaking out the traffic to the secondary cloud breakout node.</p> <p>If a WAN link type that matches the preferred path is enabled for breakout, then that WAN link type is used for breakout traffic.</p>
<b>Secondary Preshared Key</b>	<p>Enter the preshared key used for IKE authentication with the secondary cloud breakout node.</p> <p>The key that you enter is masked.</p>

## RELATED DOCUMENTATION

[Breakout and Breakout Profiles Overview | 635](#)
[Creating SD-WAN Policy Intents | 620](#)

## Assigning Cloud Breakout Settings to Sites

You use the Assign Cloud Breakout Settings to Sites page to assign cloud breakout settings to one or more sites. You assign cloud breakout settings to one or more sites to provision tunnels from the sites to the cloud breakout node. For breakout traffic from the site, the cloud breakout profile must be referenced in an SD-WAN policy intent.

**NOTE:**

- If you want a site to have cloud breakout enabled, you must assign cloud breakout settings for that site.
- A site can have only one cloud breakout setting associated with it at any given time.

To assign one or more sites to a cloud breakout profile:

1. Select **Configuration > SD-WAN > Breakout Profiles**.

The Breakout Profiles page appears.

2. On the **Cloud Breakout Settings** tab, select a cloud breakout profile and click **Assign Sites**.

The Assign Cloud Breakout Settings to Sites page appears displaying the name of the cloud breakout setting and the existing sites to which you can assign to the setting.

3. In the Sites field, select one or more sites in the Available column and click the right arrow icon to move the selected sites to the Selected column. You can also use the search icon on the top right of each column to search for sites names.

Alternatively, if you want to remove sites that you previously selected for assignment, select one or more sites in the Selected column and click the left arrow icon to move the selected sites back to the Available column.

**NOTE:** You must select at least one site before proceeding.

4. Click **Save**.

A Job is created and you are returned to the Breakout Profiles page (Cloud Breakout Settings tab). After successful completion of the job, the names of the sites to which the settings are assigned are displayed in the Sites column.

## RELATED DOCUMENTATION

[Breakout and Breakout Profiles Overview](#) | 635

## Configuring Breakout on SD-WAN Sites

The following is the workflow for configuring breakout (local breakout [underlay], backhaul [central breakout], or cloud breakout):

1. Before configuring breakout, ensure that you complete the following tasks:
  - a. Add, configure, and activate at least one cloud hub site. See [“Adding Cloud Hub Sites for SD-WAN Deployment” on page 789](#).
  - b. (Optional) If you are using gateway sites, add, configure, and activate one or more gateway sites. See [“Adding Gateway Sites for SD-WAN Deployments” on page 779](#).
  - c. Add, configure, and activate one or more on-premise spoke sites. See [“Adding On-Premise Spoke Sites for SD-WAN Deployment” on page 768](#).
  - d. (Optional) If you are using application-based breakout, ensure that you install the application ID license (if it is required for the device) and signatures on the devices (associated with the sites).
2. Depending on the type of breakout you are configuring, add one or more breakout profiles for the following types of breakout:
  - Local breakout (underlay)
  - Backhaul (central breakout)
  - Cloud breakoutSee [“Adding Breakout Profiles” on page 641](#).
3. For cloud breakout, add cloud breakout settings and then assign the cloud breakout settings to one or more on-premise spoke or gateway sites. See [“Adding Cloud Breakout Settings” on page 643](#) and [“Assigning Cloud Breakout Settings to Sites” on page 645](#).
4. Add one or more SD-WAN policy intents in which you reference the previously-added breakout profiles. See [“Creating SD-WAN Policy Intents” on page 620](#).
5. Deploy the SD-WAN policy. See [“Deploying Policies” on page 746](#).
6. Configure firewall policy intents to allow Internet-bound traffic from the sites or departments for which you configured breakout (through the SD-WAN policy intent). See [“Creating Firewall Policy Intents” on page 505](#).
7. Deploy the firewall policy. See [“Deploying Policies” on page 746](#).
8. For cloud breakout using Zscaler, ensure that the user IDs in the Zscaler account are configured as follows:
  - *Site-Name.primary.1@Tenant-Name.com* for the primary tunnel

- *Site-Name.backup.1@Tenant-Name.com* for the secondary tunnel

Where *Site-Name* is the name of the site (in CSO) for which the breakout is configured and *Tenant-Name* is the name of the tenant (in CSO) to which the site belongs.

## RELATED DOCUMENTATION

| [Breakout and Breakout Profiles Overview](#) | 635

## Editing Breakout Profiles and Cloud Breakout Settings

### IN THIS SECTION

- [Editing Breakout Profiles](#) | 649
- [Editing Cloud Breakout Settings](#) | 649

On the Breakout Profiles page, you can edit breakout profiles and cloud breakout settings that are not assigned to sites.

**NOTE:** You cannot edit the cloud breakout profile that is automatically created by Contrail Service Orchestration (CSO).



## Editing Breakout Profiles

To edit a breakout profile:

**NOTE:** If you edit a breakout policy that is used in an SD-WAN policy intent, then that SD-WAN policy is marked for redeployment.

1. Select **Configuration > SD-WAN > Breakout Profiles**.

The Breakout Profiles page appears.

2. On the **Breakout Profiles** tab, select the breakout profile that you want to edit.

3. Click the edit (pencil) icon.

The Edit Breakout Profile page appears displaying the same fields that are presented when you add a breakout profile. For more information, see [“Adding Breakout Profiles” on page 641](#).

4. Modify the fields as needed.

**NOTE:** You can modify only some fields when you are editing a breakout profile

5. Click **OK**.

You are returned to the Breakout Profiles page. The modifications that you made are saved and a confirmation message is displayed.

## Editing Cloud Breakout Settings

To edit cloud breakout settings that are not assigned to sites:

1. Select **Configuration > SD-WAN > Breakout Profiles**.

The Breakout Profiles page appears.

2. On the **Cloud Breakout Settings** tab, select the cloud breakout setting that you want to edit.

3. Click the edit (pencil) icon.

The Edit Cloud Breakout page appears displaying the same fields that are presented when you add cloud breakout settings. For more information, see [“Adding Cloud Breakout Settings” on page 643](#).

4. Modify the fields as needed.

**NOTE:** You can modify only some fields when you are editing a breakout profile

5. Click **OK**.

You are returned to the Breakout Profiles page. The modifications that you made are saved and a confirmation message is displayed.

## RELATED DOCUMENTATION

[Breakout and Breakout Profiles Overview | 635](#)

[About the Breakout Profiles Page | 638](#)

## Deleting Breakout Profiles and Cloud Breakout Settings

### IN THIS SECTION

- [Deleting Breakout Profiles | 650](#)
- [Deleting Cloud Breakout Settings | 651](#)

On the Breakout Profiles page, you can delete breakout profiles that are not used in SD-WAN policy intents and cloud breakout settings that are not assigned to sites.

### Deleting Breakout Profiles

To delete a breakout profile that is not used in an SD-WAN policy intent:

1. Select **Configuration > SD-WAN > Breakout Profiles**.

The Breakout Profiles page appears.

2. On the **Breakout Profiles** tab, select the breakout profile that you want to delete.

3. Click the delete (trash can) icon.

A popup dialog appears asking you to confirm the deletion.

4. Click **Yes**.

You are returned to the Breakout Profiles page. The selected breakout profile is deleted and a confirmation message is displayed.

## Deleting Cloud Breakout Settings

To delete cloud breakout settings that are not assigned to sites:

1. Select **Configuration > SD-WAN > Breakout Profiles**.

The Breakout Profiles page appears.

2. On the **Cloud Breakout Settings** tab, select the cloud breakout setting that you want to delete.

3. Click the delete (trash can) icon.

A popup dialog appears asking you to confirm the deletion.

4. Click **Yes**.

You are returned to the Breakout Profiles page. The selected cloud breakout setting is deleted and a confirmation message is displayed.

## RELATED DOCUMENTATION

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[Breakout and Breakout Profiles Overview](#) | 635

[About the Breakout Profiles Page](#) | 638

# Managing NAT Policies

## IN THIS CHAPTER

- NAT Policies Overview | 653
- About the NAT Policies Page | 656
- Creating NAT Policies | 657
- Editing and Deleting NAT Policies | 659
- About the Single NAT Policy Page | 660
- Creating NAT Policy Rules | 662
- Editing, Cloning, and Deleting NAT Policy Rules | 669
- Deploying NAT Policy Rules | 671
- Selecting NAT Source | 672
- Selecting NAT Destination | 676
- NAT Pools Overview | 680
- About the NAT Pools Page | 680
- Creating NAT Pools | 681
- Editing, Cloning, and Deleting NAT Pools | 684

## NAT Policies Overview

Network Address Translation (NAT) is a form of network masquerading where you can hide devices or sites between zones or interfaces. A trusted zone is a segment of a network on which security measures are applied. It is usually assigned to the internal LAN. An example of an untrusted zone is the internet. NAT modifies the IP addresses of the packets moving between the trusted and untrusted zones.

Whenever a packet exits a NAT device (when traversing from the internal LAN to the external WAN), the device performs a translation on the packet's IP address by rewriting it with an IP address that was specified for external use. After translation, the packet appears to have originated from the gateway rather than from the original device within the network. This process hides your internal IP addresses from the other networks and keeps your network secure.

Using NAT also enables you to use more internal IP addresses. As these IP addresses are hidden, there is no risk of conflict with an IP address from a different network. This helps you conserve IP addresses.

CSO supports three types of NAT:

- **Source NAT**— Translates the source IP address of a packet leaving a trust zone (outbound traffic). It translates the traffic originating from the device in the trust zone. The source IP address of the traffic (which is a private IP address), is translated to a public IP address that can be accessed by the destination device specified in the NAT rule. The destination IP address is not translated.

The following uses cases show the support for source NAT translation between IPv6 and IPv4 address domains:

- Translation from one IPv6 subnet to another IPv6 subnet without Network Address Port Translation (NAPT), also known as Port Address Translation (PAT).
- Translation from IPv4 addresses to IPv6 prefixes along with IPv4 address translation.
- Translation from IPv6 hosts to IPv6 hosts with or without NAPT.
- Translation from IPv6 hosts to IPv4 hosts with or without NAPT.
- Translation from IPv4 hosts to IPv6 hosts with or without NAPT.
- **Destination NAT**—Translates the destination IP address of a packet. Using destination NAT, an external device can send packets to a hidden internal device. As an example, consider the case of a webserver behind a NAT device. Traffic to the WAN-facing public IP address (the destination IP address) is translated to the internal webserver private IP address.

The following uses cases show the support for destination NAT translation between IPv6 and IPv4 address domains:

- Mapping of one IPv6 subnet to another IPv6 subnet
- Mapping between one IPv6 host and another IPv6 host

- Mapping of one IPv6 host (and optional port number) to another special IPv6 host (and optional port number)
- Mapping of one IPv6 host (and optional port number) to another special IPv4 host (and optional port number)
- Mapping of one IPv4 host (and optional port number) to another special IPv6 host (and optional port number)
- Static NAT— Always translates a private IP address to the same public IP address. It translates traffic from both sides of the network (both source and destination). For example, a web-server with a private IP address can access the Internet using a static, one-to-one address translation. In this case, outgoing traffic from the web-server undergoes source NAT translation, and incoming traffic to the web-server undergoes destination NAT translation.

The following uses cases show the support for static NAT translation between IPv6 and IPv4 address domains:

- Mapping of one IPv6 subnet to another IPv6 subnet.
- Mapping between one IPv6 host and another IPv6 host.
- Mapping between IPv4 address *a.b.c.d* and IPv6 address *Prefix::a.b.c.d*.
- Mapping between IPv4 hosts and IPv6 hosts.
- Mapping between IPv6 hosts and IPv4 hosts.

CSO also supports persistent NAT where address translations are maintained in the database for a configurable amount of time after a session ends.

[Table 262 on page 654](#) shows the persistent NAT support for different source NAT and destination NAT addresses.

**Table 262: Persistent NAT Support**

Source NAT Address	Translated Address	Destination NAT Address	Persistent NAT
IPv4	IPv6	IPv4	No
IPv4	IPv6	IPv6	No
IPv6	IPv4	IPv4	Yes
IPv6	IPv6	IPv6	No

[Table 263 on page 655](#) and [Table 264 on page 655](#) show the translated address pool selection for source NAT, destination NAT, and static NAT addresses.

Table 263: Translated Address Pool Selection for Source NAT

Source NAT Address	Destination Address	Pool Address
IPv4	IPv4	IPv4
IPv4	IPv6 - Subnet must be greater than 96	IPv6
IPv6	IPv4	IPv4
IPv6	IPv6	IPv6

Table 264: Translated Address Pool Selection for Destination NAT And Static NAT

Source NAT Address	Destination Address	Pool Address
IPv4	IPv4	IPv4 or IPv6
IPv4	IPv6 - Subnet must be greater than 96	IPv4 or IPv6
IPv6	IPv4	IPv4
IPv6	IPv6	IPv4 or IPv6

**NOTE:**

- For source NAT, the proxy Neighbor Discovery Protocol (NDP) is available for NAT pool addresses. For destination NAT and static NAT, the proxy NDP is available for destination NAT addresses.
- A NAT pool can have a single IPv6 subnet or multiple IPv6 hosts.
- You cannot configure the overflow pool if the address type is IPv6.
- NAT pools permit address entries of only one version type: IPv4 or IPv6.

**RELATED DOCUMENTATION**
[About the NAT Policies Page | 656](#)
[Creating NAT Policies | 657](#)
[Editing and Deleting NAT Policies | 659](#)
[Editing, Cloning, and Deleting NAT Policy Rules | 669](#)

## About the NAT Policies Page

To access this page, select **Configuration > NAT > NAT Policies**.

Use the **NAT Policies** page to create, modify, clone, and delete NAT policies and policy rules. You can filter and sort this information to get a better understanding of what you want to configure.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a NAT policy. See [“Creating NAT Policies” on page 657](#).
- Modify or delete a NAT policy. See [“Editing and Deleting NAT Policies” on page 659](#).
- Create, modify, clone, and delete NAT policy rules. See [“About the Single NAT Policy Page” on page 660](#).
- Search for a specific NAT policy. See [“Searching for Text in an Object Data Table” on page 385](#).
- Show or hide columns. Click the **Show Hide Columns** icon in the top right corner of the page.

### Field Descriptions

[Table 265 on page 656](#) provides guidelines on using the fields on the **NAT Policies** page.

Table 265: Fields on the NAT Policies Page

Field	Description
Name	Displays the name of the NAT policy.
Installed On	Displays the sites on which the NAT policy is assigned.
Rules	Number of rules assigned to the NAT policy.
Undeployed	Number of undeployed rules associated with the NAT policy.

### RELATED DOCUMENTATION

- [NAT Policies Overview | 653](#)
- [Creating NAT Policies | 657](#)
- [Editing and Deleting NAT Policies | 659](#)
- [About the Single NAT Policy Page | 660](#)



# Creating NAT Policies

Use the **Create NAT Policy** page to create NAT policies.

To create a NAT policy:

1. Select **Configuration > NAT > NAT Policies**.


The **NAT Policies** page appears.

2. Click the add icon (+).

The **Create NAT Policy** page displays fields required for creating and configuring a NAT policies.

3. Complete the configuration according to the guidelines provided in [Table 266 on page 657](#).

**NOTE:** You can associate only a single device or a device cluster with a site.

 **WARNING:** NAT policy restriction for sites—While you can assign one NAT policy to multiple sites, you cannot assign multiple NAT policies to a single site.

4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

A NAT policy with the configuration you provided is created.

[Table 266 on page 657](#) provides guidelines on using the fields on the **Create NAT Policy** page.

**Table 266: Fields on the Create NAT Policy Page**

Field	Description
Name	Enter a unique string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 255 characters.
Description	Enter a description for the policy intent; maximum length is 1024 characters.

Table 266: Fields on the Create NAT Policy Page (*continued*)

Field	Description
Manage Auto-Proxy ARP	<p>The Address Resolution Protocol (ARP) protocol translates IPv4 addresses to MAC addresses. Typically, an interface responds with its MAC address only when an ARP request for its IP address is received.</p> <p>A proxy ARP implies that the same interface will proxy for other IP addresses (that is, respond to ARP requests for other IP addresses).</p> <p>Managing a proxy ARP automatically enables the selection of an appropriate interface for any address (as part of a NAT rule) that is not an actual interface address. Proxy ARP management applies to translated addresses in a source NAT rule or to a destination address in a destination NAT rule.</p> <p><b>NOTE:</b> When creating a source NAT rule with pool translation, the address pool assigned must be in the same subnet as the outgoing interface selected.</p> <p><b>NOTE:</b> When creating a destination NAT rule, the external WAN interface can be a proxy for another IP address in the same subnet as the original IP address of the interface.</p>
Sites Applied On	<p>Select the sites on which you want to apply the policy in the <b>Available</b> column and move them to the <b>Selected</b> column by clicking the greater-than icon (&gt;).</p> <p><b>NOTE:</b> The <b>Available</b> column lists only those sites that do not have a NAT policy associated with them.</p>
Sequence No.	<p>Click <b>Select Policy Sequence</b>. The <b>Select Policy Sequence</b> page appears, displaying all NAT policies. Select the policy you want to reorder and select <b>Move Policy Up</b> or <b>Move Policy Down</b> to reorder your NAT policy among the existing policies.</p>

## RELATED DOCUMENTATION

[NAT Policies Overview | 653](#)

[About the NAT Policies Page | 656](#)

[Editing and Deleting NAT Policies | 659](#)

[About the Single NAT Policy Page | 660](#)

[Creating NAT Policy Rules | 662](#)

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## Editing and Deleting NAT Policies

### IN THIS SECTION

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- [Deleting NAT Policies | 659](#)

You can edit or delete a NAT policy from the **NAT Policies** page.

### Editing NAT Policies

To modify the parameters configured for a NAT Policy:

1. Select **Configuration > NAT > NAT Policies**.

The **NAT Policies** page appears.

2. Hover over the NAT policy you want to edit, and then click on the edit icon (pencil symbol) on the right side of the table.

The **Edit NAT Policy** page appears, showing the same fields as those seen when you create a new NAT policy.

3. Modify the parameters according to the guidelines provided in [“Creating NAT Policies” on page 657](#).
4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, you will see the modified NAT policy in the **NAT Policies** page.

### Deleting NAT Policies

To delete a NAT policy:

1. Select **Configuration > NAT > NAT Policies**.

The **NAT Policies** page appears.

2. Hover over the NAT policy you want to delete and then click the delete icon (X).

An alert message appears, verifying that you want to delete your selection.

3. Click **Yes** to delete the selection. If you do not want to delete, click **Cancel** instead.

If you click **Yes**, the NAT policy is deleted.

**NOTE:** When the NAT policy is deleted, the NAT rules associated with the policy are deleted from device.

## RELATED DOCUMENTATION

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## About the Single NAT Policy Page

To access this page, select **Configuration > NAT > NAT Policies**. The **NAT Policies** page appears displaying all existing NAT policies. Click on a NAT policy to view the rules associated with it.

The *Single NAT Policy* page displays the NAT rules associated with the NAT policy, and keep track of the number and order of rules for each policy. You can also create a new NAT rule, modify the configured parameters of existing NAT rules, clone, and delete NAT rules, using this page.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a NAT rule. See [“Creating NAT Policy Rules” on page 662](#).
- Update the sequence of the NAT rules using the up and down arrows that appear when you hover over the NAT rule.
- Modify, clone, and delete NAT rules. See [“Editing, Cloning, and Deleting NAT Policy Rules” on page 669](#).
- Deploy a NAT rule. See [“Deploying NAT Policy Rules” on page 671](#).
- Search for a specific NAT rule. See [“Searching for Text in an Object Data Table” on page 385](#).
- Show or hide columns. Click the **Show Hide Columns** icon in the top right corner of the page.

Field Descriptions

Table 267 on page 661 provides information on the fields in the NAT rules contained within this NAT policy.

Table 267: Fields on the Single NAT Policy Page

Field	Description
Source	Displays the source endpoint on which the NAT policy applies. A source endpoint can be an address, protocol, interface, routing instance, zone, or port.
Destination	Displays the destination endpoint on which the NAT policy applies. A destination endpoint can be an address, interface, service, routing instance, zone, or port.
Translation	Displays the translation type applied on the incoming or outgoing traffic.
Details	Displays the type of NAT rule. A NAT rule can be of type source, static, or destination.

The **Total Rules** field on the top right corner of the page displays the total number of rules associated with the NAT policy. The **Undeployed** field displays the number of undeployed rules associated with the NAT policy. To deploy undeployed rules, click **Deploy**. See “[Deploying NAT Policy Rules](#)” on page 671.

RELATED DOCUMENTATION

<a href="#">NAT Policies Overview</a>	<a href="#">  653</a>
<a href="#">About the NAT Policies Page</a>	<a href="#">  656</a>
<a href="#">Creating NAT Policies</a>	<a href="#">  657</a>
<a href="#">Editing and Deleting NAT Policies</a>	<a href="#">  659</a>
<a href="#">Creating NAT Policy Rules</a>	<a href="#">  662</a>
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<a href="#">Deploying NAT Policy Rules</a>	<a href="#">  671</a>

## Creating NAT Policy Rules

NAT processing centers on the evaluation of NAT rule sets and rules. A rule set determines the overall direction of the traffic to be processed. After a rule set that matches the traffic is found, each rule in the rule set is evaluated for a match. NAT rules can match on the following packet information:

- Source and destination address
- Source port (for source and static NAT only)
- Destination port

The first rule in the rule set that matches the traffic is used. If a packet matches a rule in a rule set during session establishment, traffic is processed according to the action specified by that rule.

To create a new NAT rule, click the NAT policy name. The *Single NAT Policy* page appears, providing you with options to configure NAT rules. Alternately, you can click on the rule number listed under **Rules** against the policy, to create a new rule. You can configure the following types of NAT rules:

- **Static**—To add a static NAT rule, click **Add Static NAT Rule** or click **Create** on the top right corner and select **Static**.
- **Source**—To add a source NAT rule, click **Add Source NAT Rule** or click **Create** on the top right corner and select **Source**.
- **Destination**—To add a destination NAT rule, click **Add Destination NAT Rule** or click **Create** on the top right corner and select **Destination**.

Depending on the type of rule you have chosen, some fields in the rule will not be applicable. In addition to defining rules between zones and interfaces, you can define NAT rules with virtual routers defined on the device. These rules can be successfully published and updated on the device.

To create a NAT policy rule:

1. Select **Configuration > NAT > NAT Policies**.

The **NAT Policies** page appears, displaying the existing NAT policies.

2. Click the name of the NAT policy for which you want to create rules. Alternately, you can click on the number listed under **Rules** against a NAT policy.

The *Single NAT Policy* page appears.

3. Click **Create** and select either **Source**, **Static**, or **Destination**. The page displays fields for creating a NAT rule.

4. Complete the configuration according to the guidelines provided in [Table 268 on page 663](#).
5. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

A NAT rule with the configuration you provided is created.

[Table 268 on page 663](#) provides guidelines on using the fields on the **Single NAT Policy** page.

**Table 268: Fields on the Single NAT Policy Page for Creating NAT Rules**

Field	Description
Source	<p>Click the add icon (+) to select the source endpoints on which the NAT policy rule applies, from the displayed list of addresses, protocols, interfaces, routing instances, zones, or ports.</p> <p>The possible endpoints for source differ based on whether the NAT rule is a source, destination, or static NAT rule.</p> <ul style="list-style-type: none"> <li>• The possible endpoints for source for a source NAT rule are: <ul style="list-style-type: none"> <li>• Addresses</li> <li>• Routing instances, interfaces, or zones</li> <li>• Protocols</li> <li>• Ports</li> </ul> </li> <li>• The possible endpoints for source for a destination NAT rule are: <ul style="list-style-type: none"> <li>• Addresses</li> <li>• Routing instances, interfaces, or zones</li> <li>• Protocols</li> </ul> </li> <li>• The possible endpoints for source for a static NAT rule are: <ul style="list-style-type: none"> <li>• Addresses</li> <li>• Routing instances, interfaces, or zones</li> <li>• Ports</li> </ul> </li> </ul> <p>You can also select a source endpoint by using the methods described in <a href="#">“Selecting NAT Source” on page 672</a>.</p>

Table 268: Fields on the Single NAT Policy Page for Creating NAT Rules (*continued*)

Field	Description
Destination	<p>Click the add icon (+) to select the destination endpoints on which the NAT policy rule applies, from the displayed list of addresses, interfaces, services, routing instances, zones, or ports.</p> <p>The possible endpoints for destination differ based on whether the NAT rule is a source, destination, or static NAT rule.</p> <ul style="list-style-type: none"> <li>• The possible endpoints for destination for a source NAT rule are: <ul style="list-style-type: none"> <li>• Addresses</li> <li>• Routing instances, interfaces, or zones</li> <li>• Services</li> <li>• Ports</li> </ul> </li> <li>• The possible endpoints for destination for a destination NAT rule are: <ul style="list-style-type: none"> <li>• Addresses</li> <li>• Services</li> <li>• Ports</li> </ul> </li> <li>• The possible endpoints for destination for a static NAT rule are: <ul style="list-style-type: none"> <li>• Addresses</li> <li>• Ports</li> </ul> </li> </ul> <p>You can select a destination endpoint by using the methods described in <a href="#">“Selecting NAT Destination” on page 676</a>.</p> <p><b>NOTE:</b> When you create a destination NAT rule for traffic arriving on an interface that terminates a VPN link, the translation process may break the VPN link. This will happen if the destination address in a destination NAT rule is specified only as the WAN-facing IP address of that interface. For example, in the following NAT rule, any traffic destined to Wan.IP will get translated to the destination pool and will break functionality of the VPN link packets terminating on this interface.</p> <p><b>[Any.Address] --&gt; [Wan.IP] :: [Dest-Pool-1]</b></p> <p>Therefore, the recommendation in such cases is to use a destination NAT rule with destination field as <b>[Address + Port]</b>. For example:</p> <p><b>[Any.Address] --&gt; [Wan.IP + Port] :: [Dest-Pool-1]</b></p>
Translation	



Table 268: Fields on the Single NAT Policy Page for Creating NAT Rules (*continued*)

Field	Description
Translation Type	<p>Specify the translation type for the incoming traffic. The translation options vary based on whether you are creating a source, static, or destination NAT rule.</p> <p>Chose one among the following translation types for a source NAT rule:</p> <ul style="list-style-type: none"> <li>• None—No translation is required for the incoming traffic.</li> <li>• Interface—Performs interface-based translations on the source or destination packet.</li> <li>• Pool—Performs pool-based translations on the source or destination packet. Click on the add icon (+) in the <b>Select Pool</b> field to choose the translation pool.</li> </ul> <p>You can also create a new pool by clicking <b>Add new pool</b>. See <a href="#">“Creating NAT Pools” on page 681</a>.</p> <p>Chose one among the following translation types for a static NAT rule:</p> <ul style="list-style-type: none"> <li>• Address—Performs address-based translations on the source or destination packet. Click on the add icon (+) in the <b>Select Address</b> field to choose the translation address.</li> </ul> <p>You can also create a new address by clicking <b>Add new address</b>. See <a href="#">“Creating Addresses or Address Groups” on page 717</a>.</p> <p><b>NOTE:</b> In an SD-WAN environment, it is mandatory that you select the routing instance corresponding to the translation address. You can select the routing instance for a translation address using the <b>Advanced Settings</b> page. For more information on <b>Advanced Settings</b>, see <a href="#">Table 270 on page 668</a>.</p> <ul style="list-style-type: none"> <li>• Corresponding IPv4—Uses the corresponding IPv4 address to perform translations on the source or destination packet.</li> </ul> <p>Chose one among the following translation types for a destination NAT rule:</p> <ul style="list-style-type: none"> <li>• None—No translation is required for the incoming traffic.</li> <li>• Pool—Performs pool-based translations on the source or destination packet. Click on the add icon (+) in the <b>Select Pool</b> field to choose the translation pool.</li> </ul> <p>You can also create a new pool by clicking <b>Add new pool</b>. See <a href="#">“Creating NAT Pools” on page 681</a>.</p> <p><b>NOTE:</b> In an SD-WAN environment, the destination NAT pool selected should be configured with a site and a routing instance corresponding to the pool address. For example, a webserver with IP address (IP1) is running in the HR department. To create a destination NAT pool corresponding to this webserver IP address, you must specify the following mandatory fields while creating the NAT pool:</p> <p><b>Address - IP1</b></p> <p><b>Site - the site hosting the webserver</b></p> <p><b>Routing instance - natVR_HR</b></p>

Table 268: Fields on the Single NAT Policy Page for Creating NAT Rules (*continued*)

Field	Description
Advanced Settings (Optional)	Click <b>Configure</b> to configure advance settings for a source or static NAT rule. For more information about advanced settings for the translation types <b>Interface</b> and <b>Pool</b> for a source NAT rule, see <a href="#">Table 269 on page 666</a> . For more information about advanced settings for the translation types <b>Interface</b> and <b>Pool</b> for a static NAT rule, see <a href="#">Table 270 on page 668</a>
<b>Details</b>	
Name	Enter a unique string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 255 characters.
Description	Enter a description for the policy intent; maximum length is 1024 characters.
End Points	<p>Create source and destination endpoints such as addresses and services.</p> <ul style="list-style-type: none"> <li>• To create an address, click the add icon (+) and select <b>Address</b>. See <a href="#">“Creating Addresses or Address Groups” on page 717</a> to configure the parameters of the address.</li> <li>• To create a service, click the add icon (+) and select <b>Service</b>. See <a href="#">“Creating Services and Service Groups” on page 724</a> to configure the parameters of the service.</li> </ul> <p>To edit the configured parameters of an address or service, hover over it and click on the edit icon (pencil symbol).</p>

[Table 269 on page 666](#) provides guidelines on using the fields on the **Advanced Settings** page for a source NAT rule.

Table 269: Fields on the Advanced Settings Page for Source NAT Rule

Field	Description
Persistent	<p>Enable the check box to ensure that all requests from the same internal transport address are mapped to the same reflexive transport address.</p> <p><b>NOTE:</b> For persistence to be applicable for the NAT policy, ensure that port overloading is turned off for the device to which the NAT policy is applicable. Use the following command to turn off port overloading for a device:</p> <pre>[Edit mode] set security nat source interface port-overloading off</pre>

Table 269: Fields on the Advanced Settings Page for Source NAT Rule (*continued*)

Field	Description
Persistent NAT Type	<p>Configure persistent NAT mappings.</p> <ul style="list-style-type: none"> <li>• Permit any remote host—All requests from a specific internal IP address and port are mapped to the same reflexive transport address. (The reflexive transport address is the public IP address and port created by the NAT device closest to the STUN server.) Any external host can send a packet to the internal host by sending the packet to the reflexive transport address.</li> <li>• Permit target host—All requests from a specific internal IP address and port are mapped to the same reflexive transport address. An external host can send a packet to an internal host by sending the packet to the reflexive transport address. The internal host must have previously sent a packet to the external host's IP address.</li> <li>• Permit target host port—All requests from a specific internal IP address and port are mapped to the same reflexive transport address. An external host can send a packet to an internal host by sending the packet to the reflexive transport address. The internal host must have previously sent a packet to the external host's IP address and port.</li> </ul>
Inactivity Timeout	<p>The amount of time, in seconds, that the persistent NAT binding remains in the site's memory when all the sessions of the binding entry have ended. When the configured timeout is reached, the binding is removed from memory. The value of the inactivity timeout can range from 60 through 7200 seconds. The default value of the inactivity timeout is 60 seconds.</p>
Maximum Session Number	<p>Maximum session number—The maximum number of sessions with which a persistent NAT binding can be associated. For example, if the maximum session number of the persistent NAT rule is 65,536, then a 65,537th session cannot be established if that session uses the persistent NAT binding created from the persistent NAT rule.</p> <p>The range is 8 through 65,536. The default is 30 sessions.</p>
Address Mapping	<p>Select an address from the available list.</p>
Pool Address	<p>Displays the NAT pool address.</p>
Host Address Base	<p>Displays the base address of the original source IP address range. The host address base is used for IP address shifting.</p>
Port Translation	<p>Displays whether port translation is enabled or disabled for this NAT rule.</p>
Overflow Pool Type	<p>Displays the source pool to be used when the current address pool is exhausted.</p>
Overflow Pool Name	<p>Displays the name of the overflow pool.</p>

Table 269: Fields on the Advanced Settings Page for Source NAT Rule (*continued*)

Field	Description
Mapped Port Type	<p>Specify the type of port mapping:</p> <ul style="list-style-type: none"> <li>• Port—Enter a value for <b>Port</b>, ranging from 0 through 65,535.</li> <li>• Range—Enter the port range values in the <b>Start</b> and <b>End</b> fields, ranging from 0 through 65,535.</li> </ul>

[Table 270 on page 668](#) provides guidelines on using the fields on the **Advanced Settings** page for a static NAT rule.

Table 270: Fields on the Advanced Settings Page for Static NAT Rule

Field	Description
Mapped Port Type	<p>Specify the type of port mapping:</p> <ul style="list-style-type: none"> <li>• Port—Enter a value for <b>Port</b>, ranging from 0 through 65,535.</li> <li>• Range—Enter the port range values in the <b>Start</b> and <b>End</b> fields, ranging from 0 through 65,535.</li> </ul>
Routing Instance	Select the routing instance for the static NAT rule.

## RELATED DOCUMENTATION

[About the Single NAT Policy Page | 660](#)

[Editing, Cloning, and Deleting NAT Policy Rules | 669](#)

[Deploying NAT Policy Rules | 671](#)

[NAT Policies Overview | 653](#)

[About the NAT Policies Page | 656](#)

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## Editing, Cloning, and Deleting NAT Policy Rules

### IN THIS SECTION

- [Editing NAT Policy Rules | 669](#)
- [Cloning NAT Policy Rules | 669](#)
- [Deleting NAT Policy Rules | 670](#)

You can edit, clone, or delete a NAT policy rule from the **NAT Policy** page.

### Editing NAT Policy Rules

To modify the parameters configured for an NAT policy rule:

1. Select **Configuration > NAT > NAT Policies**.

The **NAT Policies** page appears, displaying the NAT policies.

2. Select the NAT policy whose rules you want to edit.

The selected **NAT Policy** appears, displaying the rules associated with the NAT policy.

3. Hover over the NAT policy rule that you want to modify and click on the edit icon (pencil symbol) that appears on the right side of the NAT policy rule. The page changes to display the same fields that you use to create a NAT policy rule.

4. Complete the configuration according to the guidelines provided in [“Creating NAT Policy Rules” on page 662](#).

5. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

The modified NAT policy rule appears on the **NAT Policy** page.

### Cloning NAT Policy Rules

To clone a NAT policy rule:

1. Select **Configuration > NAT > NAT Policies**.

The **NAT Policies** page appears, displaying the NAT policies.

2. Select the NAT policy whose rule you want to clone.

The selected **NAT Policy** appears, displaying the rules associated with the NAT policy.

3. Hover over the NAT policy rule that you want to clone and click on the clone icon that appears on the right side of the NAT policy rule.

The cloned NAT policy rule appears below the current rule.

You can modify the parameters configured for the cloned NAT policy rule or rename it as required.

## Deleting NAT Policy Rules

To delete a NAT policy rule:

1. Select **Configuration > NAT > NAT Policies**.

The **NAT Policies** page appears, displaying the NAT policies.

2. Select the NAT policy whose rule you want to delete.

The selected **NAT Policy** appears, displaying the rules associated with the NAT policy.

3. Hover over the NAT policy rule you want to delete and then click the delete icon **(X)**.

An alert message appears, verifying that you want to delete your selection.

4. Click **Yes** to delete the selection. If you do not want to delete, click **Cancel** instead.

If you click **Yes**, the selected NAT policy rule is deleted.

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## Deploying NAT Policy Rules

To deploy an NAT policy rule:

1. Select **Configuration > NAT Policy > Policies**.

2. Click on the name of the NAT policy rules displayed.

The NAT policy rule page appears.

3. Click **Deploy**.

The **Deploy** page appears.

4. Configure your deployment as required. See [“Deploying Policies” on page 746](#).

All the NAT policy rules associated with the NAT policy are deployed. That is, the entire NAT policy is deployed.

**NOTE:** By default, all the NAT policy rules associated with the NAT policy (the entire NAT policy) are deployed when you click **Deploy**. Suppose you select a particular NAT policy rule and click **Deploy**, even then, all the NAT policy rules associated with that NAT policy are deployed.

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## Selecting NAT Source

### IN THIS SECTION

- [Adding an Endpoint as NAT Source | 672](#)
- [Selecting Interfaces when GWR Resides Inside an NFX Box | 672](#)
- [Selecting NAT Source Using Abbreviations | 673](#)
- [Selecting a NAT Source from the End Points Panel | 674](#)
- [Creating and Selecting a NAT Source from the End Points Panel | 674](#)
- [Creating Addresses from Source Field | 675](#)

The following procedures provides various methods using which you can choose an endpoint as a NAT source:

### Adding an Endpoint as NAT Source

View and select the source endpoint from the complete list of addresses, protocols, interfaces, zones, routing instances, or ports.

1. Click the **Source** field. A list of relevant endpoints are displayed.
2. Click the **View more results** link provided at the bottom of the source endpoints. The complete list of addresses, protocols, interfaces, and ports is displayed in the **End Points** panel on the right.
3. (Optional) Click the edit icon to edit the address, protocol, interface, zones, routing instances, or port endpoint.
4. Click check mark icon (✓) to select the endpoint as a source.

### Selecting Interfaces when GWR Resides Inside an NFX Box

The physical interfaces of an NFX box are mapped to the virtual interfaces of the Gateway Router (GWR) (vSRX) as given in [Table 271 on page 673](#). These are the default mappings provided by CSO. You may change these interface mappings based on your requirements, see [“Configuring a Single Site” on page 804](#).



Table 271: NFX and GWR Interface Mapping

NFX Physical Interface	GWR Virtual Interface
WAN 0 (ge-0/0/10)	ge-0/0/2
WAN 1 (ge-0/0/11)	ge-0/0/3
WAN 2 (xe-0/0/12)	ge-0/0/7
WAN 3 (xe-0/0/13)	ge-0/0/8
LAN-X (ge-0/0/X)	Ge-0/0/06.<vlan-id-for-X>

When you create a new NAT rule and an NFX physical interface is intended as the source endpoint, select the respective mapped GWR interface.

### Selecting NAT Source Using Abbreviations

Enter an abbreviation in the **Source** field to select the source endpoint from a filtered list of source endpoints.

- To view a filtered list of addresses, enter **ADDR** or **addr**.
- To view a filtered list of protocols, enter **PROT** or **prot**.
- To view a filtered list of interfaces, enter **INTR** or **intr**.
- To view a filtered list of zones, enter **ZONE** or **zone**.
- To view a filtered list of routing instances, enter **ROUT** or **rout**.

Click the endpoints in the filtered list to select them.

You can add a port number as a source endpoint. To do so:

1. Type **PORT** or **port** in the **Source** field.
2. Press Tab.
3. Enter the port number and press Enter.

You can also enter a range of ports by using the separator -. For example, you can enter **10-20**.

The entered port value is selected as a source endpoint.

You can also select the endpoint from the complete list of addresses, protocols, interfaces, zones, and routing instances. See [“Adding an Endpoint as NAT Source” on page 672](#).

## Selecting a NAT Source from the End Points Panel

You can select a NAT source endpoint from the **End Points** panel. Alternately, you can create a new NAT source endpoint from the **End Points** panel, see [“Creating and Selecting a NAT Source from the End Points Panel” on page 674](#).

To select an NAT source endpoint from the **End Points** panel:

1. Click the **Source** field.

2. Click the lesser-than icon (<) on the right.

The **End Points** panel appears, displaying the list of available addresses, interfaces, protocols, zones, and routing instances.

3. (Optional) To view more information about a source endpoint, click the details icon on the right of the endpoint. To edit the source endpoint, click the edit icon (pencil symbol) on the right of the endpoint.

**NOTE:** You can only edit or view details of a source endpoint if these options appear on right side of the endpoint when you hover over it. Not all endpoints provide these options.

4. Click the check mark icon (✓) to add the endpoint as a source.

## Creating and Selecting a NAT Source from the End Points Panel

To create a new source endpoint from the **End Points** panel:

1. Click the add icon (+) on the top right of the panel and select the type of endpoint you want to create, among the options provided.

Based on the option you select, the respective page appears. Fill in the required details to create a new endpoint.

- To create a new address, see [“Creating Addresses or Address Groups” on page 717](#).
- To create a new service, see [“Creating Services and Service Groups” on page 724](#).
- To create a new NAT pool, see [“Creating NAT Pools” on page 681](#).

After the endpoint is created, it appears in the **Endpoints** panel.

2. Click the check mark icon (✓) to add the new endpoint as a source.

## Creating Addresses from Source Field

You can use one of the following ways to create a new address from the **Source** field and use the newly created address as a source endpoint:

- Type the address directly in the **Source** field. If the address is valid, it is created immediately and added as a source endpoint.
- Create an address from the **Source** field, using the following steps:
  1. In the **Source** field, type **addr**. The **Add new address** link appears at the bottom of the list of addresses.
  2. Click **Add new address** to create a new address.  
The **Create Addresses** page appears.
  3. Configure the new address. See [“Creating Addresses or Address Groups” on page 717](#).
  4. Click **Save** to save the new address.

The new address is created, and will be listed as an option for the source. Select the new address to add it to the source.

## RELATED DOCUMENTATION

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[Creating NAT Policy Rules | 662](#)

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## Selecting NAT Destination

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- [Creating Services from Destination Field | 679](#)

The following procedures provides various methods that you can use to choose an endpoint as a NAT destination:

### Adding an Endpoint as NAT Destination

View and select the destination endpoint from the complete list of addresses, interfaces, services, zones, routing instances, or ports.

1. Click the **Destination** field. A list of relevant endpoints are displayed.
2. Click the **View more results** link provided at the bottom of the destination endpoints. The complete list of addresses, interfaces, services, zones, and routing instances, is displayed in the **End Points** panel on the right.
3. (Optional) Click the edit icon to edit the address, service, or port endpoint.
4. Click check mark icon (✓) to select the endpoint as a destination.

### Selecting Interfaces when GWR Resides Inside an NFX Box

The physical interfaces of an NFX box are mapped to the virtual interfaces of the Gateway Router (GWR) (vSRX) as given in [Table 272 on page 677](#). These are the default mappings provided by CSO. You may change these interface mappings based on your requirements, see [“Configuring a Single Site” on page 804](#).

Table 272: NFX and GWR Interface Mapping

NFX Physical Interface	GWR Virtual Interface
WAN 0 (ge-0/0/10)	ge-0/0/2
WAN 1 (ge-0/0/11)	ge-0/0/3
WAN 2 (xe-0/0/12)	ge-0/0/7
WAN 3 (xe-0/0/13)	ge-0/0/8
LAN-X (ge-0/0/X)	Ge-0/0/06.<vlan-id-for-X>

When you create a new NAT rule and an NFX physical interface is intended as the destination endpoint, select the respective mapped GWR interface.

### Selecting NAT Destination Using Abbreviations

Enter an abbreviation in the **Destination** field to select the destination endpoint from a filtered list of destination endpoints.

- To view a filtered list of addresses, enter **ADDR** or **addr**.
- To view a filtered list of interfaces, enter **INTR** or **intr**.
- To view a filtered list of services, enter **SVCS** or **svcs**.
- To view a filtered list of zones, enter **ZONE** or **zone**.
- To view a filtered list of routing instances, enter **ROUT** or **rout**.

Click the endpoints in the filtered list to select them.

You can add a port number as a destination endpoint. To do so:

1. Enter **PORT** or **port** in **Destination**.
2. Press Tab.
3. Enter the port number and press Enter.

You can also enter a range of ports by using the separator -. For example, you can enter **10-20**.

The entered port value is selected as a destination endpoint.

You can also select the endpoint from the complete list of addresses, interfaces, services, zones, and routing instances. See [“Adding an Endpoint as NAT Destination” on page 676](#).

## Selecting a NAT Destination from the End Points Panel

You can select a NAT destination endpoint from the **End Points** panel. Alternately, you can create a new NAT destination endpoint from the **End Points** panel, see [“Creating and Selecting a NAT Destination from the End Points Panel” on page 678](#).

To select a NAT destination endpoint from the **End Points** panel:

1. Click the **Destination** field.

2. Click the lesser-than icon (<) on the right.

The **End Points** panel appears, displaying the list of available addresses, interfaces, services, zones, and routing instances.

3. (Optional) To view more information about a destination endpoint, click the details icon on the right of the endpoint. To edit the destination endpoint, click the edit icon (pencil symbol) on the right of the endpoint.

**NOTE:** You can only edit or view details of a destination endpoint if these options appear on right side of the endpoint when you hover over it. Not all endpoints provide these options.

4. Click the check mark icon (✓) to add the endpoint as a destination.

## Creating and Selecting a NAT Destination from the End Points Panel

To create a new destination endpoint from the **End Points** panel:

1. Click the add icon (+) on the top right of the panel and select the type of endpoint you want to create, among the options provided.

Based on the option you select, the respective page appears. Fill in the required details to create a new endpoint.

- To create a new address, see [“Creating Addresses or Address Groups” on page 717](#).
- To create a new service, see [“Creating Services and Service Groups” on page 724](#).

After the endpoint is created, it appears in the **Endpoints** panel.

2. Click the check mark icon (✓) to add the new endpoint as a destination.

## Creating Addresses from Destination Field

You can use one of the following ways to create a new address from the **Destination** and use the newly created address as a destination endpoint:

- Type the address directly in the **Destination** field. If the address is valid, it is created immediately and added as a destination endpoint.
- Create an address from the **Destination** field, using the following steps:

1. In the **Destination** field, type **addr**. The **Add new address** link appears at the bottom of the list of addresses.

2. Click **Add new address** to create a new address.

The **Create Addresses** page appears.

3. Configure the new address. See [“Creating Addresses or Address Groups” on page 717](#).

4. Click **Save** to save the new address.

The new address is created, and will be listed as an option for the destination. Select the new address to add it to the destination.

## Creating Services from Destination Field

To create a new service from the **Destination** field and use the newly created service as a destination endpoint:

1. In the **Destination** link, type **svcs**. The **Add new service** link appears at the bottom of the list of services.

2. Click **Add new service** to create a new service.

The **Create Services** page appears.

3. Configure the new service. See [“Creating Services and Service Groups” on page 724](#).

4. Click **Save** to save the new service.

The new service is created, and will be listed as an option for the destination. Select the new service to add it to the destination.

## RELATED DOCUMENTATION

<a href="#">About the Single NAT Policy Page   660</a>
<a href="#">Editing, Cloning, and Deleting NAT Policy Rules   669</a>
<a href="#">Creating NAT Policy Rules   662</a>
<a href="#">Deploying NAT Policy Rules   671</a>
<a href="#">NAT Policies Overview   653</a>
<a href="#">About the NAT Policies Page   656</a>
<a href="#">Creating NAT Policies   657</a>
<a href="#">Editing and Deleting NAT Policies   659</a>

## NAT Pools Overview

A NAT pool is a set of IP addresses that you can define and use for address translation. NAT policies perform address translation by translating internal IP addresses to the addresses in these pools. Unlike static NAT, where there is a one-to-one mapping that includes destination IP address translation in one direction and source IP address translation in the reverse direction, with source NAT, you translate the original source IP address to an IP address in the address pool. With destination NAT, you translate the original destination address to an IP address in the address pool.

### RELATED DOCUMENTATION

<a href="#">NAT Policies Overview   653</a>
<a href="#">About the NAT Pools Page   680</a>
<a href="#">Creating NAT Pools   681</a>
<a href="#">Editing, Cloning, and Deleting NAT Pools   684</a>

## About the NAT Pools Page

To access this page, select **Configuration > NAT > Pools**.

Use the **NAT Pools** page to create, modify, clone, and delete NAT pools. You can filter and sort this information to get a better understanding of what you want to configure.



Tasks You Can Perform

You can perform the following tasks from this page:

- Create a NAT pool. See [“Creating NAT Pools” on page 681](#).
- Modify, clone, or delete a NAT pool. See [“Editing, Cloning, and Deleting NAT Pools” on page 684](#).
- View unused NAT pools by selecting **More > Show Unused**. Delete unused NAT pools by selecting **More > Delete Unused Items**.
- View duplicate NAT pools. Select **More > Show Duplicates**. The **Show Duplicates** page appears, displaying duplicate NAT pools. To delete a duplicate NAT pool, select it and click the delete icon (X).
- View the details of a NAT pool by selecting **More > Detailed View**, or by right-clicking a NAT pool and select **Detailed View**. See [“Viewing Object Details” on page 385](#).
- Search for a specific NAT pool. See [“Searching for Text in an Object Data Table” on page 385](#).
- Show or hide columns. Click the **Show Hide Columns** icon at the top right corner of the page.

[Table 273 on page 681](#) provides description of the fields on the **NAT Pools** page.

Table 273: Fields on the NAT Pools Page

Field	Description
Name	Displays the name of the NAT pool.
Pool Address	Displays the IP address of the NAT pool.
Description	Displays the description provided about the NAT pool when it was created.
Pool Type	Displays the NAT pool type. A NAT pool can be of type <b>Source</b> or <b>Destination</b> .

RELATED DOCUMENTATION

<a href="#">NAT Pools Overview   680</a>
<a href="#">Creating NAT Pools   681</a>
<a href="#">Editing, Cloning, and Deleting NAT Pools   684</a>

Creating NAT Pools

Use the **Create NAT Pools** page to create NAT pools.

To create a NAT pool:

1. Select **Configuration > NAT > Pools**.

The **NAT Pools** page appears.

2. Click the add icon (+).

The **Create NAT Pool** page displays fields required for creating and configuring a NAT pool.

3. Complete the configuration according to the guidelines provided in [Table 274 on page 682](#).

4. Click **OK** to save the changes. A NAT pool with the configuration you provided is created.

If you want to discard your changes, click **Cancel** instead.

[Table 274 on page 682](#) provides guidelines on using the fields on the **Create NAT Pool** page.

**Table 274: Fields on the Create NAT Pool Page**

Field	Description
<b>General Information</b>	
Name	Enter a unique string of alphanumeric characters, dashes, and underscores. Colons, and periods are not allowed, and the maximum length is 31 characters.
Description	Enter a description for the new NAT pool; maximum length is 1024 characters.
Pool Type	Select a NAT pool type to configure: <ul style="list-style-type: none"> <li>• Source</li> <li>• Destination</li> </ul>
Pool Address	Select a NAT pool address or click <b>Add new address</b> to create a new NAT pool address.
<b>Routing Instance</b>	
Site	Select the site to which the NAT pool is applicable. <p><b>NOTE:</b> In a hub and spoke topology, both hub and spoke sites are listed in the <b>Site</b> drop-down. Ensure that you select only a spoke site, when you are creating a destination NAT pool.</p>
Routing Instance	Select the required routing instance from the list of available routing instances for the selected site.

Table 274: Fields on the Create NAT Pool Page (*continued*)

Field	Description
<b>Advanced</b>	
Host Address Base	Enter the base address of the original source IP address range. The <b>Host Address Base</b> is used for IP address shifting.
Translation	<p>Select the translation type for the incoming traffic:</p> <ul style="list-style-type: none"> <li>• No Translation—There is no translation required for the incoming traffic.</li> <li>• Port/Range—Set the global default single port range for source NAT pools with port translation.</li> <li>• Overload—Multiple source addresses are translated to pool addresses. If you set <b>Overload</b> as the translation type, the value of the <b>Pool Address</b> field cannot be an IP range or subnet, but it will be a single address.</li> </ul>
Address Pooling	<p>Select a NAT address pooling behavior:</p> <ul style="list-style-type: none"> <li>• Paired—Use this option for applications that require all sessions associated with one internal IP address to be translated to the same external IP address for multiple sessions.</li> <li>• Non-Paired—Use this option for applications that can be assigned IP addresses in a round-robin fashion.</li> </ul>
Port	Enter the port number for the destination NAT pool type.
Start	Enter the start port range for the source NAT pools, if the translation type is Port/Range. The value of the port range can be any value between 1024 to 65535.
End	Enter the end port range. The value of the port range can be any value between 1024 to 65535.
Port Overloading Factor	Configure the port overloading capacity for a source NAT pool. If the factor is set to x, each translated IP address has x times the maximum number of ports available. The value of the port overloading factor can range between 2 and 32.
Address Sharing	Enable address sharing so that multiple internal IP addresses can be mapped to the same external IP address. Select this option only when the source NAT pool is configured with no port translation. When a source NAT pool has only one or a few external IP addresses available, the address sharing option with a many-to-one address mapping increases NAT resources and improves traffic.

Table 274: Fields on the Create NAT Pool Page (continued)

Field	Description
Overflow Pool Type	Select a source pool to use when the current address pool is exhausted. <ul style="list-style-type: none"><li>• Interface—Allow the egress interface IP address to support overflow.</li><li>• Pool—Name of the source address pool.<ul style="list-style-type: none"><li>• Overflow Pool—When addresses from the original source NAT pool are exhausted, IP addresses and port numbers are allocated from the overflow pool. A user-defined source NAT pool or an egress interface can be used as the overflow pool. (When the overflow pool is used, the pool ID is returned with the address.)</li></ul></li></ul>

RELATED DOCUMENTATION

<a href="#">NAT Pools Overview</a>	<a href="#">  680</a>
<a href="#">About the NAT Pools Page</a>	<a href="#">  680</a>
<a href="#">Editing, Cloning, and Deleting NAT Pools</a>	<a href="#">  684</a>

## Editing, Cloning, and Deleting NAT Pools

IN THIS SECTION

- [Editing NAT Pools](#) | 684
- [Cloning NAT Pools](#) | 685
- [Deleting NAT Pools](#) | 685

### Editing NAT Pools

To modify the parameters configured for a NAT pool:

1. Select **Configuration > NAT > Pools**.  
The **NAT Pools** page appears.
2. Select the NAT pool that you want to edit, and click the edit icon (pencil symbol) at the top right corner of the table, or right-click and select **Edit NAT Pool**.

The **Edit NAT Pool** page appears, displaying the same options that are displayed when creating a new NAT pool.

3. Modify the parameters according to the guidelines provided in [“Creating NAT Pools” on page 681](#).
4. Click **OK** to save the changes. If you click **OK**, you see the modified NAT pool in the **NAT Pools** page.  
If you want to discard your changes, click **Cancel** instead.

## Cloning NAT Pools

To clone a NAT pool:

1. Select **Configuration > NAT > Pools**.

The **NAT Pools** page appears.

2. Right-click the NAT pool that you want to clone and then click **Clone**, or select **More > Clone**.

The **Clone NAT Pool** page appears with editable fields. Modify the parameters of the cloned NAT pool as per your requirements.

3. Click **OK** to save the changes. If you click **OK**, the cloned NAT pool appears at the end of the NAT pools list in the **NAT Pools** page.  
If you want to discard your changes, click **Cancel** instead.

## Deleting NAT Pools

To delete a NAT pool:

1. Select **Configuration > NAT > Pools**.

The **NAT Pools** page appears.

2. Select the NAT pool you want to delete and then click the delete icon **(X)**.

An alert message appears, verifying that you want to delete the NAT pool.

3. Click **Yes** to delete the NAT pool. If you click **Yes**, the selected NAT pool is deleted.  
If you do not want to delete, click **Cancel** instead.

## RELATED DOCUMENTATION

[NAT Pools Overview | 680](#)

[About the NAT Pools Page | 680](#)

[Creating NAT Pools | 681](#)

# Managing SSL Proxies

## IN THIS CHAPTER

- [SSL Forward Proxy Overview | 687](#)
- [About the SSL Proxy Policy Page | 693](#)
- [Creating SSL Proxy Policy Intents | 695](#)
- [Editing, Cloning, and Deleting SSL Proxy Policy Intents | 699](#)
- [Understanding How SSL Proxy Policy Intents Are Applied | 702](#)
- [About the SSL Proxy Profiles Page | 704](#)
- [Creating SSL Forward Proxy Profiles | 706](#)
- [Editing, Cloning, and Deleting SSL Forward Proxy Profiles | 711](#)
- [Configuring and Deploying an SSL Forward Proxy Policy | 713](#)

## SSL Forward Proxy Overview

### IN THIS SECTION

- [Supported Ciphers in Proxy Mode | 689](#)
- [Server Authentication | 690](#)
- [Root CA | 691](#)
- [Trusted CA List | 691](#)
- [Session Resumption | 692](#)
- [SSL Proxy Logs | 692](#)

Secure Sockets Layer (SSL) is an application-level protocol that provides encryption technology for the Internet. SSL, also called *Transport Layer Security* (TLS), ensures the secure transmission of data between a client and a server through a combination of privacy, authentication, confidentiality, and data integrity. SSL relies on certificates and private–public key exchange pairs for this level of security.

Server authentication guards against fraudulent transmissions by enabling a Web browser to validate the identity of a Web server. Confidentiality mechanisms ensure that communications are private. SSL enforces confidentiality by encrypting data to prevent unauthorized users from eavesdropping on electronic communications. Finally, message integrity ensures that the contents of a communication have not been tampered with.

SSL forward proxy is a transparent proxy; that is, it performs SSL encryption and decryption between the client and the server, but neither the server nor the client can detect its presence. SSL forward proxy ensures that it has the keys to encrypt and decrypt the payload:

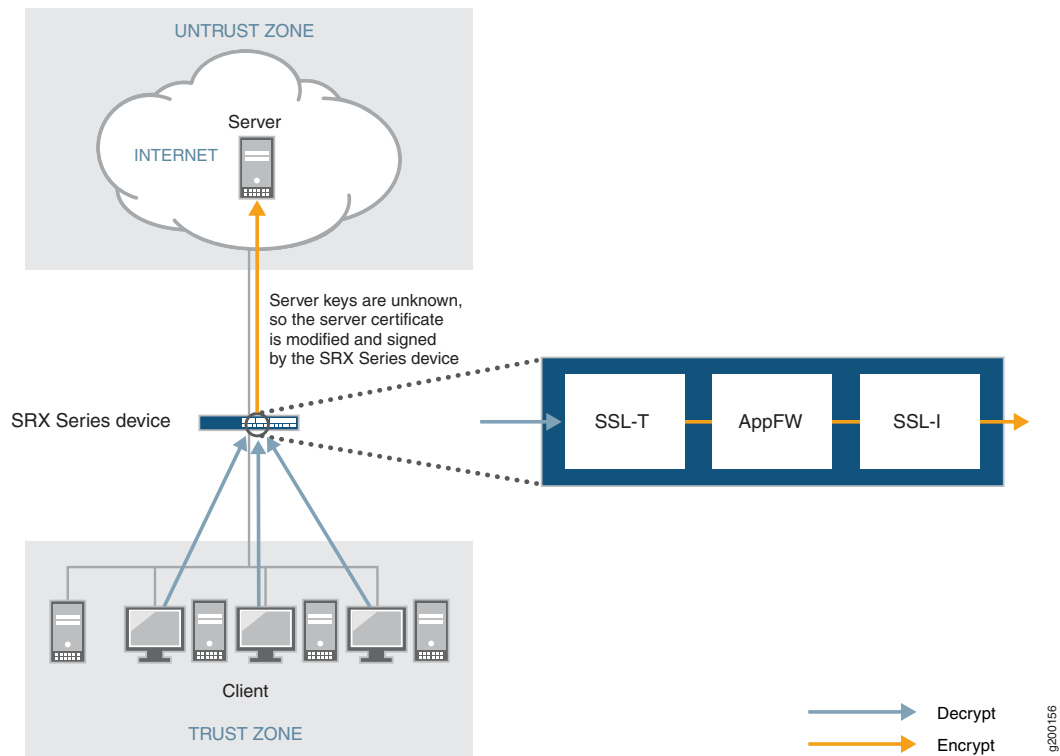
- For the server, SSL forward proxy acts as a client—Because SSL forward proxy generates the shared pre-master key, it determines the keys to encrypt and decrypt.
- For the client, SSL forward proxy acts as a server—SSL forward proxy first authenticates the original server and replaces the public key in the original server certificate with a key that is known to it. It then generates a new certificate by replacing the original issuer of the certificate with its own identity and signs this new certificate with its own public key (provided as a part of the proxy profile configuration). When the client accepts such a certificate, it sends a shared pre-master key encrypted with the public key on the certificate. Because SSL forward proxy replaced the original key with its own key, it is able to receive the shared pre-master key. Decryption and encryption take place in each direction (client and server), and the keys are different for both encryption and decryption.

[Figure 14 on page 689](#) shows how SSL forward proxy works on an encrypted payload. When application firewall (AppFW) is configured, SSL forward proxy acts as an SSL server terminating the SSL session from the client and a new SSL session is established to the server. The device decrypts and then re-encrypts all SSL forward proxy traffic. SSL forward proxy uses the following services:

- SSL-T-SSL terminator on the client side.
- SSL-I-SSL initiator on the server side.
- Configured AppFW services use the decrypted SSL sessions.



Figure 14: SSL Forward Proxy on an Encrypted Payload



This topic has the following sections:

Supported Ciphers in Proxy Mode

An SSL cipher comprises encryption ciphers, authentication method, and compression. [Table 275 on page 689](#) displays a list of supported ciphers. NULL ciphers are excluded.

The following SSL protocols are supported:

- SSLv3
- TLS1

Table 275: Supported Ciphers in Proxy Mode

SSL Cipher	Key Exchange Algorithm	Data Encryption	Message Integrity
RSA_WITH_RC4_128_MD5	RSA key exchange	128-bit RC4	Message Digest 5 (MD5) hash

Table 275: Supported Ciphers in Proxy Mode (continued)

SSL Cipher	Key Exchange Algorithm	Data Encryption	Message Integrity
RSA_WITH_RC4_128_SHA	RSA key exchange	128-bit RC4	Secure Hash Algorithm (SHA) hash
RSA_WITH_DES_CBC_SHA	RSA key exchange	DES CBC	SHA hash
RSA_WITH_3DES_EDE_CBC_SHA	RSA key exchange	3DES EDE/CBC	SHA hash
RSA_WITH_AES_128_CBC_SHA	RSA key exchange	128-bit AES/CBC	SHA hash
RSA_WITH_AES_256_CBC_SHA	RSA key exchange	256-bit AES/CBC	SHA hash
RSA_EXPORT_WITH_RC4_40_MD5	RSA-export	40-bit RC4	MD5 hash
RSA_EXPORT_WITH_DES40_CBC_SHA	RSA-export	40-bit DES/CBC	SHA hash
RSA_EXPORT1024_WITH_DES_CBC_SHA	RSA 1024 bit export	DES/CBC	SHA hash
RSA_EXPORT1024_WITH_RC4_56_MD5	RSA 1024 bit export	56-bit RC4	MD5 hash
RSA_EXPORT1024_WITH_RC4_56_SHA	RSA 1024 bit export	56-bit RC4	SHA hash
RSA-WITH-AES-256-GCM-SHA384	RSA key exchange	256-bit AES/GCM	SHA384 hash
RSA-WITH-AES-256-CBC-SHA256	RSA key exchange	256-bit AES/CBC	SHA256 hash
RSA-WITH-AES-128-GCM-SHA256	RSA key exchange	128-bit AES/GCM	SHA256 hash
RSA-WITH-AES-128-CBC-SHA256	RSA key exchange	128-bit AES/CBC	SHA256 hash

## Server Authentication

Implicit trust between the client and the device (because the client accepts the certificate generated by the device) is an important aspect of SSL proxy. It is extremely important that server authentication is not compromised; however, in reality, self-signed certificates and certificates with anomalies are in abundance. Anomalies can include expired certificates, instances of common name not matching a domain name, and so forth.

You can specify that the SSL forward proxy should ignore server authentication completely. In this case, SSL forward proxy ignores errors encountered during the server certificate verification process (such as CA signature verification failure, self-signed certificates, and certificate expiry).

You can specify whether the SSL proxy should ignore server authentication errors or not during the creation of an SSL forward proxy profile.

- If you specify that server authentication errors should *not* be ignored, the following scenarios occur:
  - If authentication succeeds, a new certificate is generated by replacing the keys and changing the issuer name to the issuer name that is configured in the root CA certificate in the proxy profile.
  - If authentication fails, the connection is dropped.
- If you specify that server authentication errors should be ignored, the following scenarios occur:

**NOTE:** We do not recommend that you configure this option for authentication because configuring it results in websites not being authenticated at all. However, you can use this option to effectively identify the root cause for dropped SSL sessions.

- If the certificate is self-signed, a new certificate is generated by replacing the keys only. The issuer name is not changed. This ensures that the client browser displays a warning that the certificate is not valid.
- If the certificate has expired or if the common name does not match the domain name, a new certificate is generated by replacing the keys and changing the issuer name to SSL-PROXY: DUMMY\_CERT:GENERATED DUE TO SRVR AUTH FAILURE. This ensures that the client browser displays a warning that the certificate is not valid.

## Root CA

In a public key infrastructure (PKI) hierarchy, the root CA is at the top of the trust path. The root CA identifies the server certificate as a trusted certificate.

## Trusted CA List

SSL forward proxy ensures secure transmission of data between a client and a server. Before establishing a secure connection, SSL forward proxy checks certificate authority (CA) certificates to verify signatures on server certificates. For this reason, a reasonable list of trusted CA certificates is required to effectively authenticate servers.

### Session Resumption

An SSL session refers to the set of parameters and encryption keys that are created when a full handshake is performed. A connection is the conversation or active data transfer that occurs within the session. The computational overhead of a complete SSL handshake and generation of master keys is considerable. In short-lived sessions, the time taken for the SSL handshake can be more than the time for data transfer. To improve throughput and still maintain an appropriate level of security, SSL session resumption provides a mechanism for caching sessions so that session information, such as the pre-master secret key and agreed-upon ciphers, can be cached for both the client and the server. The cached information is identified by a session ID. In subsequent connections, both parties agree to use the session ID to retrieve the information rather than create a new pre-master secret key. Session resumption shortens the handshake process and accelerates SSL transactions.

### SSL Proxy Logs

When logging is enabled in an SSL proxy profile, the SSL proxy can generate the messages shown in [Table 276 on page 692](#).

**Table 276: SSL Proxy Logs**

Log Type	Description
SSL_PROXY_SSL_SESSION_DROP	Logs generated when a session is dropped by SSL proxy.
SSL_PROXY_SSL_SESSION_ALLOW	Logs generated when a session is processed by SSL proxy even after encountering some minor errors.
SSL_PROXY_SESSION_IGNORE	Logs generated if non-SSL sessions are initially mistaken as SSL sessions.
SSL_PROXY_SESSION_WHITELIST	Logs generated when a session is allowed.
SSL_PROXY_ERROR	Logs used for reporting errors.
SSL_PROXY_WARNING	Logs used for reporting warnings.
SSL_PROXY_INFO	Logs used for reporting general information.

All logs contain similar information; the message field contains the reason for the log generation. One of three prefixes shown in [Table 277 on page 693](#) identifies the source of the message. Other fields are descriptively labeled.

Table 277: SSL Proxy Log Prefixes

Prefix	Description
system	Logs generated because of errors related to the device or an action taken as part of the SSL proxy profile. Most logs fall into this category.
openssl error	Logs generated during the handshake process if an error is detected by the openssl library.
certificate error	Logs generated during the handshake process if an error is detected in the certificate (X.509 related errors).

## RELATED DOCUMENTATION

[About the SSL Proxy Policy Page | 693](#)

[About the SSL Proxy Profiles Page | 704](#)

[Certificates Overview | 934](#)

## About the SSL Proxy Policy Page

To access this page, select **Configuration > SSL Proxy > Policy** in Customer Portal.

Use the SSL Proxy Policy page to view and manage SSL proxy policy intents. You can also deploy the SSL proxy policy immediately or schedule the deployment for later.

### NOTE:

- When an SSL proxy intent is deployed, the corresponding certificates used in the SSL profile (associated with the SSL proxy intent) are automatically deployed to the applicable sites.
- If the application firewall (AppFW) service is not configured in the corresponding firewall policy intent, then the SSL forward proxy services are bypassed even if an SSL proxy profile is attached to a firewall policy. Therefore, ensure that AppFW is configured for the firewall policy intents that should go through SSL inspection. If AppFW is not included in the policy intent, this does not cause an error; however, the SSL proxy action does not take place even though sessions are matched.

Tasks You Can Perform

You can perform the following tasks from this page:

- Create SSL proxy policy intents—See [“Creating SSL Proxy Policy Intents” on page 695](#).
- Edit, clone, or delete SSL proxy policy intents—See [“Editing, Cloning, and Deleting SSL Proxy Policy Intents” on page 699](#).
- Search for SSL proxy policy intents by using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.
- Filter SSL proxy policy intents—Click the filter icon and select whether you want to show or hide column filters or apply a quick filter. Depending on your selection, you can filter the policy intents based on source, destination, or both, or view the filtered results. The filtered results are displayed on the same page.
- Deploy the SSL proxy policy—See [“Deploying Policies” on page 746](#).

Field Descriptions

[Table 278 on page 694](#) describes the fields on SSL Proxy Policy page.

Table 278: SSL Proxy Policy Page Fields

Field	Description
Total Intents	Total number of policy intents in the SSL proxy policy.
Undeployed	Number of SSL proxy policy intents that have not yet been deployed.

For each SSL proxy policy intent, the following information is displayed in a grid:

Source	Source endpoints to which an SSL proxy policy intent applies.
Destination	Destination endpoints to which an SSL proxy policy intent applies..
SSL Proxy Profile	Name of the SSL proxy profile associated with the policy intent.
Options	Name and description of the SSL proxy policy intent.

RELATED DOCUMENTATION

## Creating SSL Proxy Policy Intents

You can configure an SSL proxy policy intent inline on the SSL Proxy Policy page. An SSL proxy policy intent enables you to configure an SSL proxy between source and destination endpoints by associating the latter with an SSL proxy profile.

To create an SSL proxy policy intent:

1. Select **Configuration > SSL Proxy > Policy** in Customer Portal.

The SSL Proxy Policy page appears.

2. Click the add icon (+).

The options to create policy intents appear inline on the SSL Proxy Policy page.

3. Enter the policy intent information according to the guidelines provided in [Table 279 on page 696](#)

4. Click **Save**.

The SSL proxy policy intent is saved and a confirmation message is displayed.

**NOTE:** After the policy intent is created, you must deploy the policy to ensure that the changes take effect on the applicable sites. When an SSL proxy policy intent is created, the **Undeployed** field is incremented by one indicating that intents are pending deployment.

Table 279: Create SSL Proxy Policy Intent Settings

Setting	Guideline
Source	<p>A source endpoint can be an IP address, an IP address group, a site, a site group, or a department, or or a combination of these.</p> <p><b>NOTE:</b> A source IP address value of <b>Any</b> signifies any IP address from any site.</p> <p>Specify one or more source endpoints in one of the following ways:</p> <ul style="list-style-type: none"> <li>• Click the add icon (+) and select the endpoints from the list of previously configured endpoints.</li> <li>• Filter the endpoints by entering a search term or one or more predefined keywords in the <b>Source</b> field and select one or more endpoints.  <a href="#">Table 280 on page 698</a> displays the list of predefined keywords.</li> <li>• Click the <b>View more results</b> link to view additional configured endpoints. The list of endpoints is displayed in the <b>End Points</b> panel on the right.            Do one of the following:           <ul style="list-style-type: none"> <li>• To add one endpoint at a time, select an endpoint and click the check mark icon (✓) that appears when you hover over the endpoint.</li> <li>• To add multiple endpoints, select one or more endpoints that you want to add, click the check mark icon (✓) at the top of the <b>End Points</b> panel, and select <b>Source</b>.</li> <li>• Filter the endpoints by entering a search term or one or more predefined keywords in the <b>End Points</b> field and select one or more endpoints.  <a href="#">Table 280 on page 698</a> displays the list of predefined keywords.</li> </ul> </li> </ul> <p><b>NOTE:</b> You can also create endpoints by clicking the add icon (+) in the End Points panel.  <a href="#">Table 281 on page 699</a> displays the endpoints that can be created.</p>



Table 279: Create SSL Proxy Policy Intent Settings (*continued*)

Setting	Guideline
<b>Destination</b>	<p>A destination endpoint can be an IP address, an IP address group, a site, a site group, or a department, or or a combination of these.</p> <p><b>NOTE:</b> A destination IP address value of <b>Any</b> signifies traffic going to the Internet (any address). Traffic within sites (internal traffic) is not covered by the destination IP address value of <b>Any</b>.</p> <p>If you want to cover traffic between two sites, ensure that the sites are included in both the source and destination endpoints.</p> <p>Specify one or more destination endpoints in one of the following ways:</p> <ul style="list-style-type: none"> <li>• Click the add icon (+) and select the endpoints from the list of previously configured endpoints.</li> <li>• Filter the endpoints by entering a search term or one or more predefined keywords in the <b>Destination</b> field and select one or more endpoints.</li> </ul> <p><a href="#">Table 280 on page 698</a> displays the list of predefined keywords.</p> <ul style="list-style-type: none"> <li>• Click the <b>View more results</b> link to view additional configured endpoints. The list of endpoints is displayed in the <b>End Points</b> panel on the right.</li> </ul> <p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• To add one endpoint at a time, select an endpoint and click the check mark icon (✓) that appears when you hover over the endpoint.</li> <li>• To add multiple endpoints, select one or more endpoints that you want to add, click the check mark icon (✓) at the top of the <b>End Points</b> panel, and select <b>Destination</b>.</li> <li>• Filter the endpoints by entering a search term or one or more predefined keywords in the <b>End Points</b> field and select one or more endpoints.</li> </ul> <p><a href="#">Table 280 on page 698</a> displays the list of predefined keywords.</p> <p><b>NOTE:</b> You can also create endpoints by clicking the add icon (+) in the End Points panel.</p> <p><a href="#">Table 281 on page 699</a> displays the endpoints that can be created.</p>

Table 279: Create SSL Proxy Policy Intent Settings (*continued*)

Setting	Guideline
<b>SSL Proxy Profile</b>	<p>Specify an SSL proxy profile to associate with the SSL proxy policy intent in one of the following ways:</p> <ul style="list-style-type: none"> <li>Click the add icon (+) and select the SSL proxy profile from the list of previously configured profiles.</li> <li>Filter the profiles by entering a search term in the <b>SSL Proxy Profile</b> field and select a profile.</li> <li>Create a SSL proxy profile—Click the <b>Add New Profile</b> link. The Create SSL Proxy Profiles page appears. See <a href="#">“Creating SSL Forward Proxy Profiles” on page 706</a>.</li> </ul> <p><b>NOTE:</b> You can also create profiles by clicking the add icon (+) in the End Points panel and selecting <b>SSL Proxy Profiles</b>.</p> <ul style="list-style-type: none"> <li>Click the <b>View more results</b> link to view additional configured profiles. The list of SSL proxy profiles is displayed in the <b>End Points</b> panel on the right.</li> </ul> <p>To add a profile, select it and click the check mark icon (✓) that appears when you hover over the profile.</p>
<b>Details</b>	<p>Enter the name of the SSL proxy policy intent in the first text box. If you do not enter a name, the system-generated name is used. The name that you enter must begin with an alphanumeric character and can contain alphanumeric characters and some special characters (- _). The maximum length is 63 characters.</p> <p>Enter the description of the SSL proxy policy intent in the second text box.</p>

Table 280: Keywords for Filtering Endpoints

Endpoint	Keyword	Applicable to
Address or Address Group	<b>addr</b> or <b>ADDR</b>	Source Destination
Site	<b>site</b> or <b>SITE</b>	Source Destination
Site Group	<b>stgp</b> or <b>STGP</b>	Source Destination
Department	<b>dept</b> or <b>DEPT</b>	Source Destination

Table 281: Creating Endpoints

Endpoint	Procedure
Address or Address Group	Click the add icon (+) and select <b>Address</b> . The Create Addresses page appears. See <a href="#">“Creating Addresses or Address Groups” on page 717</a> .
Site Group	Click the add icon (+) and select <b>Site Group</b> . The Create Site Group page appears. See <a href="#">“Creating Site Groups” on page 836</a> .
Department	Click the add icon (+) and select <b>Department</b> . The Create Department page appears. See <a href="#">“Adding a Department” on page 739</a> .

RELATED DOCUMENTATION

| [SSL Forward Proxy Overview](#) | 687

## Editing, Cloning, and Deleting SSL Proxy Policy Intents

IN THIS SECTION

- [Editing SSL Proxy Policy Intents](#) | 700
- [Cloning SSL Proxy Policy Intents](#) | 700
- [Deleting SSL Proxy Policy Intents](#) | 701

You can edit, clone, and delete SSL proxy policy intents from the SSL Proxy Policy page. This topic has the following sections:

## Editing SSL Proxy Policy Intents

To modify the parameters configured for an SSL proxy policy intent:

1. Select **Configuration > SSL Proxy > Policy** in Customer Portal.

The SSL Proxy Policy page appears, displaying the intents associated with the policy.

2. Hover over the SSL proxy policy intent that you want to edit, and then click the edit icon (pencil symbol) that appears on the right side of the intent.

You can now modify the policy intent inline on the SSL Proxy Policy page.

3. Modify the parameters following the guidelines provided in [“Creating SSL Proxy Policy Intents” on page 695](#).

4. Click **Save** to save your changes.

The SSL proxy policy intent is saved and a confirmation message is displayed.

**NOTE:** After a policy intent is modified, you must redeploy the policy to ensure that the changes take effect on the relevant sites. When an SSL proxy policy intent is modified, the **Undeployed** field is incremented by one indicating that intents are pending deployment.

## Cloning SSL Proxy Policy Intents

Cloning enables you to easily create a new SSL proxy policy intent based on an existing one.

To clone an SSL proxy policy intent:

1. Select **Configuration > SSL Proxy > Policy** in Customer Portal.

The **SSL Proxy Policy** page appears, displaying the intents associated with the policy.

2. Hover over the SSL proxy policy intent that you want to clone, and then click the clone icon that appears on the right side of the intent.

You can modify the cloned policy intent inline on the SSL Proxy Policy page.

3. Modify the parameters following the guidelines provided in [“Creating SSL Proxy Policy Intents” on page 695](#).

4. Click **Save** to save your changes.

The SSL proxy policy intent is cloned and a confirmation message is displayed.

**NOTE:** After a policy intent is cloned, you must redeploy the policy to ensure that the changes take effect on the relevant sites. When an SSL proxy policy intent is cloned, the **Undeployed** field is incremented by one indicating that one or more intents are pending deployment.

## Deleting SSL Proxy Policy Intents

To delete one or more SSL proxy policy intents:

1. Select **Configuration > SSL Proxy > Policy** in Customer Portal.

The **SSL Proxy Policy** page appears, displaying the intents associated with the policy.

2. Select the SSL proxy policy intents that you want to delete and then click the delete icon (X).

You are asked to confirm the delete operation.

3. Click **Yes** to delete the selected SSL proxy policy intents.

A confirmation message appears indicating the status of the delete operation.

**NOTE:** After one or more policy intents are deleted, you must redeploy the policy to ensure that the changes take effect on the applicable sites.

## RELATED DOCUMENTATION

| [About the SSL Proxy Policy Page](#) | 693

# Understanding How SSL Proxy Policy Intents Are Applied

## IN THIS SECTION

- [Example 1: Firewall Policy Intent and SSL Proxy Policy Intent Match | 702](#)
- [Example 2: Firewall Policy Intent and SSL Proxy Policy Intent Do Not Match | 703](#)
- [Example 3: Applying SSL Proxy Policy Intents on Internal \(Site-to-Site\) Traffic | 703](#)

When you deploy an SSL proxy policy, SSL proxy profiles are deployed to the applicable sites based on SSL proxy policy intents. The deployments of firewall and SSL policies are related in that firewall policy deployments take into account the last-deployed SSL snapshots and vice versa. Therefore, even if an SSL proxy profile is deployed to the applicable sites, it is *applied* only to traffic to which the firewall policy intent applies.

The decision regarding *which* SSL proxy profile is attached to a firewall policy intent is based on matching criteria between SSL proxy policy and firewall policy intents. In addition, if there is a match between the SSL proxy policy intent and the firewall policy intent, the SSL profile is applied *only* to the policy intents that are common between the firewall and the SSL proxy policies.

The following examples demonstrate the matching logic between SSL proxy policy and firewall policy intents.

### Example 1: Firewall Policy Intent and SSL Proxy Policy Intent Match

[Table 282 on page 702](#) shows an example of a firewall policy intent and an SSL proxy policy intent that match, which means that the SSL proxy profile attaches to the firewall policy intent. In this case, the firewall policy intent has a source and destination of **Any** IP address, which signifies traffic from any IP address from any site to any IP address on the Internet. The SSL proxy policy intent has a source of **Any** IP address, which signifies any IP address *from* any site, and a destination IP address of 198.51.100.0.

Therefore, there is a match between the firewall policy intent and the SSL proxy policy intent and the SSL proxy profile is applied *only* to traffic from any IP address of any site to the IP address 198.51.100.0.

**Table 282: (Example) Match Between Firewall Policy Intent and SSL Proxy Policy Intent**

Type	Source	Destination	Action or Profile
Firewall policy intent	IP address—Any	IP address—Any	Allow
SSL proxy policy intent	IP address—Any	IP address—198.51.100.0	SSL-Profile-1

### Example 2: Firewall Policy Intent and SSL Proxy Policy Intent Do Not Match

Table 283 on page 703 shows an example of a firewall policy intent and an SSL proxy policy intent that do not match, which means that the SSL proxy profiles do not attach.

Although, at first glance, it *appears* that an SSL proxy policy intent with a source and destination IP address **Any** should match a firewall policy intent with a source IP address **Any** and destination department Finance, this is not the case because of what the IP address **Any** signifies in the destination.

For both firewall and SSL proxy policy intents:

- A source IP address value of **Any** signifies any IP address *from* any site.
- A destination IP address value of **Any** signifies traffic going *to* the Internet—that is, to any IP address on the Internet. Traffic *within* sites (internal traffic) is not covered by the destination IP address value of **Any**.

In this example, the firewall policy intent applies to traffic from any IP address (from any site) to the Finance department. However, the SSL proxy policy intent applies to traffic from any IP address (from any site) to any IP address on the Internet. This means that there is no match between the firewall policy intent and the SSL proxy policy intent and the SSL proxy profile does not attach.

**Table 283: (Example) No Match Between Firewall Policy Intent and SSL Proxy Policy Intent**

Type	Source	Destination	Action or Profile
Firewall policy intent	IP address—Any	Department—Finance	Allow
SSL proxy policy intent	IP address—Any	IP address—Any	SSL-Profile-2

### Example 3: Applying SSL Proxy Policy Intents on Internal (Site-to-Site) Traffic

**NOTE:** SSL forward proxy typically might not be used for site-to-site traffic, but this example is provided as an explanation of how an SSL proxy policy intent applies to site-to-site traffic.

Consider a scenario in which you have three sites (A, B, C) and you want to configure an SSL proxy for traffic between the sites. Table 284 on page 704 displays the firewall policy and SSL proxy policy intents that you can use for such a scenario.

Both the firewall policy intent and the SSL proxy policy intent use Site A, Site B, and Site C as the source and destination. Therefore, the firewall policy intent and the SSL proxy policy intent match, and the SSL proxy profile attaches to the firewall policy intent.

**NOTE:** The destination must be Site A, Site B, and Site C because the destination IP address **Any** signifies any IP address on the *Internet*.

**Table 284: (Example) Firewall Policy and SSL Proxy Policy Intents for Site-to-Site Traffic**

Type	Source	Destination	Action or Profile
Firewall Policy Intent	Site A, Site B, Site C	Site A, Site B, Site C	Allow
SSL Proxy Policy Intent	Site A, Site B, Site C	Site A, Site B, Site C	SSL-Profile-3

## RELATED DOCUMENTATION

[SSL Forward Proxy Overview | 687](#)

[Configuring and Deploying an SSL Forward Proxy Policy | 713](#)

## About the SSL Proxy Profiles Page

To access this page, click **Configuration > SSL Proxy > Profiles** in Customer Portal.

Use the SSL Proxy Profiles page to view and manage SSL proxy profiles.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create an SSL proxy profile—See [“Creating SSL Forward Proxy Profiles” on page 706](#).
- Edit, clone, or delete an SSL proxy profile—See [“Editing, Cloning, and Deleting SSL Forward Proxy Profiles” on page 711](#).
- View the details of an SSL proxy profile—Select the SSL proxy profile for which you want to view the details and from the More or right-click menu, select **Detailed View**. The View SSL Proxy Profile Details page appears. [Table 286 on page 705](#) describes the fields on this page.
- Search for SSL proxy profiles using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.



## Widget Descriptions

Table 285 on page 705 describes the fields on the SSL Proxy Profiles page.

Table 285: Fields on the SSL Proxy Profiles Page

Field	Description
<b>Name</b>	Name of the SSL proxy profile.
<b>Preferred Cipher</b>	Preferred cipher associated with the profile.
<b>Custom Ciphers</b>	The set of ciphers, if the preferred cipher is <b>Custom</b> , which the SSH server uses to perform encryption and decryption functions.
<b>Exempted Address</b>	Addresses that can are exempted from SSL forward proxy processing.
<b>Description</b>	Description of the SSL proxy profile.
<b>Root Certificate</b>	Root certificate associated with the SSL proxy profile.

Table 286: View SSL Forward Proxy Profile Details Page Fields

Field	Description
<b>General Information</b>	
<b>Name</b>	Name of the SSL proxy profile.
<b>Description</b>	Description of the SSL proxy profile.
<b>Preferred Cipher</b>	Preferred cipher associated with the proxy profile.
<b>Custom Ciphers</b>	The set of ciphers, if the preferred cipher is <b>Custom</b> , which the SSH server uses to perform encryption and decryption functions.
<b>Flow Trace Enabled</b>	Indicates whether flow tracing is enabled or disabled.
<b>Certificates</b>	Displays the root certificate and the trusted certificate authorities associated with the root certificate.
<b>Exempted Address</b>	Addresses that can are exempted from SSL forward proxy processing.
<b>Exempted URL Categories</b>	URL categories that are exempted from SSL forward proxy processing.
<b>Actions</b>	

Table 286: View SSL Forward Proxy Profile Details Page Fields (*continued*)

Field	Description
<b>Ignore</b>	Indicates whether server authentication failure is ignored ( <b>Enabled</b> ) or not ( <b>Disabled</b> ).
<b>Session Resumption</b>	Indicates whether session information is cached to enable session resumption ( <b>Enabled</b> ) or not ( <b>Disabled</b> ).
<b>Logging</b>	If logging is enabled, indicates the type of events that are logged.
<b>Renegotiation</b>	Indicates the type of renegotiation required if there is a change in SSL parameters after a session is created and SSL tunnel transport is established.

## RELATED DOCUMENTATION

[About the SSL Proxy Policy Page | 693](#)

## Creating SSL Forward Proxy Profiles

Use this page to configure SSL forward proxy profiles. SSL proxy is enabled as an application service within a security policy. You specify the traffic that you want the SSL proxy enabled on as match criteria and then specify the SSL proxy profile to be applied to the traffic.

To create an SSL forward proxy profile:

**NOTE:** Ensure that you have a root certificate imported for the tenant before you create an SSL forward proxy profile. You can import SSL certificates (root and trusted) from the Certificates page (**Administration > Certificates**) and associate the certificates with SSL forward proxy profiles.

1. Select **Configuration > SSL Proxy > Profiles** in Customer Portal.

The SSL Proxy Profiles page appears.

2. Click the add icon (+) to create an SSL forward proxy profile.

The Create SSL Proxy Profiles page appears.

3. Complete the configuration according to the guidelines provided in [Table 287 on page 707](#).

**NOTE:** Fields marked with an asterisk (\*) are mandatory.

4. Click **OK**.

An SSL forward proxy profile is created. You are returned to the SSL Proxy Profiles page where a confirmation message is displayed.

The SSL forward proxy profile can be used in an SSL proxy policy intent (**Configuration > SSL Proxy > Policy**).

Table 287: Creating SSL Forward Proxy Profile Settings

Setting	Guideline
General Information	
Name	Enter a unique name for the profile, which is string of alphanumeric characters and some special characters (- _). No spaces are allowed and the maximum length is 63 characters.
Description	Enter a description for the profile. The maximum length is 255 characters.
Preferred Cipher	<p>Select a preferred cipher. Preferred ciphers enable you to define an SSL cipher that can be used with acceptable key strength. You can select from the following categories:</p> <ul style="list-style-type: none"><li>• <b>None</b> (Default)—Do not specify a preferred cipher.</li><li>• <b>Medium</b>—Use ciphers with key strength of 128 bits or greater.</li><li>• <b>Strong</b>—Use ciphers with key strength of 168 bits or greater.</li><li>• <b>Weak</b>—Use ciphers with key strength of 40 bits or greater.</li><li>• <b>Custom</b>—Configure a custom cipher suite.</li></ul>

Table 287: Creating SSL Forward Proxy Profile Settings (*continued*)

Setting	Guideline
<b>Custom Ciphers</b>	<p>If you specified <b>Custom</b> as the preferred cipher, you can define a custom cipher list by selecting ciphers.</p> <p>Select the set of ciphers that the SSH server can use to perform encryption and decryption functions.</p> <p>The available custom ciphers are:</p> <ul style="list-style-type: none"> <li>• rsa-with-RC4-128-md5—RSA, 128- bit RC4, MD5 hash</li> <li>• rsa-with-RC4-128-sha—RSA, 128-bit RC4, SHA hash</li> <li>• rsa-with-des-cbc-sha—RSA, DES/CBC, SHA hash</li> <li>• rsa-with-3DES-edc-cbc-sha—RSA, 3DES EDE/CBC, SHA hash</li> <li>• rsa-with-aes-128-cbc-sha—RSA, 128-bit AES/CBC, SHA hash</li> <li>• rsa-with-aes-256-cbc-sha—RSA, 256 bit AES/CBC, SHA hash</li> <li>• rsa-export-with-rc4-40-md5—RSA-export, 40 bit RC4, MD5 hash</li> <li>• rsa-export-with-des40-cbc-sha—RSA-export, 40 bit DES/CBC, SHA hash</li> <li>• rsa-export1024-with-des-cbc-sha—RSA 1024 bit export, DES/CBC, SHA hash</li> <li>• rsa-export1024-with-rc4-56-md5—RSA 1024 bit export, 56 bit RC4, MD5 hash</li> <li>• rsa-export1024-with-rc4-56-sha—RSA 1024 bit export, 56 bit RC4, SHA hash</li> <li>• rsa-with-aes-256-gcm-sha384—RSA, 256 bit AES/GCM, SHA384 hash</li> <li>• rsa-with-aes-256-cbc-sha256—RSA, 256 bit AES/CBC, SHA256 hash</li> <li>• rsa-with-aes-128-gcm-sha256—RSA, 128 bit AES/GCM, SHA256 hash</li> <li>• rsa-with-aes-128-cbc-sha256—RSA, 256 bit AES/CBC, SHA256 hash</li> <li>• ecdhe-rsa-with-aes-256-gcm-sha384—ECDHE, RSA, 256 bit AES/GCM, SHA384 hash</li> <li>• ecdhe-rsa-with-aes-256-cbc-sha384—ECDHE, RSA, 256 bit AES/CBC, SHA384 hash</li> <li>• ecdhe-rsa-with-aes-256-cbc-sha—ECDHE, RSA, 256 bit AES/CBC, SHA hash</li> <li>• ecdhe-rsa-with-aes-3des-edc-cbc-sha—ECDHE, RSA, 3DES, EDE/CBC, SHA hash</li> <li>• ecdhe-rsa-with-aes-128-gcm-sha256—ECDHE, RSA, 128 bit AES/GCM, SHA256 hash</li> <li>• ecdhe-rsa-with-aes-128-cbc-sha256—ECDHE, RSA, 128 bit AES/CBC, SHA256 hash</li> <li>• ecdhe-rsa-with-aes-128-cbc-sha—ECDHE, RSA, 128 bit AES/CBC, SHA hash</li> </ul>
<b>Flow Trace</b>	<p>Select this option to enable flow tracing to enable the troubleshooting of policy-related issues.</p>

Table 287: Creating SSL Forward Proxy Profile Settings (*continued*)

Setting	Guideline
Root Certificate	Select or add a root certificate. In a public key infrastructure (PKI) hierarchy, the root certificate authority (CA) is at the top of the trust path.
Trusted Certificate Authorities	<p>Choose whether you want to add all trusted certificates present on the device (<b>All</b>) or select specific trusted certificates. Before establishing a secure connection, the SSL proxy checks CA certificates to verify signatures on server certificates.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Specifying that all trusted certificates should be used means that all trusted certificates on a particular device (site) will be used during SSL policy deployment.</li> <li>• If you specify that all trusted certificates should be used in an SSL forward proxy profile, you must ensure that at least one trusted certificate is installed on the device.</li> </ul>
<b>Actions</b>	
Exempted Addresses	<p>Exempted addresses include addresses that you want to exempt from undergoing SSL proxy processing.</p> <p>To specify exempted addressees, select one or more addresses in the <b>Available</b> column and click the forward arrow to confirm your selection. The selected addresses are then displayed in the <b>Selected</b> column. These addresses are used to create allowlists that bypass SSL forward proxy processing.</p> <p>Because SSL encryption and decryption are complicated and expensive procedures, network administrators can selectively bypass SSL proxy processing for some sessions.</p> <p>Such sessions typically include connections and transactions with trusted servers or domains with which network administrators are very familiar. There are also legal requirements to exempt financial and banking sites. Such exemptions are achieved by configuring the IP addresses or domain names of the servers under allowlists.</p> <p><b>NOTE:</b> You can also add addresses by clicking <b>Add New Address</b>. The Create Addresses page appears. See <a href="#">“Creating Addresses or Address Groups” on page 717</a>.</p>
Exempted URL Categories	Select the previously defined URL categories to create allowlists that bypass SSL forward proxy processing. The selected URL categories are exempted during SSL inspection.

Table 287: Creating SSL Forward Proxy Profile Settings (*continued*)

Setting	Guideline
<b>Server Auth Failure</b>	<p>Select this check box to ignore errors encountered during the server certificate verification process (such as CA signature verification failure, self-signed certificates, and certificate expiry). This check box is cleared by default.</p> <p>We do not recommend this option for authentication, because configuring it results in websites not being authenticated at all. However, you can use this option to effectively identify the root cause for dropped SSL sessions.</p>
<b>Session Resumption</b>	<p>Select this check box to disable session resumption. This check box is cleared by default.</p> <p>To improve throughput and still maintain an appropriate level of security, SSL session resumption provides a session-caching mechanism so that session information, such as the pre-master secret key and agreed-upon ciphers, can be cached for both the client and server.</p>
<b>Logging</b>	<p>Select one or more events to be logged. You can choose to log all events, warnings, general information, errors, or different sessions (allowed, dropped, or ignored). Logging is disabled by default.</p>
<b>Renegotiation</b>	<p>Select one of the following options if a change in SSL parameters requires renegotiation:</p> <ul style="list-style-type: none"> <li>• <b>None</b> (default)—Indicates that renegotiation is not required.</li> <li>• <b>Allow</b>—Allow secure and nonsecure renegotiation.</li> <li>• <b>Allow-secure</b>—Allow secure negotiation only.</li> <li>• <b>Drop</b>—Drop session on renegotiation request.</li> </ul> <p>After a session is created and SSL tunnel transport has been established, a change in SSL parameters requires renegotiation. SSL forward proxy supports both secure (RFC 5746) and nonsecure (TLS v1.0 and SSL v3) renegotiation.</p> <p>When session resumption is enabled, session renegotiation is useful in the following situations:</p> <ul style="list-style-type: none"> <li>• Cipher keys need to be refreshed after a prolonged SSL session.</li> <li>• Stronger ciphers need to be applied for a more secure connection.</li> </ul>

## RELATED DOCUMENTATION

[About the SSL Proxy Policy Page](#) | 693

## Editing, Cloning, and Deleting SSL Forward Proxy Profiles

### IN THIS SECTION

- [Editing SSL Forward Proxy Profiles | 711](#)
- [Cloning SSL Forward Proxy Profiles | 712](#)
- [Deleting SSL Forward Proxy Profiles | 712](#)

You can edit, clone, and delete SSL forward proxy profiles from the SSL Proxy Profiles page. This topic has the following sections:

### Editing SSL Forward Proxy Profiles

To modify the parameters configured for an SSL forward proxy profile:

**NOTE:** If an SSL forward proxy profile is already used in an SSL proxy policy intent, we recommend that you do not modify the profile name. If you want to create a profile with a new name, clone the existing profile and modify the name.

1. Select **Configuration > SSL Proxy > Profiles**.

The SSL Proxy Profiles page appears, displaying the existing SSL forward proxy profiles.

2. Select the SSL forward proxy profile that you want to edit and click the edit icon (pencil). Alternatively, right-click a profile and select **Edit Profile**.

The Edit SSL Proxy Profile page appears showing the same fields that are presented when you create an SSL forward proxy profile.

3. Modify the SSL forward proxy profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the SSL Proxy Profiles page. A confirmation message appears, indicating the status of the edit operation.

**NOTE:** If an SSL forward proxy profile that is associated with an SSL proxy policy intent is modified, you must redeploy the SSL proxy policy to ensure that the changes take effect on the site.

## Cloning SSL Forward Proxy Profiles

Cloning enables you to easily create a new SSL forward proxy profile based on an existing one.

To clone an SSL forward proxy profile:

1. Select **Configuration > SSL Proxy > Profiles**.

The SSL Proxy Profiles page appears displaying the existing SSL forward proxy profiles.

2. Select the SSL forward proxy profile that you want to clone and select **More > Clone**. Alternatively, right-click a profile and select **Clone**.

The Clone SSL Proxy Profile page appears, showing the same fields that are presented when you create an SSL forward proxy profile.

3. Modify the SSL forward proxy profile fields as needed.

4. Click **OK** to save your changes.

You are taken to the SSL Proxy Profiles page. A confirmation message appears, indicating the status of the clone operation.

## Deleting SSL Forward Proxy Profiles

To delete one or more SSL forward proxy profiles:

**NOTE:** If you try to delete an SSL forward proxy profile that is associated with an SSL proxy policy intent, a message is displayed indicating that the profile cannot be deleted.

1. Select **Configuration > SSL Proxy > Profiles**.

The SSL Proxy Profiles page appears, displaying the existing SSL forward proxy profiles.

2. Select one or more SSL forward proxy profiles that you want to delete and click the delete icon (**X**). Alternatively, right-click a profile and select **Delete SSL Proxy Profile**.



An alert message appears asking you to confirm the delete operation.

3. Click **Yes** to delete the selected SSL forward proxy profiles.

A confirmation message appears indicating the status of the delete operation.

**NOTE:** If the deleted SSL forward proxy profile is associated with an SSL proxy policy intent, you must redeploy the SSL proxy policy to ensure that the changes take effect on the site.

## RELATED DOCUMENTATION

[Creating SSL Forward Proxy Profiles | 706](#)

[About the SSL Proxy Profiles Page | 704](#)

## Configuring and Deploying an SSL Forward Proxy Policy

The following is the workflow for configuring and deploying an intent-based SSL forward proxy policy in CSO:

1. Obtain the root certificate and private key from your trusted certificate authority (CA).
2. Combine the root certificate and private key into a single file.
3. Import the certificate and private key file (on the Import Certificate page); see [“Importing a Certificate” on page 936](#).
4. (Optional) Install the imported certificate on one or more sites (on the Install Certificate page); see [“Installing and Uninstalling Certificates” on page 939](#).
5. By default, Juniper Networks ships trusted certificates for sites that use HTTPS. These certificates are installed automatically by CSO when the site is successfully provisioned.  
  
If you want to use additional trusted certificates, import and install the certificates as explained in [Step 3](#) and [4](#).
6. Create an SSL proxy profile (on the Create SSL Proxy Profiles) page; see [“Creating SSL Forward Proxy Profiles” on page 706](#).

**NOTE:**

- Use the imported root certificate when you create the SSL proxy profile.
- For trusted certificates, specify that all trusted certificates on the device are used (select **All** in the **Trusted Certificate Authorities** field).

7. Create an SSL proxy policy intent that uses the SSL proxy profile that you created (on the SSL Proxy Policy page); see [“Creating SSL Proxy Policy Intents” on page 695](#).

8. Deploy the SSL proxy policy; see [“Deploying Policies” on page 746](#).

**NOTE:**

- Ensure that the root and trusted certificates are imported into CSO before the policy is deployed.
- If you have not installed the certificates referenced in the SSL proxy profile, then they are automatically installed when the SSL proxy policy is deployed.

9. For Internet access from an SRX Series device by using the SSL proxy, ensure that you import the root certificate (obtained in Step 1) into the browsers of the clients accessing the Internet.

**NOTE:** If you do not import the certificate, the traffic does not go through for clients in the LAN segments.

## RELATED DOCUMENTATION

[SSL Forward Proxy Overview | 687](#)

[Understanding How SSL Proxy Policy Intents Are Applied | 702](#)

# Managing Shared Objects

## IN THIS CHAPTER

- [Addresses and Address Groups Overview | 715](#)
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## Addresses and Address Groups Overview

An address specifies an IP address or a hostname. You can create addresses that can be used across all policies. Addresses are used in firewall and NAT services and apply to the corresponding policies. If you know only the hostname, you enter it into the **Hostname** field and use the address resolution option to resolve it to an IP address. You can also resolve an IP address to the corresponding hostname.

After you create an address, you can combine it with other addresses to form an address group. Address groups are useful when you want to apply the same policy to multiple addresses.

Contrail Service Orchestration (CSO) manages its address book at the global level, assigning objects to devices that are required to create policies. An address book is a collection of addresses and address groups that are available in a security zone. If the device is capable of using a global address book, CSO pushes address objects used in the policies to the global address book of the device.

## RELATED DOCUMENTATION

[About the Addresses Page | 716](#)

[Creating Addresses or Address Groups | 717](#)

[Editing, Cloning, and Deleting Addresses and Address Groups | 720](#)

## About the Addresses Page

To access this page, select **Configuration > Shared Objects > Addresses**.

Use this page to create, edit, and delete addresses and address groups. Addresses and address groups are used in firewall and NAT services. After you create an address, you can combine it with other addresses to form an address group. Address groups are useful when you want to apply the same policy to multiple services.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create an address or address group. See [“Creating Addresses or Address Groups” on page 717](#).
- Modify, clone, or delete an address or address group. See [“Editing, Cloning, and Deleting Addresses and Address Groups” on page 720](#).
- View the configured parameters of an address or address group. Click the details icon that appears when you hover over the name of an image or select **More > Detailed View**. See [“Viewing Object Details” on page 385](#).
- Show or hide columns about the address or address group. See [“Sorting Objects” on page 384](#).
- Search for an address or address group. See [“Searching for Text in an Object Data Table” on page 385](#).

### Field Descriptions

[Table 288 on page 717](#) provides guidelines on using the fields on the Addresses page.

Table 288: Fields on the Addresses Page

Field	Description
Name	View the name of the address or address group.
Type	View the type of the address or address group.
Hostname	View the hostname of the address.
IP Address	View the IP address associated with the address.
Description	View the description provided about the address or address group when it was created.

## RELATED DOCUMENTATION

[Addresses and Address Groups Overview | 715](#)

[Creating Addresses or Address Groups | 717](#)

[Editing, Cloning, and Deleting Addresses and Address Groups | 720](#)

## Creating Addresses or Address Groups

Use the **Addresses** page to create addresses and address groups. Addresses and address groups are used in firewall and NAT services. After you create an address, you can combine it with other addresses to form an address group. Address groups are useful when you want to apply the same policy to multiple services.

To create an address or address group:

1. Select **Configure > Shared Objects > Addresses**.

The **Addresses** page appears.

2. Click on the add icon (+).

The **Create Addresses** page appears.

3. Complete the configuration according to the guidelines provided in [Table 289 on page 718](#) and [Table 290 on page 720](#).

4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

A new address or address group with your configurations is created. You can use this object in firewall or NAT policies.

**Table 289: Fields on the Create Addresses Page**

Field	Description
Object Type	Select Address or Address Group. If you select Address Group, then the screen changes so you can select the addresses you want to include in your address group. <a href="#">Table 290 on page 720</a> describes address group configuration parameters.
Name	Enter a unique name for the address. It must begin with an alphanumeric character and cannot exceed 63 characters. Dashes and underscores are allowed.
Description	Enter a description for your address; maximum length is 1,024 characters. You should make this description as useful as possible for all administrators.

Table 289: Fields on the Create Addresses Page (*continued*)

Field	Description
Type	<p>Select a type of address and fill in the corresponding fields. Available types are:</p> <ul style="list-style-type: none"> <li>• <b>Host</b> <ul style="list-style-type: none"> <li>• <b>Host IP</b>—Enter the IPv4 or IPv6 host IP address. For example: 192.0.2.0 or 2001:db8:4136:e378:8000:63bf:3fff:fdd2. If you do not know the IP address, you can enter the hostname and click <b>Look up hostname</b>.</li> <li>• <b>Hostname</b>—Enter the hostname. It must begin with an alphanumeric character and cannot exceed 63 characters. Dashes and underscores are allowed. If you do not know the host name, you can enter the IP address and click <b>Look up IP address</b>. For example, enter www.company.com and click <b>Look up IP address</b>. Hostname lookup is supported for IPv4 and IPv6 addresses.</li> </ul> </li> <li>• <b>Range</b> <ul style="list-style-type: none"> <li>• <b>Start Address</b>—Enter a starting IPv4 or IPv6 address for the address range. For example: 192.0.2.0 or 2001:db8:4136:e378:8000:63bf:3fff:fdd2.</li> <li>• <b>End Address</b>—Enter an ending IPv4 or IPv6 address for the address range. The range is validated after you enter the address.</li> </ul> <p><b>NOTE:</b> An address range is configured on a managed device as an address set with one or more network address objects covering the specified address range.</p> </li> <li>• <b>Network</b> <ul style="list-style-type: none"> <li>• <b>Network</b>—Enter the network IP address. For example: 192.0.2.0. IPv6 is also supported. For example: 2001:db8:4136:e378:8000:63bf:3fff:fdd2.</li> <li>• <b>Subnet Mask</b>—Enter the subnet mask for the network range. For example, IPv4 netmask: 192.0.2.0/24. The subnet mask is validated as you enter it. You must enter the correct subnet mask in accordance with the network value. For example, IPv6 netmask: 2001:db8:4136:e378:8000:63bf:3fff:fdd2.</li> </ul> </li> <li>• <b>Wildcard</b> <ul style="list-style-type: none"> <li>• <b>Network</b>—Enter the network IPv4 or IPv6 address. For example: 192.0.2.0 or 2001:db8:4136:e378:8000:63bf:3fff:fdd2.</li> <li>• <b>Wildcard Mask</b>—Enter the wildcard mask for the network range. For example: 0.0.0.255.</li> </ul> </li> <li>• <b>DNS Host</b> <ul style="list-style-type: none"> <li>• <b>DNS Name</b>—Enter the DNS name. For example: company.com. Only alphanumeric characters, dashes, and periods are accepted. This name cannot exceed 69 characters in length, and must end with an alphanumeric character.</li> </ul> </li> </ul>

Table 290: Address Group Settings

Field	Description
Object Type	Select Address or Address Group. If you select Address Group, then the screen changes so you can select the addresses you want to include in your address group. <a href="#">Table 289 on page 718</a> describes address group configuration parameters.
Name	Enter a unique name for the address group. It must begin with an alphanumeric character and cannot exceed 63 characters. Dashes and underscores are allowed.
Description	Enter a description for your address group; maximum length is 1,024 characters. You should make this description as useful as possible for all administrators.
Addresses	Select the check box beside each address you want to include in the address group. Click the greater-than icon (>) to move the selected address or addresses from the <b>Available</b> column to the <b>Selected</b> column. Note that you can use the fields at the top of each column to search for addresses.

#### RELATED DOCUMENTATION

[Addresses and Address Groups Overview | 715](#)

[About the Addresses Page | 716](#)

[Editing, Cloning, and Deleting Addresses and Address Groups | 720](#)

## Editing, Cloning, and Deleting Addresses and Address Groups

### IN THIS SECTION

- [Editing Addresses and Address Groups | 721](#)
- [Cloning Addresses and Address Groups | 721](#)
- [Deleting Addresses and Address Groups | 722](#)

You can edit, clone, and delete addresses and address groups from the **Addresses** page.



## Editing Addresses and Address Groups

To modify the parameters configured for an address or address group:

1. Select **Configuration > Shared Objects > Addresses**.

The **Addresses** page appears.

2. Select the address or address group that you want to edit, and then click **More > Edit**, or click the edit icon (pencil symbol) at the right top corner of the table, or right-click and select **Edit**.

The **Edit** page appears, showing the same options as displayed when you create a new address or address group.

3. Modify the parameters according to the guidelines provided in [“Creating Addresses or Address Groups” on page 717](#).
4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

When you click **OK**, the modified address or address group is displayed on the **Addresses** page.

**NOTE:** When you edit an address that is deployed as part of a policy, you will need to redeploy that policy in order for the changes to take effect. See [“Deploying Policies” on page 746](#) for more information.

## Cloning Addresses and Address Groups

To clone an address or address group:

1. Select **Configuration > Shared Objects > Addresses**.

The **Addresses** page appears.


2. Right-click the address or address group that you want to clone and then click **Clone**, or select **More > Clone**.

The **Clone** page appears with editable fields.

3. Modify the configured parameters of the address or address group, as required.
4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you select **OK**, the cloned address or address group is saved.

**Deleting Addresses and Address Groups**

**NOTE:** Only addresses or address groups that have not been referenced in any policy can be deleted. If you try to delete such an address or address group, an error message will be displayed.

To delete an address or address group:

1. Select **Configuration > Shared Objects > Addresses**.  
The **Addresses** page appears.
2. Select the address or address group you want to delete and then click the delete icon **(X)** .  
An alert message appears verifying that you want to delete your selection.
3. Click **Yes** to delete the address or address group. If you do not want to delete, click **Cancel** instead.

If you select **Yes**, the selected address or address group is deleted, unless it is referenced in a policy.

**RELATED DOCUMENTATION**

<a href="#">Addresses and Address Groups Overview   715</a>
<a href="#">About the Addresses Page   716</a>
<a href="#">Creating Addresses or Address Groups   717</a>
<a href="#">Viewing Object Details   16</a>
<a href="#">Sorting Objects   17</a>
<a href="#">Searching for Text in an Object Data Table   16</a>

## Services and Service Groups Overview

A service refers to an application on a device. For example, Domain Name Service (DNS). Services are based on protocols and ports used by an application, and when added to a policy, a configured service can be applied across all devices. Services are candidates for firewall policy end-points. The protocols used to create a service include: TCP, UDP, MS-RPC, SUN-RPC, ICMP, and ICMPv6. Contrail Service Orchestration (CSO) also includes predefined, commonly used services, and you cannot modify or delete them.

Once you create a service, you can combine it with other services to form a service group. Service groups are useful when you want to apply the same policy to multiple services, as this enables you create fewer policies.

### RELATED DOCUMENTATION

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[About the Services Page | 723](#)

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[Creating Services and Service Groups | 724](#)

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[Editing, Cloning, and Deleting Services and Service Groups | 731](#)

## About the Services Page

To access this page, select **Configuration > Shared Objects > Services**.

Use the **Services** page to create, modify, clone and delete service or service groups. You can also create and manage protocols, that you use to create services.

A service refers to an application on a device, such as Domain Name Service (DNS). Services are based on protocols and ports used by an application. When added to a policy, a configured service can be applied across all devices. The protocols available to create a service include: TCP, UDP, SUN-RPC, MS-RPC, ICMP, ICMPv6, and so on.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a service or service group. See [“Creating Services and Service Groups” on page 724](#).
- Modify, clone or delete a service or service group. See [“Editing, Cloning, and Deleting Services and Service Groups” on page 731](#).

- View the configured parameters of a service or service group. Click the details icon that appears when you hover over the name of a service or service group, or click **More > Detailed View**. See [“Viewing Object Details” on page 385](#).
- Show or hide columns about the services or service groups. See [“Sorting Objects” on page 384](#).
- Search a specific service or service group. See [“Searching for Text in an Object Data Table” on page 385](#).

### Field Descriptions

[Table 291 on page 724](#) provides guidelines on using the fields on the **Services** page.

**Table 291: Fields on the Service Page**

Field	Description
Name	Name of the service or service group.
Type	Specifies whether the object is a service or service group.
Description	Description about the service or service group.
Predefined or Custom	List of predefined services and service groups, and a list of custom services or service groups that you created.

### RELATED DOCUMENTATION

<a href="#">Services and Service Groups Overview   723</a>
<a href="#">Creating Services and Service Groups   724</a>
<a href="#">Editing, Cloning, and Deleting Services and Service Groups   731</a>

## Creating Services and Service Groups

Use the **Create Service** page to create a service. You can create services based on protocols and ports used by an application. The protocols used to create a service include: TCP, UDP, MS-RPC, SUN-RPC, ICMP, and ICMPv6. Once you create a service, you can combine it with other services to form a service group. Service groups are useful when you want to apply the same policy to multiple services.

You can also create or modify protocols that you base your services on, from the **Services** page.

To configure a service or service group:

1. Select **Configuration > Shared Objects > Services**.

The **Services** page appears.

2. Click the add icon (+) to create service or service group.

The **Create Services** page appears.

3. Complete the configuration of a service according to the guidelines provided in [Table 292 on page 725](#).

If you want to configure a service group, see [Table 293 on page 726](#).

4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

A new service or service group with the configuration you provided is created. You can use this service or service group as an endpoint in firewall policies.

[Table 292 on page 725](#) provides guidelines on using the fields to create a service.

**Table 292: Service Settings**

Field	Description
Object Type	Select <b>Service</b> or <b>Service Group</b> . If you select <b>Service Group</b> , then the page changes so you can select the services you want to include in your service group.
Name	Enter a unique name for the service. It must begin with an alphanumeric character and cannot exceed 63 characters; dashes and underscores are allowed.
Description	Enter a description for your service. You should make this description as useful as possible for all administrators.
Protocols	<p>Select the protocol you want to associate with the service. You can use existing protocols that are listed in the <b>Protocols</b> table. You can also create a new protocol, or edit existing protocols:</p> <ul style="list-style-type: none"> <li>• To create a new protocol, click on the add icon (+). See <a href="#">“Creating Protocols” on page 726</a>.</li> <li>• To edit an existing protocol, click on the edit icon (pencil symbol). See <a href="#">“Editing and Deleting Protocols” on page 730</a>.</li> </ul>

[Table 293 on page 726](#) provides guidelines on using the fields to create a service group.

Table 293: Service Group Settings

Field	Description
Object Type	Select <b>Service</b> or <b>Service Group</b> . If you select <b>Service Group</b> , then the screen changes so you can select the services you want to include in your service group.
Name	Enter a unique name for the service. It must begin with an alphanumeric character and cannot exceed 63 characters; dashes and underscores are allowed.
Description	Enter a description for your service group. You should make this description as useful as possible for all administrators.
Services	Select the service you want to include in the service group and click the greater-than icon (>) to move the selected service or services from the <b>Available</b> column to the <b>Selected</b> column. You can use the search field at the top of each column to search for listed services.

## RELATED DOCUMENTATION

[Services and Service Groups Overview | 723](#)

[About the Services Page | 723](#)

[Editing, Cloning, and Deleting Services and Service Groups | 731](#)

[Creating Protocols | 726](#)

[Editing and Deleting Protocols | 730](#)

## Creating Protocols

Use the **Create Protocol** page to create TCP, UDP, MS-RPC, SUN-RPC, ICMP, and ICMPv6 protocols, that can be used in services. A service refers to an application on a device. Services are based on protocols and ports used by an application.

To create a protocol:

1. Select **Configuration > Shared Objects > Services**.

The **Services** page appears.

2. Click the add icon (+) to create service or service group.

The **Create Services** page appears.

- Click the add icon (+) that appears about the **Protocols** table.

The **Create Protocol** page appears.

- Complete the configuration of the protocol according to the guidelines provided in [Table 294 on page 727](#) and [Table 295 on page 728](#).
- Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

A new protocol with the configuration you provided is created. You can use this protocol to create services.

[Table 294 on page 727](#) provides guidelines on using the fields to create a protocol.

**Table 294: Fields on Create Protocol Page Settings**

Field	Description
<b>General Information</b>	
Name	Enter a unique name for the protocol. It must begin with an alphanumeric character and cannot exceed 63 characters; dashes and underscores are allowed.
Description	Enter a description for your protocol. It cannot exceed 1,024 characters.
Type	Select the type of the protocol you want to create and fill in the corresponding fields. The available types of protocols are: TCP, UDP, ICMP, SUN-RPC, MS-RPC, ICMPv6, and so on. If you select TCP, continue with this table. See <a href="#">Table 295 on page 728</a> for the other protocol types.
Destination Port	Enter a destination port number for TCP. The range is from 0 to 65, 535.
<b>Advanced Settings</b>	
Enable Inactivity Timeout	Enabled by default. Enter a timeout value for this protocol in seconds or minutes. The maximum values are 129,600 seconds or 2,160 minutes.
ALG	Select an ALG (Application Layer Gateway) service option if applicable.
Source Ports and Port Ranges	Enter the source port or port range for the protocol.

[Table 295 on page 728](#) includes the settings and guidelines for the various protocol types.

Table 295: Create Protocol Type Settings

Field	Description
<b>UDP</b>	
Destination Port	Enter a destination port number for UDP. This is a value or value range from 0 through 65,535.
<b>Advanced Settings</b>	
Enable Inactivity Timeout	Selected by default. Enter a timeout value for this protocol in seconds or minutes. The maximum values are 129,600 seconds and 2,160 minutes.
ALG	Select an ALG (Application Layer Gateway) service option if applicable.
Source Ports and Port Ranges	Enter a source port or port range for UDP. This is a value or value range from 0 through 65,535.
<b>ICMP</b>	
Enable Inactivity Timeout	Enabled by default. Enter a timeout value for this protocol in seconds or minutes. The maximum values are 129,600 seconds and 2,160 minutes.
ICMP Type	Enter a value from 0 through 225 for the ICMP message type. For example, enter 1 for host unreachable. You can find these values in RFC 792.
ICMP Code	Enter a value from 0 through 225 for the ICMP code. For example, enter 0 for echo reply. You can find these values in RFC 792.
<b>SUN-RPC</b>	
Destination Port (available if Enable ALG is selected)	Enter a destination port for SUN-RPC. This is a value or value range from 0 through 65,535.
Enable Inactivity Timeout	Enabled by default. Enter a timeout value for this protocol in seconds or minutes. The maximum values are 129,600 seconds and 2,160 minutes.
Enable ALG	Not selected by default. If you enable ALG for this protocol, you must enter a destination port in the field that becomes available.
RPC Program Number	Enter a value or value range for the RPC (remote procedure call) service. For example, enter 100,017 for remote execution. You can find these values in RFC 5531.
Protocol Type	Select TCP or UDP for the protocol type.



Table 295: Create Protocol Type Settings (*continued*)

Field	Description
<b>MS-RPC</b>	
Destination Port (available if Enable ALG is selected)	Enter a destination port for MS-RPC. This is a value or value range from 0 through 65,535.
Enable Inactivity Timeout	Enabled by default. Enter a timeout value for this protocol in seconds or minutes. The maximum values are 129,600 seconds and 2,160 minutes.
Enable ALG	Not selected by default. If you enable ALG for this protocol, you must enter a destination port number in the field that becomes available.
UUID	Enter the corresponding UUID value for the MS-RPC service. For predefined values, refer to MS-RPC UUID Mappings.
Protocol Type	Select TCP or UDP for the protocol type.
<b>ICMPv6</b>	
Enable Inactivity Timeout	Selected by default. Enter a timeout value for this protocol in seconds or minutes. The maximum values are 129,600 seconds and 2,160 minutes.
ICMP Type	Enter a value from 0 through 225 for the ICMPv6 message type. You can find these values in RFC 4443.
ICMP Code	Enter a value from 0 through 225 for the ICMPv6 code. You can find these values in RFC 4443.
Destination Port	Use other to create protocols that do not match the provided type categories. Enter a destination port for the other protocol. This is a value or value range from 0 through 65,535.

## RELATED DOCUMENTATION

[Editing and Deleting Protocols | 730](#)
[About the Services Page | 723](#)
[Creating Services and Service Groups | 724](#)

## Editing and Deleting Protocols

### IN THIS SECTION

- [Editing Protocols | 730](#)
- [Deleting Protocols | 731](#)

You can edit and delete protocols through the **Services** page.

### Editing Protocols

To modify the parameters configured for a protocol:

1. Select **Configuration > Shared Objects > Services**.

The **Services** page appears.

2. Select the service to which the protocol you want to edit is associated, and click on the edit icon (pencil symbol) on the right top corner of the table, or right-click and select **Edit Service**.

The **Edit Service** page appears, listing the protocols associated with the service in **Protocols** table.

3. Select the protocol that you want to edit, and then click on the edit icon (pencil symbol) on the right top corner of the **Protocols** table, or right-click and select **Edit Protocol**.

The **Edit Protocol** page appears, showing the same fields as those seen when you create a new protocol.

4. Modify the parameters of the protocol according to the guidelines provided in [“Creating Protocols” on page 726](#).

5. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, the modified protocol appears in the **Protocols** table.

## Deleting Protocols

To delete a protocol:

1. Select **Configuration > Shared Objects > Services**.  
The **Services** page appears.
2. Select the service to which the protocol you want to delete is associated, and click on the edit icon (pencil symbol) on the right top corner of the table, or right-click and select **Edit Service**.  
The **Edit Service** page appears, listing the protocols associated with the service in **Protocols** table.
3. Select the protocol you want to delete and then click the delete icon **(X)**.  
An alert message appears, verifying that you want to delete the protocol.
4. Click **Yes** to delete the protocol. If you do not want to delete, click **Cancel** instead.

If you click **Yes**, the selected protocol is deleted.

### RELATED DOCUMENTATION

<a href="#">Services and Service Groups Overview   723</a>
<a href="#">About the Services Page   723</a>
<a href="#">Creating Services and Service Groups   724</a>
<a href="#">Editing, Cloning, and Deleting Services and Service Groups   731</a>
<a href="#">Creating Protocols   726</a>

## Editing, Cloning, and Deleting Services and Service Groups

### IN THIS SECTION

- [Editing Services and Service Groups | 732](#)
- [Cloning Services or Service Groups | 732](#)
- [Deleting Services and Service Groups | 733](#)

You can edit, clone, and delete services and service groups from the **Services** page.

## Editing Services and Service Groups

To modify the parameters configured for a service or service group:

1. Select **Configuration > Shared Objects > Services**.

The **Services** page appears.

2. Select the service or service group that you want to edit, and click on the edit icon (pencil symbol) on the right top corner of the table, or right-click and select **Edit Service**.

The **Edit Service** page appears, displaying the same options that are displayed when creating a new service or service group.

3. Modify the parameters according to the guidelines provided in [“Creating Services and Service Groups” on page 724](#).
4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, you will see the modified service or service group in the **Services** page.

## Cloning Services or Service Groups

To clone a service or service group:

1. Select **Configuration > Shared Objects > Services**.

The **Services** page appears.

2. Right-click on the service or service group that you want to clone and then click **Clone**, or select **More > Clone**.

The **Clone Service** page appears with editable fields.

3. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, the cloned service or service group will appear beneath the selected service or service group.

## Deleting Services and Service Groups

To delete a service or service group:

1. Select **Configuration > Shared Objects > Services**.

The **Services** page appears.

2. Select the service or service group you want to delete and then click the delete icon **(X)**.

An alert message appears, verifying that you want to delete the service or service group.

3. Click **Yes** to delete the service or service group. If you do not want to delete, click **Cancel** instead.

If you click **Yes**, the selected service or service group is deleted.

### RELATED DOCUMENTATION

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[Services and Service Groups Overview | 723](#)

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[About the Services Page | 723](#)

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[Creating Services and Service Groups | 724](#)

## Application Signatures Overview

Juniper Networks regularly updates the predefined application signature database, making it available to subscribers on the Juniper Networks website. This database includes signature definitions of known application objects that can be used to identify applications for tracking, firewall policies, and quality-of-service prioritization.

Use the **Application Signatures** page to get an overall, high-level view of your application signature settings. You can filter and sort this information to get a better understanding of what you want to configure.

### RELATED DOCUMENTATION

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[About the Application Signatures Page | 734](#)

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[Creating Application Signature Groups | 735](#)

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[Editing, Cloning, and Deleting Application Signature Groups | 736](#)

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[Signature Database Overview | 930](#)

## About the Application Signatures Page

To access this page, select **Configuration > Shared Objects > Application Signatures**.

Use the **Application Signatures** page to view application signatures that are already downloaded and to create, modify, clone, and delete custom application signature groups. The **Application Signatures** page displays the name, object type, category and subcategory, risk associated with, and characteristics of the signature. You can create custom application signature groups with a set of similar signatures for consistent reuse when defining policies.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create an application signature group. See [“Creating Application Signature Groups” on page 735](#).
- Modify, clone, or delete an application signature group. See [“Editing, Cloning, and Deleting Application Signature Groups” on page 736](#).
- View the configured parameters of an application signature or application signature group. Click the details icon that appears when you hover over the name of an image or click **More > Details**. See [“Viewing Object Details” on page 385](#).
- Show or hide columns in the **Application Signatures**. See [“Sorting Objects” on page 384](#).
- Search for a specific application signature or application signature group. See [“Searching for Text in an Object Data Table” on page 385](#).
- Filter the application signature information based on select criteria. To do this, select the filter icon at the top right-hand corner of the table. The columns in the grid change to accept filter options. Select the filter options; the table displays only the data that fits the filtering criteria.

### Field Descriptions

[Table 296 on page 734](#) provides guidelines on using the fields on the **Application Signatures** page.

**Table 296: Fields on the Application Signatures Page**

Field	Description
Name	Name of the application signature or application signature group.
Object Type	Signature type—either application signature or application signature group.
Category	UTM category of the application signature. For example, the value of <b>Category</b> can be Messaging, Web, Infrastructure, Remote-Access, Multimedia, and so on.

Table 296: Fields on the Application Signatures Page (continued)

Field	Description
Subcategory	UTM subcategory of the application signature. For example, the value of <b>Subcategory</b> can be Wiki, File-Sharing, Multimedia, Social-Networking, News, and so on.
Risk	Level of risk associated with the application signature. For example, the value of <b>Risk</b> can be Low, High, unsafe, and so on.
Characteristic	One or more characteristics of the application signature.
Predefined or Custom	A list of predefined application signatures and application signature groups, and a list of custom application signature groups that you created.

## RELATED DOCUMENTATION

- [Application Signatures Overview | 733](#)
- [Creating Application Signature Groups | 735](#)
- [Editing, Cloning, and Deleting Application Signature Groups | 736](#)
- [Signature Database Overview | 930](#)
- [About the Active Database Page | 931](#)

## Creating Application Signature Groups

Application identification supports custom application signatures to detect applications as they pass through the device. When you create custom signature groups, make sure that your signature groups are unique, by providing a unique and relevant name.

To create an application signature group:

1. Select **Configure > Shared Objects > Application Signatures**.
2. Click the add icon (+).
3. Complete the configuration according to the guidelines provided in [Table 297 on page 736](#).
4. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

A new application signature group with your configurations is created. You can use this application signature group in firewall, NAT, and SD-WAN policies.

[Table 297 on page 736](#) provides guidelines on using the fields on the **Create Application Signature Group** page.

**Table 297: Fields on the Create Application Signature Group Page**

Field	Description
Name	Enter a unique name that is a string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 63 characters.
Group Members	Click the add icon (+) to add signatures to your application group. On the <b>Add Application Signatures</b> page, select the check boxes next to the signatures you want to add to the group.

#### RELATED DOCUMENTATION

<a href="#">Application Signatures Overview   733</a>
<a href="#">About the Application Signatures Page   734</a>
<a href="#">Editing, Cloning, and Deleting Application Signature Groups   736</a>
<a href="#">Signature Database Overview   930</a>
<a href="#">About the Active Database Page   931</a>

## Editing, Cloning, and Deleting Application Signature Groups

### IN THIS SECTION

- [Editing Application Signature Groups | 737](#)
- [Cloning Application Signature Groups | 737](#)
- [Deleting Application Signature Groups | 738](#)

You can edit, clone, and delete application signature groups from the **Application Signatures** page.



## Editing Application Signature Groups

To modify the parameters configured for an application signature group:

1. Select **Configuration > Shared Objects > Application Signatures**.

The **Application Signatures** page appears.

2. Select the application signature group that you want to edit, and then select **More > Edit**, or click on the edit icon (pencil symbol), on the top right corner of the table, or right-click and select **Edit**.

The **Edit** page appears, showing the same options as those displayed when you create a new application signature group.

3. Modify the parameters according to the guidelines provided in [“Creating Application Signature Groups” on page 735](#).
4. Click **Save** to save the changes. If you want to discard your changes, click **Cancel** instead.

The modified application signature group appears in the **Application Signatures** page.

## Cloning Application Signature Groups

You can clone an application signature group when you want to reuse an existing application signature group, but with a few minor changes. This way, you can save time recreating the application signature group from the start.

To clone an application signature group:

1. Select **Configuration > Shared Objects > Application Signatures**.

The **Application Signatures** page appears.

2. Right-click the application signature group that you want to clone and then select **Clone**, or select **More > Clone**.

The **Clone** page appears with editable fields.

3. Click **OK** to save the changes. If you want to discard your changes, click **Cancel** instead.

The cloned application signature group is displayed on the **Application Signatures** page.

## Deleting Application Signature Groups

To delete an application signature group:

1. Select **Configuration > Shared Objects > Application Signatures**.

The **Application Signatures** page appears.

2. Select the application signature group you want to delete and then click the delete icon **(X)**.

An alert message appears, verifying that you want to delete the selected item.

3. Click **Yes** to delete the selected application signature group. If you do not want to delete, click **Cancel** instead.

### RELATED DOCUMENTATION

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[Application Signatures Overview | 733](#)

---

[About the Application Signatures Page | 734](#)

---

[Creating Application Signature Groups | 735](#)

---

[Signature Database Overview | 930](#)

## About the Departments Page

To access this page, click **Configuration > Network Services > Shared Objects > Departments**.

You can use the Departments page to add, view, or delete departments. A department is a grouping of LAN segments within a site. You use departments to apply specific policies to LAN segments that are members of a department.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Add a Department. See [“Adding a Department” on page 739](#).
- Delete a department. See [“Deleting a Department” on page 740](#).

Field Descriptions

Table 298 on page 739 shows the descriptions of the fields on the **Departments** page.

Table 298: Fields on the Departments Page

Field	Description
Name	Displays the name of the department.
Site/LAN Segments	Displays the sites and LAN segments that are associated with the department.
VPN	Displays the VPN to which the department is assigned.
Data Center	Displays whether the department is a data center department or not.
Description	Displays the description of the department.
UUID	Displays the Universally Unique Identifier (UUID) of the department.
Network UUID	Displays an internal UUID used by Contrail Service Orchestration (CSO).

RELATED DOCUMENTATION

- [Adding a Department | 739](#)
- [Deleting a Department | 740](#)

Adding a Department

You can add departments from the **Configuration > Shared Objects > Departments** page.

To add a department:

1. Click the add icon (+) on the **Departments** page.  
The **Add Department** page appears.
2. Complete the configuration settings according to the guidelines provided in [Table 299 on page 740](#).
3. Click **OK**.

You are taken to the **Departments** page where the department that you added is displayed.

Table 299: Fields on the Add Department Page

Field	Description
Name	Enter a unique name for the department, which can contain alphanumeric characters and some special characters (. -). No spaces are allowed and the maximum length is 15 characters.
Description	Enter a description of the department.
VPN	The default VPN to which the department is assigned is displayed.  <b>NOTE:</b> This field is displayed only if network segmentation is disabled for the tenant.
Data Center Department	Select whether the department is a data center department (Yes) or not (No).  A data center department can be attached (by using LAN segments) only to gateway sites.

## RELATED DOCUMENTATION

[About the Departments Page | 738](#)
[Deleting a Department | 740](#)

## Deleting a Department

You can delete departments by clicking the delete icon (X) on the **Departments** page. You can delete only one department at a time. You cannot delete a department that is associated with one or more LAN segments. Before you delete the department, you must reassign the LAN segments assigned to that department.

To delete a department:

1. Click **Configuration > Shared Objects > Departments**.

The Departments page appears.

2. Select the department that you want to delete.

3. Click the delete icon (X).

The Delete Department page appears.

4. Click **OK** to confirm the deletion.

The department is deleted and you are returned to the Departments page

## RELATED DOCUMENTATION

[About the Departments Page | 738](#)

[Adding a Department | 739](#)

# Managing Deployments

## IN THIS CHAPTER

- [Deploying Policies Overview | 742](#)
- [About the Deployments Page | 743](#)
- [Using the Deployment Icon to Deploy Policies | 745](#)
- [Deploying Policies | 746](#)

## Deploying Policies Overview

When you finish creating and verifying your security configurations, you can deploy these configurations and keep them ready to be pushed to the security devices. CSO enables you to push security configurations to the devices all at once by providing a single interface that is intuitive.

The deployment workflow provides the ability to save and publish different services to be updated at a later time to the appropriate firewalls (during downtime). This enables administrators to review their firewall and NAT policies before updating the device. Administrators also save troubleshooting time, avoid errors, and save costs associated with errors. Verify and tweak your security configurations before updating them to the device. This approach helps you keep the configurations ready and update these configurations to the devices during the maintenance window.

When you deploy policies, the process takes into account the priority and precedence values set on the policy and the order of rules on the device. Rules are published in the order of their priority groups.

If you change the priority or precedence of a published policy, the policy must be republished for the changes to take effect. Sometimes, changing priority or precedence in one policy can affect other policies in the same priority group. However, such dependent policies do not need to be republished in order for their changes in priority or precedence to take effect. It will be enough if the policy which is updated is republished.

There are three ways in which you can view and deploy your security configurations:

- Click on the deployment icon present in the CSO Customer Portal banner and use the deployment panel that appears, to deploy policies. See [“Using the Deployment Icon to Deploy Policies” on page 745](#).

**NOTE:** The deployment icon is highlighted in orange if there are undeployed configurations.

- Use the **Deployments** page. See [“About the Deployments Page” on page 743](#).
- Select a firewall, NAT or SD-WAN policy from its respective landing pages and click **Deploy**. For more information, see [“Deploying Policies” on page 746](#).

RELATED DOCUMENTATION

<a href="#">Using the Deployment Icon to Deploy Policies   745</a>
<a href="#">About the Deployments Page   743</a>
<a href="#">Deploying Policies   746</a>

## About the Deployments Page

To access this page, click **Configuration > Deployments**.

Use this page to deploy or schedule the deployment of undeployed SD-WAN, NAT, and firewall policies. Undeployed policies refer to newly created firewall policy rules or NAT policies. These changes do not come into effect until the policies are deployed. The **Deploy** page provides scheduling options for you to deploy these policies.

### Tasks You Can Perform

You can perform the following task from this page:

- Deploy a policy. See [“Deploying Policies” on page 746](#).

### Field Descriptions

[Table 300 on page 744](#) provides guidelines on using the fields on the **Deployments** page.

Table 300: Fields on the Deployments Page

Field	Description
Awaiting Deployment	<p>The <b>Awaiting Deployment</b> tab displays all the policies that are awaiting deployment. The following fields provide more information about the undeployed policies:</p> <ul style="list-style-type: none"> <li>• <b>Name</b>—Name of the policy that needs to be deployed.</li> <li>• <b>Deployment Type</b>—Type of the policy that needs to be deployed.</li> <li>• <b>Summary</b>—Description of the policy.</li> <li>• <b>Owner</b>—The tenant who has created the policy.</li> <li>• <b>Last updated</b>—The last time the policy was updated.</li> </ul> <p>If you want to deploy a policy, select the policy and click <b>Deploy</b>. The policy is deployed and will no longer appear in the <b>Awaiting Deployment</b> tab.</p> <p>If you want to refresh the <b>Awaiting Deployment</b> tab, click the refresh icon provided below the details table.</p>
Scheduled	<p>The <b>Scheduled</b> tab displays all the policies that have been scheduled for deployment on a certain date and time. The following fields provide more information about scheduled policies:</p> <ul style="list-style-type: none"> <li>• <b>Name</b>—Name of the policy.</li> <li>• <b>Deployment Type</b>—Type of the policy that needs to be deployed.</li> <li>• <b>Summary</b>—Description of the policy.</li> <li>• <b>Schedule</b>—The date and time at which the policy is scheduled to be deployed.</li> <li>• <b>Status</b>—Displays whether the scheduled policy has been deployed or not.</li> <li>• <b>Next Run</b>—Date and time when the scheduled deployments will be run.</li> </ul> <p>If you want to deploy a scheduled policy immediately, select the policy and click <b>Deploy Now</b>. If you want to modify the deployment schedule of a policy, select the policy and click the edit icon (pencil icon). The <b>Deploy</b> page appears displaying the current scheduling information. See <a href="#">“Deploying Policies” on page 746</a>, to update the schedule.</p>
History	<p>The <b>History</b> tab displays all the policies that have been deployed. The following fields provide more information about deployed policies:</p> <ul style="list-style-type: none"> <li>• <b>Name</b>—Name of the deployed policy.</li> <li>• <b>Deployment Type</b>—Type of the deployed policy.</li> <li>• <b>Summary</b>—Description of the policy.</li> <li>• <b>Status</b>—Displays the status of the deployed policy.</li> <li>• <b>Job Details</b>—Details of the job.</li> <li>• <b>Deployed On</b>—Date and time the policy was deployed.</li> </ul> <p>If you want to redeploy a policy, select the policy and click <b>Re-Deploy</b>. The policy is redeployed and the <b>History</b> tab details changes to reflect this information.</p>



RELATED DOCUMENTATION

<a href="#">Deploying Policies Overview   742</a>
<a href="#">Using the Deployment Icon to Deploy Policies   745</a>
<a href="#">Deploying Policies   746</a>

## Using the Deployment Icon to Deploy Policies

CSO provides an option of viewing and deploying policies through the deployment panel, that appears when you click on the deployment icon. The deployment icon is highlighted in orange if there are undeployed policies.

To deploy policies through the deployment panel:

1. Click the deployment icon on the Customer Portal banner.  
The deployment panel appears. For information about the panel, see [Table 301 on page 745](#).
2. Hover over the policy you want to deploy. The **Deploy** option appears on the right side of the policy.
3. Click **Deploy** to deploy the policy. For more information, see [“Deploying Policies” on page 746](#).

[Table 301 on page 745](#) provides guidelines on using the fields on the deployment panel.

Table 301: Fields on the Deployment Panel

Field	Description
Awaiting Deployment	The <b>Awaiting Deployment</b> tab displays all the policies that are awaiting deployment.
In Progress	The <b>In Progress</b> tab displays all the policies that are currently being deployed.

RELATED DOCUMENTATION

<a href="#">Deploying Policies Overview   742</a>
<a href="#">About the Deployments Page   743</a>
<a href="#">Deploying Policies   746</a>

## Deploying Policies

You can deploy firewall, NAT, SD-WAN, and SSL proxy policies added by various services immediately or schedule the deployment for a later date and time.

To configure a deployment:

1. You can initiate the deployment of a policy in the following ways:
  - Select a policy from the **Awaiting Deployment** tab on the **Deployments** page and click **Deploy**.
  - Select a policy from the **Scheduled** tab on the **Deployments** page and click **Deploy**.
  - Select a policy from the **Scheduled** tab on the **History** page and click **Re-Deploy**.
  - Use the deployment icon on the Customer Portal banner. For more information about deploying policies using the deployment icon, see [“Using the Deployment Icon to Deploy Policies” on page 745](#).

**NOTE:** The deployment icon is highlighted in orange if there are undeployed policies.

- Select **Configuration > Firewall > Firewall Policy**. The **Firewall Policy** page appears, displaying the intents associated with the policy. Click **Deploy**.
  - Select **Configuration > NAT > NAT Policies** and select the NAT policy you want to deploy. Click **Deploy**.
  - Select **Configuration > SSL Proxy > Policy**. The **SSL Proxy Policy** page appears, displaying the intents associated with the policy. Click **Deploy**.
  - Select an SD-WAN policy intent on the **SD-WAN Policy** page and click **Deploy**.
2. The **Deploy** page appears. In **Choose Deployment Time** options, select **Run Now** to deploy the policy immediately.  
  
Select **Schedule at a later time** to deploy the policy at a later date and time. For scheduling options, see [Table 302 on page 746](#).
  3. Click **Deploy**.

[Table 302 on page 746](#) provides guidelines on using the fields on the **Deploy** page.

**Table 302: Fields on the Deploy Page**

Field	Description
<b>Summary</b>	
Policies	The summary of the policy that is to be deployed.

Table 302: Fields on the Deploy Page (continued)

Field	Description
Choose Deployment Time	
Type	<ul style="list-style-type: none"><li>• Select <b>Run now</b> if you want to deploy the policy immediately.</li><li>• Select <b>Schedule at a later time</b> if you want to schedule the deployment for a later date and time.<ul style="list-style-type: none"><li>• Click on the calendar icon to choose the date for the deployment in MM/DD/YYYY format.</li><li>• Enter the time for the deployment in HH:MM:SS format. You can choose the 12 hour (AM or PM) or 24 hour format to specify the time by selecting the option from the drop-down list provided beside the time field.</li></ul></li></ul>

RELATED DOCUMENTATION

<a href="#">Deploying Policies Overview   742</a>
<a href="#">Using the Deployment Icon to Deploy Policies   745</a>
<a href="#">About the Deployments Page   743</a>

# Managing Sites

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- [Adding On-Premise Spoke Sites for SD-WAN Deployment | 768](#)
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- [Adding Cloud Hub Sites for SD-WAN Deployment | 789](#)
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- [Provisioning a Cloud Spoke Site in AWS VPC | 796](#)
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- [Managing LAN Segments on a Tenant Site | 819](#)
- [Activating a CPE Device | 824](#)
- [Activating Dual CPE Devices \(Device Redundancy\) | 827](#)
- [Viewing the History of Tenant Device Activation Logs | 830](#)
- [Configuring VRFs and PNE Details for a Site in a Centralized Deployment | 832](#)
- [Deleting a Site | 833](#)

## About the Sites Page

To access this page, click **Sites > Site Management**.

You can use the **Sites** page to view existing sites and to create different type of sites such as spoke site, hub site, gateway site, and local service edge and regional service edge sites. You can also use this page to view the Stage-1 configuration of the site, device activation information and the jobs executed to add, configure, and delete sites in a tenant.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View information about a site. See [“Viewing Details of a Site” on page 757](#).
- Click on the site name to view the site details and to manage the site. See [“Managing a Single Site” on page 803](#).
- Configure a site by uploading a JSON file. See [“Adding and Configuring Sites by Importing a JSON File” on page 802](#).
- View device activation logs. See [“Viewing the History of Tenant Device Activation Logs” on page 112](#).
- Add the following sites for a Hybrid WAN topology:
  - Spoke site. See [“Adding Spoke Sites for Hybrid WAN Deployment” on page 761](#)
  - Local service edge site. See [“Adding Local Service Edge Sites for Hybrid WAN Deployment” on page 764](#)
  - Regional service edge site. See [“Adding Regional Service Edge Sites for Hybrid WAN Deployment” on page 766](#)
- Add the following sites for an SD-WAN topology:
  - On-premise spoke site. See [“Adding On-Premise Spoke Sites for SD-WAN Deployment” on page 768](#)
  - Gateway site. See [“Adding Gateway Sites for SD-WAN Deployments” on page 779](#)
  - Cloud hub site. See [“Adding Cloud Hub Sites for SD-WAN Deployment” on page 789](#)
  - Cloud spoke site. See [“Adding Cloud Spoke Sites for SD-WAN Deployment” on page 790](#)
- Upgrade one or more sites. See [“Upgrading Sites” on page 813](#).
- Delete a site. See [“Deleting a Site” on page 833](#).
- Configure a site. See [“Configuring a Single Site” on page 804](#).
- View the Stage-1 configuration. See [“Viewing the Stage-1 Configuration” on page 818](#).
- View the jobs executed to add and delete sites for a tenant. see [“Viewing the Sites History” on page 816](#).

## Field Descriptions

Table 303 on page 750 describes the fields on the **Sites** page.

**Table 303: Fields on the Sites Page**

Field	Description
Alert Icon	<p>Alert associated with the site. The alert can be critical (indicated by a red icon), major (indicated by an orange icon), or minor (indicated by a yellow icon).</p> <p><b>NOTE:</b> The alert icon is displayed only if there is an alert associated with the site. If there is no alert, no icon is displayed.</p>
Site Name	<p>Name of the tenant site.</p> <p>Click the name of the site to go to the <i>Site-Name</i> page where you can view the site details and configure parameters related to the site. See <a href="#">“Managing a Single Site” on page 803</a>.</p>
Location	Location of the tenant site.
Sites Connected To	<p>Number of sites to which the site is connected or N/A (not applicable) if no sites are connected.</p> <p>Mouse over the number to view the list of sites to which the site is connected.</p>
Is Gateway Site	Displays whether a site is a gateway site (green check icon) or not (N/A).
Operational Status	Operational status (Up or Down) of the site.
Type	Indicates whether a site is an on-premise site or a cloud site.
Site Status	<p>The current status of the site:</p> <ul style="list-style-type: none"> <li>● Created—Indicates that the site was added but not configured.</li> <li>● Configured—Indicates that the site was configured but not activated.</li> <li>● Provisioned—Indicates that the site is provisioned (activated).</li> <li>● Upgrade-Required—Indicates that the site needs to be upgraded.</li> <li>● Maintenance—Indicates that the site upgrade is in progress; any deployments that might occur because of other jobs are skipped when the site status is Maintenance.</li> </ul>
Role	Indicates whether the site is a hub site or a spoke site.
Active Services	Number of active services configured for the site.

Table 303: Fields on the Sites Page (*continued*)

Field	Description
Local Breakout	Indicates whether local breakout is enabled for at least one WAN link of the site. If it is enabled for at least one WAN link, the number of links on which local breakout is enabled is also displayed. Mouse over the number to view the list of links on which local breakout is enabled.
Auto-NAT	For WAN links on which local breakout is enabled, indicates whether <b>Autocreate Source NAT Rule</b> is enabled. If enabled, the number of links on which it is enabled is also displayed. Mouse over the number to view the list of links on which the automatic creation of source NAT rule is enabled.
Version	Contrail Service Orchestration (CSO) version in which the site was added.

## RELATED DOCUMENTATION

[Upgrading Sites Overview | 755](#)

[Gateway Sites Overview | 756](#)

## Multihoming Overview

Multihoming is the ability of a spoke site to connect to two different hub devices in a hub and spoke topology, thereby providing redundancy. The hub devices function as primary and the secondary hub devices. If there are multiple spokes in the system, the same hub device may act as primary hub device for one spoke and secondary hub device for another spoke. That is, the selection of the primary and the secondary hub devices is only in the context of a spoke site. The spoke is connected to both the hub devices through an underlay network.

The hub devices can be MX series routers with an MS-MIC or SRX4000 series routers. For a specific spoke site, both the hub devices must be either MX series routers or SRX series routers. You cannot have one hub as an MX series router and another hub as an SRX series router. To enable multihoming for a site, you must select the hub and spoke topology when you create the tenant. If you enable multihoming for a site, you must specify a primary and back up site when you configure the site.

Traffic is switched from the primary hub to the secondary hub in the following scenarios:

- The primary hub is down
- The primary hub is up, but all the overlay tunnels between the spoke and the primary hub are down

- The tunnels are up, but the iBGP session between the primary hub and vRR is down. In this case, the failover occurs only after the BGP hold-time expires and the default route is withdrawn.

**NOTE:** In addition to hub-level redundancy, you can provide VRR-level redundancy by creating two VRRs—primary and secondary—in two different redundancy groups.

## Device Redundancy Support Overview

Contrail Service Orchestration (CSO) provides support for spoke device redundancy for large enterprise SD-WAN on-premise spoke sites. You can configure an SD-WAN site with two CPE devices to act as primary and secondary devices and protect the site against device and link failures. If the primary device fails, the secondary device takes over the traffic processing.

**NOTE:** You must use the same device model for both primary and secondary devices and the devices must have the same version of Junos OS installed.

The following SD-WAN features are not supported for device redundancy:

- LTE WAN backup link
- Service chain support

**NOTE:** Device redundancy is supported only on SD-WAN deployments.

### Prerequisites for SRX Series Devices

The prerequisites to configure an SD-WAN site with dual CPE SRX Series devices are as follows:

- For SRX Series, you need to form the cluster manually by connecting two SRX Series devices together using a pair of the same type of Ethernet connections. To create an SRX cluster, see [Chassis Cluster Feature Guide for SRX Series Devices](#).
- Log in to any one of the SRX Series devices, copy the **Stage-1** configuration from the **Sites** page and paste it into the console screen and commit the configuration.



## Supported Connection Plans

The following connection plans are supported for device redundancy:

- Dual NFX250 as SD-WAN CPEs—Supports dual CPE NFX Series devices on an SD-WAN site.
- Dual SRX as SD-WAN CPEs—Supports dual CPE SRX Series devices on an SD-WAN site.
- Dual SRX4x00 as SD-WAN CPEs—Supports SRX 4100 and SRX4200 devices as dual CPE devices in an SD-WAN site.

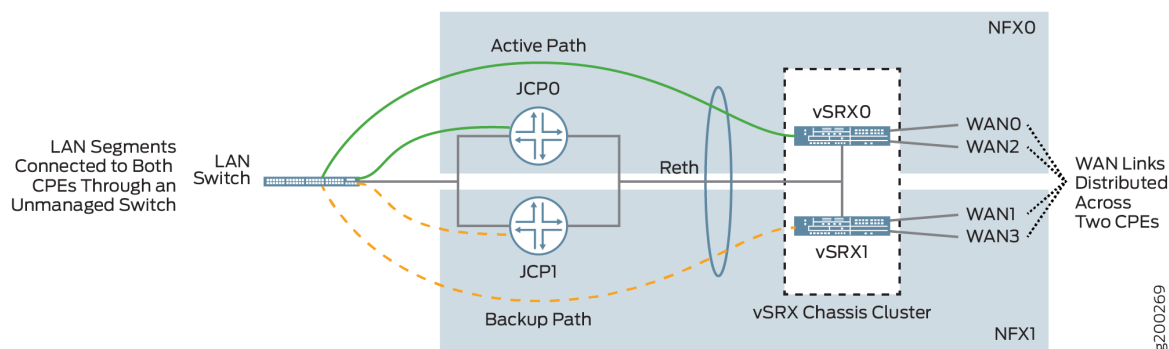
## Create and Configure an SD-WAN Site

You can create and configure an SD-WAN site with dual CPE devices and the two devices back up each other, with one node acting as the primary device and the other as the secondary device. The workflow to add and configure a site with dual CPE devices is similar to the single CPE device. For more information about creating and configuring a site with dual CPE devices, see [“Adding On-Premise Spoke Sites for SD-WAN Deployment” on page 768](#) and [“Configuring a Single Site” on page 804](#).

## Dual CPE Devices Logical Topology for NFX Network Services Platform

[Figure 1 on page 110](#) shows the logical topology of the NFX Series dual CPE devices.

Figure 15: Dual CPE Device Topology - NFX Network Services Platform



You can form a cluster using two NFX Series devices. The front panel ports of the NFX Series devices are used to interconnect two NFX Series devices and to carry the control and fabric interconnect traffic between the two NFX250 devices.

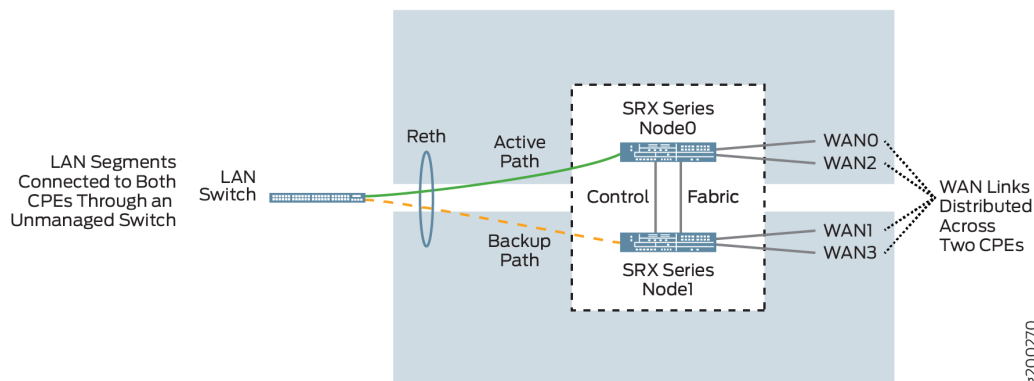
The Junos Control Plane (JCP) component acts as a switch, controls the front panel ports, and sends the traffic which arrives from the LAN or WAN to the NFX Series devices. On the LAN, the active/backup mechanism is used and if the primary device fails, the secondary device takes over processing of traffic.

On the WAN, the active/active mechanism is used and all four WAN links are active and distributed across two NFX Series devices.

## Dual CPE Devices Logical Topology for SRX Series Gateway Devices

Figure 2 on page 111 shows the logical topology of the SRX Series dual CPE devices.

Figure 16: Dual CPE Device Topology - SRX Series Devices



You can form a cluster using two SRX devices. A chassis cluster is formed between these nodes and performs as a single logical router. On the LAN, the active/backup mechanism is used and if the primary device fails, the secondary device takes over traffic processing. On the WAN, the active/active mechanism is used and all four WAN links are active and distributed across two NFX Series device.

**NOTE:** On SRX 4100 and SRX4200 devices, out of the eight 1-Gigabit Ethernet/10-Gigabit Ethernet, a maximum of two ports are used for WAN links, and the remaining ports are used for LAN connectivity. The HA ports are used only for forming the cluster.

## RELATED DOCUMENTATION

[Adding On-Premise Spoke Sites for SD-WAN Deployment](#) | 768

[Configuring a Single Site](#) | 804

[Activating Dual CPE Devices \(Device Redundancy\)](#) | 827

## Upgrading Sites Overview

When you upgrade Contrail Service Orchestration (CSO), the existing sites continue to have the functionality of earlier releases. However, there might be changes in:

- Device templates
- Image version of a device
- Application configurations (For example, SD-WAN policies)
- Stage-1 and Stage-2 configurations of a device

For CSO to support sites that are created in earlier releases, you must upgrade the existing sites to the new version. For example, in CSO Release 4.0.0 you must upgrade sites that were created in releases earlier than Release 3.3.0.

You can upgrade a single site or upgrade multiple sites simultaneously.

Users with the SP Administrator or Tenant Administrator role can upgrade a site from the Sites page. The Sites page provides information about sites that must be upgraded and sites for which the upgrade is optional. In the Sites page, following two new columns have been added to indicate whether the site upgrade is mandatory or optional:

- **Site Status**—Indicates the status of the site. If the site status is Configured or Provisioned, the upgrade is optional. If the site status is UPGRADE-REQUIRED, the site upgrade is mandatory. You cannot upgrade a site if the site status is Created, Provision Failed, and Activation Failed.
- **Site Version**—Indicates the release number in which the site was created.

Upgrading sites that were created in Release 3.3.0 and Release 3.3.1 is optional. You must upgrade sites that were created in releases earlier than Release 3.3.0. You can upgrade a cloud hub device that is created by the SP Administrator and is shared with multiple tenants.

If you create a site in a release that is tagged as a Long Term Support (LTS) release, the site remains functional in the subsequent two LTS releases. For example, if you have created a site in Release X.2 (LTS release), upgrading the site in Release (X+1).2 and Release (X+2).2 is optional, while it is mandatory to upgrade the site in Release (X+3).2.

If you have created a site in a non-LTS release, the site remains functional in the successive release only. For example if you have created a site in Release X.0 (non-LTS), upgrading the site in Release X.1 is optional, while it is mandatory to upgrade the site in Release X.2.

### Limitations

Site upgrade has the following limitations:

- During the upgrade, you experience a downtime.

- You cannot upgrade a site for centralized deployments.

## RELATED DOCUMENTATION

[Upgrading Sites | 813](#)

[Upgrading a Cloud Hub Device | 128](#)

## Gateway Sites Overview

### IN THIS SECTION

- [Benefits of Gateway Sites | 757](#)

A *gateway site* is an SD-WAN site that is used to carry site-to-site traffic between on-premise spoke sites and to break out backhaul (central breakout) traffic from on-premise spoke sites. A gateway site typically has a data center department behind it; however, this is not enforced in Contrail Service Orchestration (CSO). You add a gateway site from the **Sites** page.

A service provider can add one or more gateway sites to act as central breakout (backhaul) nodes and then associate gateway sites with on-premise spoke sites. The gateway site that is associated with a spoke site functions like a data hub and performs the following functions:

- Before the creation of site-to-site tunnels, site-to-site traffic to or from a spoke site is sent through the gateway site. This traffic triggers the creation of the site-to-site tunnel based on dynamic VPN thresholds and matching mesh tags that you configure for the spoke site.
- If Internet-bound traffic from the spoke site (and all departments associated with the spoke site) is destined for central breakout (backhaul), the traffic first reaches the assigned gateway site and then breaks out from the gateway site.
- The cloud hub associated with the spoke site works as a fallback option in case traffic cannot be sent through the gateway site.

**NOTE:** Associating a gateway site with a spoke site is optional; if you do not designate a gateway site, the spoke site uses the associated cloud hub.

If a tenant has more than one gateway site configured, CSO statically meshes these sites with overlay tunnels so that the gateway sites can exchange routing information for the on-premise spoke sites with which they are associated. This enables the site-to-site communication between the spoke sites that are associated with different gateways.

The creation of *static* tunnels between one gateway site and another and between a gateway site and a spoke site depends on matching mesh tags. These static tunnels are created during the Zero Touch Provisioning (ZTP) workflow. For more information about mesh tags, see [“Mesh Tags Overview” on page 845](#).

Gateway sites can have their own departments similar to other sites. If a gateway site does not have directly connected LAN segments in the departments used by the associated spoke sites, then CSO automatically pushes the appropriate department virtual routing and forwarding (VRF) instances to the gateway for connectivity.

### Benefits of Gateway Sites

- Because gateway sites can be used to carry backhaul (central breakout) traffic and are used as an anchor for site-to-site traffic, the volume of traffic sent to the cloud hub (controlled by the service provider) is reduced.

#### RELATED DOCUMENTATION

| [Adding Gateway Sites for SD-WAN Deployments](#) | 779

## Viewing Details of a Site

To view details of a site on the Sites page (**Sites > Site Management**):

1. Select a site and click the **Detailed View** icon that appears on the left side of the site. Alternatively, click **More > Detailed View** to view the site details.

The details appear on a pane on the right side of the Sites page. The details of the site are listed under the following three tabs:

- Info
- Detail
- Overlay Links:

[Table 304 on page 758](#) lists the information displayed on the tabs in detail.

**Table 304: Information Displayed in the Detailed View of a Site**

Field	Description
<b>Info</b>	
Location of the site	Displays the location of the site along with the latitude and longitude of the site.
Connectivity	Displays the connection between the WAN links of this site with remote sites.
Alerts	<p>Displays the following:</p> <ul style="list-style-type: none"> <li>• Count of critical, major, and minor alerts generated on the site. When you click on the hyperlinked count to go to the Generated Alerts page (<b>Monitor &gt; Alerts &amp; Alarms &gt; Alerts</b>) where you can view alerts generated for all the sites you have configured.</li> <li>• The most recent security-related and SD-WAN related alerts generated on the site.</li> </ul>
Alarms	<p>Displays the following:</p> <ul style="list-style-type: none"> <li>• Count of critical, major, and minor alarms generated on the site, as links. When you click on the numbers, the Alarms page (<b>Monitor &gt; Alerts &amp; Alarms &gt; Alarms</b>) appears, where you can view alarms generated for all the sites you have configured</li> <li>• The most recent security-related and SD-WAN related alarms generated on the site.</li> </ul>
SLA Performance	Percentage of times the WAN links of a site met the SLAs during the previous day, and the top seven applications with the lowest SLA performance levels.

Table 304: Information Displayed in the Detailed View of a Site (*continued*)

Field	Description
uCPE Device Info	<p>Displays the following information about the device:</p> <ul style="list-style-type: none"> <li>• Name</li> <li>• Operational status</li> <li>• Management status</li> <li>• Model</li> <li>• Junos OS version installed</li> <li>• Serial number</li> </ul> <p>For a cluster, information related to all the devices in the cluster is displayed.</p>
<b>Detail</b>	
<b>WAN Links</b>	
Link Type	Underlay network type—MPLS or Internet.
Access Type	Access type of the underlay link.
Used for OAM	Indicates whether the WAN link is used for operations, administration and maintenance (OAM) traffic (True) or not (False).
Address Assignment	Displays the type of address assignment for the WAN link—Static or Dynamic.
Used for Meshing	Indicates whether this WAN link can be used for full mesh creation with another site (True) or not (False).
WAN Interface	Interface on the device used for the WAN link.
Static IP Prefix	IP address prefix of the WAN interface.
Gateway IP	IP address of the gateway to the WAN.
Traffic Type	Type of traffic carried in the WAN link—only data or both OAM and data.
Mesh Tag	Mesh tag associated with the WAN link.
Mesh Overlay Link Type	<p>Mesh overlay link type—GRE and GRE_IPSEC.</p> <p>MPLS links can have both GRE and GRE_IPSEC as the mesh overlay link type where as Internet links can have only GRE_IPSEC as the mesh overlay link type.</p>

Table 304: Information Displayed in the Detailed View of a Site (*continued*)

Field	Description
Data VLAN ID	ID of the data VLAN.
Tunnel Type	Type of overlay tunnel provided by the link—GRE, and GRE_IPSEC.
Subscribed Bandwidth	Bandwidth in mega bits per second (Mbps) of the WAN link.
Provider	Service provider providing the WAN link.
Cost	Cost of the WAN link.
Cost Currency	Currency in which the cost of the WAN link is specified.
<b>Management IP Pool</b>	
IP Prefix	IP prefix used for management interfaces in the site.
<b>Device Template</b>	
Device Template Name	Name of the device template used for configuring the CPE device at the site.
<b>Dynamic VPN Thresholds</b>	
Create Tunnel Threshold	Number of sessions closed between two sites at which full mesh is created between the two sites.
Delete Tunnel Threshold	Number of sessions closed between two sites below which full mesh is deleted between the two sites.
<b>CPE AS Number</b>	
CPE AS Number	Autonomous AS number assigned to the CPE.
<b>Overlay Links</b>	
Status	Status of the link. Green color indicates the link is up and red color indicates the link is down.
Link Name	Name of the overlay link.
Type	Type of the overlay link.



Table 304: Information Displayed in the Detailed View of a Site (continued)

Field	Description
Endpoint	The other endpoint of the overlay link where the WAN link is terminating.

#### RELATED DOCUMENTATION

<a href="#">Adding Spoke Sites for Hybrid WAN Deployment   761</a>
<a href="#">Adding Local Service Edge Sites for Hybrid WAN Deployment   764</a>
<a href="#">Adding Regional Service Edge Sites for Hybrid WAN Deployment   766</a>
<a href="#">Managing a Single Site   803</a>
<a href="#">Deleting a Site   833</a>

## Adding Spoke Sites for Hybrid WAN Deployment

You add a spoke site from the **Site** page. This page describes how to create a spoke site for a tenant in hybrid WAN deployment.

To add a spoke site:

1. Select **Sites > Site Management**.

The Sites page appears.

2. Click **Add** and select **Spoke Site**.

The Add Site for *Tenant-Name* page appears.

3. Complete the configuration settings in the General and Connectivity Requirements section according to the guidelines provided in [Table 305 on page 761](#).

Table 305: Fields on the Add Spoke Site Page

Field	Description
<b>General</b>	
Site Name	Enter a site name. You can use any number of alphanumeric characters, including special characters. The maximum length is 15 characters.

Table 305: Fields on the Add Spoke Site Page (continued)

Field	Description
Site Type	Displays the site type. This field cannot be modified.  Example: Spoke
Tenant Topology	Displays the topology of the tenant that was selected during the creation of the tenant. This field cannot be modified.  Example: standalone
Site Group	Select a site group to which you want to assign the site.  Example: hybridwan-spoke
<b>Address</b>	
Street Address	Enter the street address of the site.
City	Enter the city where the site is located.
State/Province	Enter the state or province where the site is located.
ZIP/Postal Code	Enter the postal code for the locality of the site.
Country	Select the country where the site is located. Click the Validate button to verify the address. The site address verification successful message is displayed if the address is correct. You can click the View location on a map link to see the address location. If you enter the wrong address and click the Validate button to verify the address, the Site address could not be validated message is displayed .
<b>Contact Information</b>	
Contact Name	Enter the name of a contact person for the site.
Email	Enter the e-mail ID of the contact person.
Phone	Enter the phone number of the contact person.

Table 305: Fields on the Add Spoke Site Page (continued)

Field	Description
<b>Connectivity Requirements</b>	
Click a connection plan to select the plan for WAN connectivity.	
A connection plan contains information prepopulated from the device template, and includes the device information, a list of supported features and the number of WAN links supported.	
Based on the connection plan, the following fields are populated:	
WAN Underlay Links	
WAN_0 WAN_1	Displays the WAN link. Depending on the connection plan selected, you can configure up to two WAN links per site that support the hybrid WAN. You can configure these links as MPLS or Internet links.
Name	Displays the name of the WAN link. This field cannot be modified.
Type	<p>Displays the link type for WAN underlays. The default link types supported by the device templates are listed below:</p> <ul style="list-style-type: none"> <li>• NFX250 as Hybrid WAN CPE—Link type for WAN_0 is MPLS and WAN_1 is Internet.</li> <li>• NFX150 as Hybrid WAN CPE—Link type for WAN_0 is MPLS and WAN_1 is Internet.</li> <li>• SRX as Hybrid WAN CPE—Link type for WAN_0 is MPLS and WAN_1 is Internet.</li> <li>• SRX as Managed Internet CPE—Link type for WAN_0 is Internet.</li> <li>• NFX250 as Managed Internet CPE—Link type for WAN_0 is Internet.</li> <li>• NFX150 as Managed Internet CPE—Link type for WAN_0 is Internet.</li> <li>• NFX250 as Secure Internet CPE—Link type for WAN_0 is Internet.</li> <li>• NFX150 as Secure Internet CPE—Link type for WAN_0 is Internet.</li> </ul>

4. Review the configuration and modify the settings, if needed, from the **Summary** tab.
5. Click **OK**.

The newly added spoke site is displayed on the **Sites** page.

### RELATED DOCUMENTATION

- [About the Sites Page | 749](#)
- [About the Site Groups Page | 835](#)

## Adding Local Service Edge Sites for Hybrid WAN Deployment

You add a local service edge site when the site is directly connected to the Internet or when you access the Internet through a corporate VPN. You use the **Sites** page to add the local service edge site.

To add a local service edge site:

1. Select **Sites > Site Management**.

The Sites page appears.

2. Click **Add** and select **Local Service Edge**.

The Add Local Service Edge site page appears.

3. Complete the configuration settings according to the guidelines provided in [Table 306 on page 764](#).

**Table 306: Fields on the Add Local Service Edge Site Page**

Field	Description
<b>Site Information</b>	
Site Name	Enter a site name. You can use any number of alphanumeric characters, including special characters. The maximum length is 15 characters.
<b>Address</b>	
Street Address	Enter the street address of the site.
City	Enter the city where the site is located.

Table 306: Fields on the Add Local Service Edge Site Page (continued)

Field	Description
State/Province	Enter the state or province where the site is located.
ZIP/Postal Code	Enter the postal code for the locality of the site.
Country	Select the country name from the drop-down list.
<b>Contact Information</b>	
Contact Name	Enter the name of a contact person for the site.
Email	Enter the e-mail ID of the contact person at the site.
Phone	Enter the phone number of the contact person at the site.
<b>Configuration</b>	
Service POP	Select the name of the point of presence (POP) for the site. A network point of presence is a location at which a service provider instantiates a network function, such as a virtualized network function (VNF).
VIM	Select a virtualized infrastructure manager (VIM). The VIM controls and manages the compute, storage, and network resources in the NFV infrastructure. The VIM also collects and forwards performance measurements and events.
Resource Pool	Select a resource pool for the VIM. Resource pools identify the compute zones for the VIM for the POP.
Route Target	Enter a route target for the virtual network.  Example: 64512:10000
SDN Gateway Router	Click the toggle button to enable SDN gateway router that is configured in the POP. The SDN gateway router provides a Layer 3 routing service to customer sites in a centralized deployment. <ul style="list-style-type: none"> <li>• Enabled : Managed—Select Managed option if you use Contrail Service Orchestration to manage the device.</li> <li>• Disabled : Unmanaged—Select Unmanaged option if you use another application to manage the device.</li> </ul>
PE Router	Specify the name of the device.

Table 306: Fields on the Add Local Service Edge Site Page (continued)

Field	Description
VRF Name	Specify the name of the virtual routing and forwarding (VRF) instance for the tenant.
<b>Service Attachment Points</b>	
Local Internet Breakout	Click the toggle button to enable or disable local Internet breakout to the site.
Left Subnet Prefix	Select one or more IPv4 prefixes for the management network.
Right Virtual Network Name	Select the network to which the site transmits Internet traffic.
<b>Right Network - Internet Information</b>	
Internet Network Name	Select the network to which the site transmits Internet traffic.
Site to VPN	Click the toggle button to enable VPN.
Left Subnet Prefix	Select one or more IPv4 prefixes for the management network.
Right Virtual Network Name	Select the network to which the site transmits Internet traffic.

4. Click **OK**.

The newly added local service edge site is displayed on the **Sites** page.

## RELATED DOCUMENTATION

[About the Sites Page | 749](#)

[About the Site Groups Page | 835](#)

## Adding Regional Service Edge Sites for Hybrid WAN Deployment

You add a regional service edge site when you have to assign common services, such as NAT or UTM to multiple sites. The traffic from customer site is serviced and forwarded to common service and then to Internet. You add a regional service edge site from the **Sites** page.

To add a regional service edge site:

1. Select **Sites > Site Management**.

The Sites page appears.

2. Click **Add** and select **Regional Service Edge**.

The Add Regional Service Edge Site page appears.

3. Complete the configuration settings according to the guidelines provided in [Table 307 on page 767](#).

**Table 307: Fields on the Add Regional Service Edge Site Page**

Field	Description
<b>Site Information</b>	
Site Name	Enter a site name. You can use any number of alphanumeric characters, including special characters. The maximum length is 15 characters.
<b>Address</b>	
Street Address	Enter the street address of the site.
City	Enter the city where the site is located.
State/Province	Enter the state or province where the site is located.
ZIP/Postal Code	Enter the postal code for the locality of the site.
Country	Select the country name from the drop-down list.
<b>Contact Information</b>	
Contact Name	Enter the name of a contact person for the site.
Email	Enter the e-mail address of the contact person.
Phone	Enter the phone number of the contact person.
<b>Configuration</b>	
Service POP	Select the name of the point of presence (POP) for the site. A network point of presence is a location at which a service provider instantiates a network function, such as a virtualized network function (VNF).

Table 307: Fields on the Add Regional Service Edge Site Page (*continued*)

Field	Description
VIM	Select a virtualized infrastructure manager (VIM). The VIM controls and manages the compute, storage, and network resources in the NFV infrastructure. The VIM also collects and forwards performance measurements and events.
Resource Pool	Select a resource pool for the VIM. Resource pools identify the compute zones for the VIM for the POP.
Route Target	Enter a route target for the virtual network.
Virtual Network Name	Enter a unique string of alphanumeric characters and some special characters (. -). No spaces are allowed and the maximum length is 15 characters.  A virtual network is a representation of your own network in the cloud.
Left Subnet Prefix	Select one or more IPv4 prefixes for the management network.
<b>Service Attachment Points</b>	
Local Internet Breakout	Click the toggle button to enable or disable local Internet breakout to the site.
Internet Network Name	Select the network to which the site transmits Internet traffic.

4. Click **OK**.

The newly added regional service edge site is displayed on the **Sites** page.

## RELATED DOCUMENTATION

[About the Sites Page | 749](#)

[About the Site Groups Page | 835](#)

## Adding On-Premise Spoke Sites for SD-WAN Deployment

An on-premise spoke represents an endpoint that is part of customer premise equipment (CPE) at some physical location such as branch office or point of sale location. Typically, these points are connected using overlay connections to hub sites. You add an on-premise spoke site from the **Sites** page. The following device templates are supported for on-premise spoke sites:



- NFX150 as SD-WAN CPE
- NFX250 as SD-WAN CPE
- Dual NFX250 as SD-WAN CPEs
- SRX as SD-WAN CPE
- Dual SRX as SD-WAN CPEs
- SRX4x00 as SD-WAN CPE
- Dual SRX4x00 as SD-WAN CPEs

To add an on-premise spoke site:

1. Click **Add** and select **On-Premise Spoke Site**.

The **Add Site for *Tenant-Name*** page appears.

2. Complete the configuration settings according to the guidelines provided in [Table 308 on page 769](#).
3. (Optional) You can review the configuration in the **Summary** tab and modify the settings, if required.
4. Click **OK**.

You are returned to the Sites page and a message indicating that the site creation job was triggered is displayed. You can click the job ID link to view the progress of the job. After the job is completed successfully, a confirmation message is displayed and the site that you added is displayed on the Sites page.

After you add the site, you must configure the site parameters, and then activate the on-premise site.

**Table 308: Add Site for <Tenant-Name> Settings**

Field	Description
<b>General</b>	
<b>Site Information</b>	
Site Name	Enter a unique name for the site. You can use alphanumeric characters and hyphen (-); the maximum length is 15 characters.
Site Type	Displays the site type (hub or spoke). This field cannot be modified.
SDWAN Mode	Displays the SD-WAN mode for the tenant. This field cannot be modified.

Table 308: Add Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
Site Group	Select a site group to which you want to assign the site.
<b>Address</b>	
Street Address	Enter the street address of the site.
City	Enter the name of the city where the site is located.
State/Province	Select the state or province where the site is located.
ZIP/Postal Code	Enter the postal code for the site.
Country	<p>Select the country where the site is located.</p> <p>You can click the <b>Validate</b> button to verify the address that you specified:</p> <ul style="list-style-type: none"> <li>• The <b>site address verification successful</b> message is displayed if the address can be verified. You can click the <b>View location on a map</b> link to see the address location.</li> <li>• If the address cannot be verified, the <b>Site address could not be validated</b> message is displayed .</li> </ul>
<b>Contact Information</b>	
Contact Name	Enter the name of the contact person for the site.
Email	Enter the e-mail address of the contact person for the site.
Phone	<p>Enter the phone number of the contact person for the site.</p> <p>Click <b>Next</b> to continue.</p>
<b>Connectivity Requirements</b>	

Table 308: Add Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
Connection Plan	<p>The list of available connection plans is displayed in a carousel. You can use the left arrow and right arrow icons to view the different connection plans.</p> <p>Click a connection plan to select the plan for the site.</p> <p><b>NOTE:</b> After you select a connection plan, the WAN links that can be configured are displayed:</p> <ul style="list-style-type: none"> <li>• For single CPE connection plans, you must enable at least one WAN link.</li> <li>• For dual CPE connection plans, you must enable one primary WAN link and one secondary WAN link.</li> </ul>
Connectivity Requirements for the Selected Plan	
WAN Underlay Links	
WAN_0	<p>Select the check box to enable this WAN link.</p> <p>When you enable a WAN link, fields related to the WAN link appear. Fields marked with an asterisk (*) must be configured to proceed.</p>
Type	<p>Select the underlay network type (MPLS or Internet) of the WAN link that is connected to the on-premise spoke site.</p>

Table 308: Add Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
Access Type	<p>Select the access type for the underlay link:</p> <ul style="list-style-type: none"> <li>• <b>Ethernet</b>—Supports WAN connectivity through Ethernet.</li> <li>• <b>LTE</b>—Supports LTE USB dongle for WAN connectivity.</li> <li>• <b>ADSL</b>—Supports asymmetric digital subscriber line (ADSL) for WAN connectivity.</li> <li>• <b>VDSL</b>—Supports very-high-bit-rate digital subscriber line (VDSL) for WAN connectivity</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• LTE, ADSL, and VDSL access types are: <ul style="list-style-type: none"> <li>• Applicable only to NFX150 and NFX250 device templates.</li> <li>• Supported only for Internet links.</li> <li>• Not supported when a dual CPE connection plan (device template) is used.</li> </ul> </li> <li>• You can configure only one WAN link with either LTE, ADSL, or VDSL access type.</li> </ul>
PPPoE	<p>This field is displayed only if you specify ADSL or VDSL as the access type.</p> <p>Click the toggle button to enable Point-to-Point Protocol over Ethernet (PPPoE) for a WAN link. By default, PPPoE is disabled.</p> <p>PPPoE connects multiple hosts on an Ethernet LAN to a remote site through a single customer premises equipment (CPE) device.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• If you enable PPPoE, you must specify the PPPoE parameters while configuring the site.</li> <li>• PPPoE is not supported when a dual CPE connection plan (device template) is used.</li> </ul>

Table 308: Add Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
Subscribed Bandwidth	<p>Enter the maximum bandwidth (in mega bits per second [Mbps]) to be allowed for the WAN link.</p> <p>Range: 1 through 10,000</p> <p><b>NOTE:</b> If you specify LTE as the access type, you cannot configure the subscribed bandwidth.</p>
Provider	<p>Enter the name of the service provider who is responsible for providing the WAN link.</p>
Cost/Month	<p>Enter the cost per month (in the specified currency) of the subscribed bandwidth.</p> <p>Range: 1 through 10,000</p> <p>In bandwidth-optimized SD-WAN, CSO uses this information to identify the least-expensive link to route traffic if multiple WAN links meet SLA profile parameters. For more information, see <a href="#">“Cost-Based Link Switching” on page 241</a>.</p>
Enable Local Breakout	<p>Click the toggle button to enable local breakout on the WAN link. By default, local breakout is disabled.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• If you enable local breakout on a WAN link, the WAN link <i>can be used</i> for local breakout. The decision of whether traffic breaks out locally from the site depends on the breakout profile that is referenced in the SD-WAN policy intent.</li> <li>• If you do not enable local breakout on at least one WAN link for a single CPE connection plan and at least two WAN links for a dual CPE connection plan, then local breakout is disabled for the site.</li> </ul>
Breakout Options	<p>Select whether you want to use the WAN link for both breakout and WAN traffic (default) or only for breakout traffic.</p>
WAN Link (Primary or Secondary)	<p>For dual CPE connection plans, displays whether the WAN link is for the primary device or for the secondary device. This field cannot be modified.</p>

Table 308: Add Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
WAN_1	<p>Select the check box to enable this WAN link.</p> <p>When you enable the WAN link, fields related to the WAN link appear. Fields marked with an asterisk (*) must be configured to proceed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields</p>
WAN_2	<p>Select the check box to enable this WAN link.</p> <p>When you enable the WAN link, fields related to the WAN link appear. Fields marked with an asterisk (*) must be configured to proceed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields</p>
WAN_3	<p>Select the check box to enable this WAN link.</p> <p>When you enable the WAN link, fields related to the WAN link appear. Fields marked with an asterisk (*) must be configured to proceed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields</p> <p>Click <b>Next</b> to continue.</p>
<b>Additional Requirements</b>	
Site Type	<p>Displays the type of site being added (spoke or hub). This field cannot be modified.</p>
Default Link	<p>Select one or more links to be used for routing traffic in the absence of matching SD-WAN policy intents.</p> <p>Default links are used primarily for overlay traffic but can also be used for local breakout traffic. However, a default link cannot be used exclusively for local breakout traffic. If you do not specify a default link, then equal-cost multipath (ECMP) is used to choose the link on which to route traffic.</p>

Table 308: Add Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
Backup Link	<p>Select a backup link through which traffic can be routed when the primary (other) links are unavailable.</p> <p>You can select any link other than the default links or links that are configured exclusively for local breakout traffic as the backup link.</p> <p>When a primary link comes back online, CSO monitors the performance on the primary link and when the primary link meets the SLA requirements, the traffic is switched back to the primary link. However, SLA data is not monitored for the backup link.</p>
Preferred Breakout Link	Select the preferred link for local breakout. If no link is selected, then the breakout link is chosen using ECMP from the available links.
<b>Dynamic VPN Thresholds</b>	
Threshold	<p>Select the <b>Set Custom Threshold</b> check box to specify a custom threshold values for the creation and deletion of dynamic VPN tunnels from the on-premise spoke site to a destination site.</p> <p><b>NOTE:</b> The threshold value that you specify overrides the threshold value specified for the tenant.</p>
<b>Threshold for Creating a Tunnel</b>	
Sessions Closed	Specify the threshold for the number of sessions (flows) closed (in a two-minute duration) between the on-premise spoke site and a destination site. When the number of sessions closed exceeds the specified threshold, a tunnel is created between the on-premise spoke site and the destination site.
<b>Threshold for Deleting a Tunnel</b>	

Table 308: Add Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
Sessions Closed	Specify the threshold for the number of sessions closed (in a 15-minute duration) between the on-premise spoke site and a destination site. When the number of sessions closed is lower than the specified threshold, the tunnel between the on-premise spoke site and destination site is deleted.
Enable Hub Multihoming	Click the toggle button to enable multihoming on the site. Multihoming is the ability of a spoke site to connect to multiple hub sites, thereby providing redundancy.
Device Redundancy	<p>For an SD-WAN site, displays whether device redundancy is enabled (true) or disabled (false) on the on-premise spoke site.</p> <p>Device redundancy is enabled only when you select a dual CPE NFX or a dual CPE SRX connection plan. In device redundancy, two CPE devices (either NFX devices or SRX devices) are used to protect the site against device failures. If the primary device fails, the secondary device takes over the traffic processing. This field cannot be modified.</p> <p>Click <b>Next</b> to continue.</p>
LAN Segments	<p>You must add at least one LAN segment for the on-premise site. To add a LAN segment:</p> <ol style="list-style-type: none"> <li>1. Click the <b>+</b> icon. The Add LAN Segment page appears.</li> <li>2. Complete the configuration settings according to the guidelines provided in <a href="#">Table 309 on page 777</a>.</li> <li>3. Click <b>Save</b>. The LAN segment is added and you are returned to the Add Site for <i>Tenant-Name</i> page.</li> </ol> <p>Click <b>Next</b> to continue to the Summary tab.</p>



Table 309: Fields on the Add LAN Segment page

Field	Description
Name	Enter a unique string of alphanumeric characters. No spaces are allowed and the maximum length is 15 characters.
Type	<p>Select the type of LAN segment:</p> <ul style="list-style-type: none"> <li>• <b>Directly Connected</b>—Indicates that the LAN segment is directly connected to the site. This is the default.</li> <li>• <b>Dynamic Routed</b>—Indicates that the LAN segment is not directly connected to the site and is reachable by using a dynamic route. If you select this option, you must specify the dynamic routing information.</li> </ul> <p><b>NOTE:</b> You can configure dynamically routed LAN segments only for gateway sites.</p>
Ports	Select one or more port numbers from the list depending on the connection plan that you previously specified.
VLAN ID	<p>Enter the VLAN ID for the LAN segment.</p> <p>Range: 1 through 4094.</p>
IP Address Prefix	Enter the IP address prefix for the LAN segment; for example, 192.0.2.8/24.
Department	<p>Select a department to which the LAN segment is to be assigned. You group LAN segments as departments for ease of management and for applying policies at the department-level. For LAN segments that are dynamically routed, you can assign only a data center department.</p> <p>Alternatively, click <b>Create Department</b> to create a new department and assign the LAN segment to it. See <a href="#">“Adding a Department” on page 739</a>.</p>
DHCP	<p>For directly connected LAN segments, click the toggle button to enable DHCP. DHCP is disabled by default.</p> <p>You enable DHCP if you want to assign IP addresses by using a DHCP sever. You disable DHCP if you want to assign a static IP address to the LAN segment.</p> <p><b>NOTE:</b> If you enable DHCP, fields related to DHCP-related parameters appear and must be configured.</p>
[DHCP-Related Fields]	
IP Address Prefix (for DHCP)	Enter the IP prefix of the DHCP IP address pool. For example: 192.0.2.10/24.

Table 309: Fields on the Add LAN Segment page (*continued*)

Field	Description
Address Range Low	Enter the starting IP address in the range of IP addresses that can be allocated by the DHCP server to the LAN segment.
Address Range High	Enter the ending IP address in the range of IP addresses that can be allocated by the DHCP server to the LAN segment.
Maximum Lease Time	Specify the maximum duration (in seconds) for which a client can request for and hold a lease on the DHCP server.  Range: 0 through 4,294,967,295 seconds.
Name Server	Specify one or more IPv4 addresses of the DNS server. To enter more than one DNS server address, type address, press Enter, and then type the next address, and so on. DNS servers are used to resolve hostnames into IP addresses.
Protocol	For dynamically routed LAN segments, select the routing protocol (BGP or OSPF) to be used by the data center department to learn routes from the data center.
<b>BGP Configuration</b>	
Authentication	Select the BGP route authentication method to be used: <ul style="list-style-type: none"> <li>• None—Indicates that no authentication should be used. This is the default.</li> <li>• Use MD5—Indicates that MD5 is to be used for authentication. If you choose this option, you must specify an authentication key.</li> </ul>
Peer IP Address	Enter the IP address of the BGP neighbor.
Peer AS Number	Enter the autonomous system (AS) number BGP neighbor.
Auth Key	If you specified that MD5 should be used for authentication, specify an MD5 authentication key (password), which is used to verify the authenticity of BGP packets.
<b>OSPF Configuration</b>	
OSPF Area ID	Specify the OSPF area identifier to be used for the dynamic route.

Table 309: Fields on the Add LAN Segment page (*continued*)

Field	Description
Authentication	<p>Select the OSPF route authentication method to be used:</p> <ul style="list-style-type: none"> <li>• Password—Indicates that password-based authentication should be used. If you choose this option, you must specify the password. (This is the default).</li> <li>• Use MD5—Indicates that MD5 is to be used for authentication. If you choose this option, you must specify an authentication key.</li> <li>• None—Indicates that no authentication should be used.</li> </ul>
Password	Enter the password to be used to verify the authenticity of OSPF packets.
Confirm Password	Retype the password for confirmation purposes.
MD5 Auth Key ID	<p>If you specified that MD5 should be used for authentication, enter the OSPF MD5 authentication key ID.</p> <p>Range: 1 through 255.</p>
Auth Key	If you specified that MD5 should be used for authentication, enter an MD5 authentication key, which is used to verify the authenticity of OSPF packets.

## RELATED DOCUMENTATION

[About the Sites Page](#) | 749

## Adding Gateway Sites for SD-WAN Deployments

A gateway site is an SD-WAN site that is used to carry site-to-site traffic between on-premise spoke sites and to break out backhaul (central breakout) traffic from on-premise spoke sites. A gateway site *typically* has a data center department behind it; however, this is not enforced in Contrail Service Orchestration (CSO). The following device templates are supported for gateway sites:

- SRX as SD-WAN CPE (vSRX only)
- Dual SRX as SD-WAN CPEs
- SRX4x00 as SD-WAN CPE
- Dual SRX4x00 as SD-WAN CPEs

To add a gateway site:

**NOTE:** You can add gateway sites only for tenants with real-time optimized SD-WAN mode.

1. Click **Sites > Site Management**.

The Sites page appears.

2. Click **Add** and select **Gateway Site**.

The **Add Gateway Site for *Tenant-Name*** page appears.

3. Complete the configuration settings according to the guidelines provided in [Table 310 on page 780](#).

**NOTE:** Fields marked with an asterisk (\*) are mandatory.

4. (Optional) You can review the configuration in the **Summary** tab and modify the settings, if required.

5. Click **OK**.

You are returned to the Sites page and a message indicating that the site creation job was triggered is displayed. You can click the job ID link to view the progress of the job. After the job is completed successfully, a confirmation message is displayed and the site that you added is displayed on the Sites page.

After you add the site, you must configure the site parameters, and then activate the gateway site. For a gateway site to be attached to an on-premise spoke site, the gateway site must be in the provisioned state.

**Table 310: Add Gateway Site for <Tenant-Name> Settings**

Field	Description
<b>General</b>	
<b>Site Information</b>	
Site Name	Enter a unique name for the site. You can use alphanumeric characters and hyphen (-); the maximum length is 15 characters.
Site Type	Displays the site type (hub or spoke). This field cannot be modified.

Table 310: Add Gateway Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
SDWAN Mode	Displays the SD-WAN mode for the tenant. This field cannot be modified.
Site Group	Select a site group to which you want to assign the site.
<b>Address</b>	
Street Address	Enter the street address of the site.
City	Enter the name of the city where the site is located.
State/Province	Select the state or province where the site is located.
ZIP/Postal Code	Enter the postal code for the site.
Country	<p>Select the country where the site is located.</p> <p>You can click the <b>Validate</b> button to verify the address that you specified:</p> <ul style="list-style-type: none"> <li>• The <b>site address verification successful</b> message is displayed if the address can be verified. You can click the <b>View location on a map</b> link to see the address location.</li> <li>• If the address cannot be verified, the <b>Site address could not be validated</b> message is displayed .</li> </ul>
<b>Contact Information</b>	
Contact Name	Enter the name of the contact person for the site.
Email	Enter the e-mail address of the contact person for the site.
Phone	<p>Enter the phone number of the contact person for the site.</p> <p>Click <b>Next</b> to continue.</p>
<b>Connectivity Requirements</b>	

Table 310: Add Gateway Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
Connection Plan	<p>The list of available connection plans is displayed in a carousel. You can use the left arrow and right arrow icons to view the different connection plans.</p> <p>Click a connection plan to select the plan for the site.</p> <p><b>NOTE:</b> After you select a connection plan, the WAN links that can be configured are displayed:</p> <ul style="list-style-type: none"> <li>• For single CPE connection plans, you must enable at least one WAN link.</li> <li>• For dual CPE connection plans, you must enable one primary WAN link and one secondary WAN link.</li> </ul>
Connectivity Requirements for the Selected Plan	
WAN Underlay Links	
WAN_0	<p>Select the check box to enable this WAN link.</p> <p>When you enable a WAN link, fields related to the WAN link appear. Fields marked with an asterisk (*) must be configured to proceed.</p>
Type	Select the underlay network type (MPLS or Internet) of the WAN link that is connected to the gateway site.
Access Type	<p>Select the access type for the underlay link:</p> <ul style="list-style-type: none"> <li>• <b>Ethernet</b>—Supports WAN connectivity through Ethernet.</li> <li>• <b>LTE</b>—Supports LTE USB dongle for WAN connectivity.</li> <li>• <b>ADSL</b>—Supports asymmetric digital subscriber line (ADSL) for WAN connectivity.</li> <li>• <b>VDSL</b>—Supports very-high-bit-rate digital subscriber line (VDSL) for WAN connectivity</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• LTE, ADSL, and VDSL access types are: <ul style="list-style-type: none"> <li>• Applicable only to NFX250 device templates.</li> <li>• Supported only for Internet links.</li> <li>• Not supported when a dual CPE connection plan (device template) is used.</li> </ul> </li> <li>• You can configure only one WAN link with either LTE, ADSL, or VDSL access type.</li> </ul>

Table 310: Add Gateway Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
PPPoE	<p>This field is displayed only if you specify ADSL or VDSL as the access type.</p> <p>Click the toggle button to enable Point-to-Point Protocol over Ethernet (PPPoE) for a WAN link. By default, PPPoE is disabled.</p> <p>PPPoE connects multiple hosts on an Ethernet LAN to a remote site through a single customer premises equipment (CPE) device.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• If you enable PPPoE, you must specify the PPPoE parameters while configuring the site.</li> <li>• PPPoE is not supported when a dual CPE connection plan (device template) is used.</li> </ul>
Subscribed Bandwidth	<p>Enter the maximum bandwidth (in mega bits per second [Mbps]) to be allowed for the WAN link.</p> <p>Range: 1 through 10,000</p> <p><b>NOTE:</b> If you specify LTE as the access type, you cannot configure the subscribed bandwidth.</p>
Provider	Enter the name of the service provider who is responsible for the WAN link.
Cost/Month	<p>Enter the cost per month (in the specified currency) of the subscribed bandwidth.</p> <p>Range: 1 through 10,000</p> <p>In bandwidth-optimized SD-WAN, CSO uses this information to identify the least-expensive link to route traffic if multiple WAN links meet SLA profile parameters. For more information, see <a href="#">“Cost-Based Link Switching” on page 241</a>.</p>
Enable Local Breakout	<p>Click the toggle button to enable local breakout on the WAN link. By default, local breakout is disabled.</p> <p><b>NOTE:</b> If you enable local breakout on a WAN link, the WAN link <i>can be used</i> for local breakout. The decision of whether traffic breaks out locally from the site depends on the breakout profile that is referenced in the SD-WAN policy intent.</p>
Breakout Options	Select whether you want to use the WAN link for both breakout and WAN traffic (default) or only for breakout traffic.
WAN Link (Primary or Secondary)	For dual CPE connection plans, displays whether the WAN link is for the primary device or for the secondary device. This field cannot be modified.

Table 310: Add Gateway Site for <Tenant-Name> Settings (*continued*)

Field	Description
WAN_1	<p>Select the check box to enable this WAN link.</p> <p>When you enable the WAN link, fields related to the WAN link appear. Fields marked with an asterisk (*) must be configured to proceed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields</p>
WAN_2	<p>Select the check box to enable this WAN link.</p> <p>When you enable the WAN link, fields related to the WAN link appear. Fields marked with an asterisk (*) must be configured to proceed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields</p>
WAN_3	<p>Select the check box to enable this WAN link.</p> <p>When you enable the WAN link, fields related to the WAN link appear. Fields marked with an asterisk (*) must be configured to proceed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields</p> <p>Click <b>Next</b> to continue.</p>
<b>Additional Requirements</b>	
Site Type	Displays the type of site being added (spoke or hub). This field cannot be modified.
Default Links	<p>Select one or more links to be used for routing traffic in the absence of matching SD-WAN policy intents.</p> <p>Default links are used primarily for overlay traffic but can also be used for local breakout traffic. However, a default link cannot be used exclusively for local breakout traffic. If you do not specify a default link, then equal-cost multipath (ECMP) is used to choose the link on which to route traffic.</p>
Backup Link	<p>Select a backup link through which traffic can be routed when the primary (other) links are unavailable.</p> <p>You can select any link other than the default links or links that are configured exclusively for local breakout traffic as the backup link.</p> <p>When a primary link comes back online, CSO monitors the performance on the primary link and when the primary link meets the SLA requirements, the traffic is switched back to the primary link. However, SLA data is not monitored for the backup link.</p>
Preferred Breakout Link	Select the preferred link for local breakout. If no link is selected, then the breakout link is chosen using ECMP from the available links.



Table 310: Add Gateway Site for &lt;Tenant-Name&gt; Settings (continued)

Field	Description
<b>Dynamic VPN Thresholds</b>	
Threshold	<p>Select the <b>Set Custom Threshold</b> check box to specify a custom threshold values for the creation and deletion of dynamic VPN tunnels from the gateway site to a destination site.</p> <p><b>NOTE:</b> The threshold values that you specify overrides the threshold values specified for the tenant.</p>
<b>Create Tunnel Threshold</b>	
Sessions Closed	<p>Specify the threshold for the number of sessions (flows) closed (in a two-minute duration) between the gateway site and a destination site. When the number of sessions closed exceeds the specified threshold, a tunnel is created between the gateway site and the destination site.</p> <p>For example, if an on-premise spoke site is not attached to a gateway and if there is traffic between the gateway site and the spoke site, the dynamic tunnel can be created based on the threshold.</p>
<b>Delete Tunnel Threshold</b>	
Sessions Closed	Specify the threshold for the number of sessions closed (in a 15-minute duration) between the gateway site and a destination site. When the number of sessions closed is lower than the specified threshold, the tunnel between the gateway site and destination site is deleted.
<b>Hub Multihoming</b>	
Enable Hub Multihoming	Click the toggle button to enable multihoming on the site. Multihoming is the ability of a spoke site to connect to multiple hub sites, thereby providing redundancy.
Device Redundancy	<p>For an SD-WAN site, displays whether device redundancy is enabled (true) or disabled (false) on the gateway site.</p> <p>Device redundancy is enabled only when you select a dual CPE NFX or a dual CPE SRX connection plan. In device redundancy, two CPE devices (either NFX devices or SRX devices) are used to protect the site against device failures. If the primary device fails, the secondary device takes over the traffic processing. This field cannot be modified.</p> <p>Click <b>Next</b> to continue.</p>

Table 310: Add Gateway Site for <Tenant-Name> Settings (*continued*)

Field	Description
<b>LAN Segments</b>	<p>You must add at least one LAN segment for the gateway site. To add a LAN segment:</p> <ol style="list-style-type: none"> <li>1. Click the + icon. The Add LAN Segment page appears.</li> <li>2. Complete the configuration settings according to the guidelines provided in <a href="#">Table 311 on page 786</a>.</li> <li>3. Click <b>Save</b>. The LAN segment is added and you are returned to the Add Gateway Site for <i>Tenant-Name</i> page.</li> </ol> <p>Click <b>Next</b> to continue to the Summary tab.</p>

Table 311: Add LAN Segment Settings

Field	Description
Name	Enter a unique string of alphanumeric characters. No spaces are allowed and the maximum length is 15 characters.
Type	<p>Select the type of LAN segment:</p> <ul style="list-style-type: none"> <li>• <b>Directly Connected</b>—Indicates that the LAN segment is directly connected to the site. This is the default.</li> <li>• <b>Dynamic Routed</b>—Indicates that the LAN segment is not directly connected to the site and is reachable by using a dynamic route. If you select this option, you must specify the dynamic routing information.</li> </ul> <p><b>NOTE:</b> You can configure dynamically routed LAN segments only for gateway sites.</p>
Ports	Select one or more port numbers from the list depending on the connection plan that you previously specified.
VLAN ID	<p>Enter the VLAN ID for the LAN segment.</p> <p>Range: 1 through 4094.</p>
IP Address Prefix	Enter the IP address prefix for the LAN segment; for example, 192.0.2.8/24.

Table 311: Add LAN Segment Settings (*continued*)

Field	Description
Department	<p>Select a department to which the LAN segment is to be assigned. You group LAN segments as departments for ease of management and for applying policies at the department-level. For LAN segments that are dynamically routed, you can assign only a data center department.</p> <p>Alternatively, click <b>Create Department</b> to create a new department and assign the LAN segment to it. See <a href="#">“Adding a Department” on page 739</a>.</p>
DHCP	<p>For directly connected LAN segments, click the toggle button to enable DHCP. DHCP is disabled by default.</p> <p>You enable DHCP if you want to assign IP addresses by using a DHCP sever. You disable DHCP if you want to assign a static IP address to the LAN segment.</p> <p><b>NOTE:</b> If you enable DHCP, fields related to DHCP-related parameters appear and must be configured.</p>
[DHCP-Related Fields]	
IP Address Prefix (for DHCP)	Enter the IP prefix of the DHCP IP address pool. For example: 192.0.2.10/24.
Address Range Low	Enter the starting IP address in the range of IP addresses that can be allocated by the DHCP server to the LAN segment.
Address Range High	Enter the ending IP address in the range of IP addresses that can be allocated by the DHCP server to the LAN segment.
Maximum Lease Time	<p>Specify the maximum duration (in seconds) for which a client can request for and hold a lease on the DHCP server.</p> <p>Range: 0 through 4,294,967,295 seconds.</p>
Name Server	Specify one or more IPv4 addresses of the DNS server. To enter more than one DNS server address, type address, press Enter, and then type the next address, and so on. DNS servers are used to resolve hostnames into IP addresses.
Protocol	For dynamically routed LAN segments, select the routing protocol (BGP or OSPF) to be used by the data center department to learn routes from the data center.
<b>BGP Configuration</b>	

Table 311: Add LAN Segment Settings (*continued*)

Field	Description
Authentication	<p>Select the BGP route authentication method to be used:</p> <ul style="list-style-type: none"> <li>• None—Indicates that no authentication should be used. This is the default.</li> <li>• Use MD5—Indicates that MD5 is to be used for authentication. If you choose this option, you must specify an authentication key.</li> </ul>
Peer IP Address	Enter the IP address of the BGP neighbor.
Peer AS Number	Enter the autonomous system (AS) number BGP neighbor.
Auth Key	If you specified that MD5 should be used for authentication, specify an MD5 authentication key (password), which is used to verify the authenticity of BGP packets.
<b>OSPF Configuration</b>	
OSPF Area ID	Specify the OSPF area identifier to be used for the dynamic route.
Authentication	<p>Select the OSPF route authentication method to be used:</p> <ul style="list-style-type: none"> <li>• Password—Indicates that password-based authentication should be used. If you choose this option, you must specify the password. (This is the default).</li> <li>• Use MD5—Indicates that MD5 is to be used for authentication. If you choose this option, you must specify an authentication key.</li> <li>• None—Indicates that no authentication should be used.</li> </ul>
Password	Enter the password to be used to verify the authenticity of OSPF packets.
Confirm Password	Retype the password for confirmation purposes.
MD5 Auth Key ID	<p>If you specified that MD5 should be used for authentication, enter the OSPF MD5 authentication key ID.</p> <p>Range: 1 through 255.</p>
Auth Key	If you specified that MD5 should be used for authentication, enter an MD5 authentication key, which is used to verify the authenticity of OSPF packets.

## RELATED DOCUMENTATION

[About the Sites Page](#) | 749

# Adding Cloud Hub Sites for SD-WAN Deployment

A cloud hub site represents an automation endpoint that is part of a data center or POP that is owned by the service provider. The cloud hub site is connected to multiple spoke sites using the overlay connections. Cloud hubs sites are logical entities in a multi-tenant device (cloud hub device). You add a cloud hub site from the **Sites** page. This page describes how to add a cloud hub site for a tenant.

To add a cloud hub site:

1. Select **Sites > Site Management**.

The Sites page appears.

2. Click **Add** and select **Cloud Site**.

The **Add Cloud Site** page appears.

3. Complete the configuration settings in the Site Information, Configuration, and Service Attachment Points sections according to the guidelines provided in [Table 312 on page 789](#).

**Table 312: Fields on the Add Cloud Site Page**

Field	Description
<b>Site Information</b>	
Site Name	Enter a site name. You can use any number of alphanumeric characters, including special characters. The maximum length is 15 characters.
Cloud Hub Type	Displays the type of cloud hub site. By default, the <b>Cloud Hub</b> type is displayed when configuring a cloud hub site.
<b>Address</b>	
Street Address	Enter the street address of the site.
City	Enter the city where the site is located.
State/Province	Enter the state or province where the site is located.
ZIP/Postal Code	Enter the postal code for the locality of the site.
Country	Select the name of the country.

Table 312: Fields on the Add Cloud Site Page (*continued*)

Field	Description
Contact Name	Enter the name of a contact person for the site.
E-mail	Enter the e-mail ID of the contact person.
Phone	Enter the phone number of the contact person.

### Configuration

Based on the cloud hub device, the following fields are populated:

Service POP	Select the name of the point of presence (POP) for the site. A network POP is a location at which a service provider instantiates a network function, such as a virtualized network function (VNF).
Hub Device Name	Select the cloud hub device for the site. The cloud hub devices that support either <b>Data</b> or <b>Data and OAM</b> capability are listed.

#### 4. Click **OK**.

The newly created cloud site is displayed on the **Sites** page.

### RELATED DOCUMENTATION

[About the Sites Page | 749](#)

[About the Site Groups Page | 835](#)

## Adding Cloud Spoke Sites for SD-WAN Deployment

A cloud spoke represents an automation endpoint (virtual machine (VM) or an EC2 Instance) running with Juniper Networks vSRX image in the Amazon Web Services(AWS) virtual private cloud (VPC). The cloud spoke sites are connected with the hub sites using the overlay connections. You create a cloud spoke site from the **Sites** page. This topic describes how to add a cloud site for a tenant.

To add a cloud spoke site:

- 1. Select **Sites > Site Management**.

The Sites page appears.

- 2. Click **Add** and select **Cloud Spoke**.

The **Add Site for Tenant Name** page appears.

- 3. Complete the configuration settings in the Site Information, Configuration, and Service Attachment Points sections according to the guidelines provided in [Table 313 on page 791](#).

**NOTE:** Fields marked with an asterisk (\*) are mandatory.

- 4. Review the configuration and modify the settings, if needed, from the **Summary** tab.

- 5. Click **OK**.

The newly added cloud spoke site is displayed on the **Sites** page.

Table 313: Fields on the Add Cloud Spoke Site Page

Field	Description
<b>Site Information</b>	
Site Name	Enter a unique name for the site. Enter a unique string of alphanumeric characters and special character (-). The maximum length is 15 characters.  Example: aws-cloud-spoke
Site Type	Displays the site type as <b>Spoke</b> . This field cannot be modified.
Tenant Topology	Displays the SD-WAN mode for the tenant. This field cannot be modified.
Site Group	(Optional) Select a site group to which you want to assign the site.  Example: cloud-spoke
<i>Cloud Information</i>	

Table 313: Fields on the Add Cloud Spoke Site Page (continued)

Field	Description
Region	<p>Select the region to which the site belongs. The regions in CSO are mapped to the regions in the AWS account.</p> <p>Example: Ohio</p>
VPC ID	<p>Enter the VPC ID from the AWS account.</p> <p>To obtain VPC ID:</p> <ol style="list-style-type: none"> <li>1. Log in to AWS account.</li> <li>2. Search for VPC service.</li> <li>3. Click the VPC dashboard.</li> <li>4. Select a VPC ID.</li> </ol> <p>Ensure that the VPC is attached to the Internet gateway.</p> <p>To check whether VPC is attached:</p> <ol style="list-style-type: none"> <li>1. Log in to AWS account.</li> <li>2. Search for VPC service.</li> <li>3. Click the Internet Gateway dashboard.</li> <li>4. Check whether the VPC state is <b>attached</b>.</li> </ol> <p>Example: vpc-6d810314</p>
Management Subnet	<p>Specify whether CSO must create a new subnet or use an existing subnet from the AWS account. The management subnet of vSRX is used to push the initial stage-1 configuration. The following options are available:</p> <ul style="list-style-type: none"> <li>• Use an existing subnet in AWS account</li> <li>• Create new</li> </ul>
IP Prefix	<p>Enter the management IP prefix. The first four IP addresses in the subnet are reserved by AWS. For example, IP addresses x.x.x.0/x through x.x.x.3/x are always reserved by AWS. Hence, provide an IP prefix other than the reserved IP prefix.</p> <p>Example: 105.0.1.5/24</p>



Table 313: Fields on the Add Cloud Spoke Site Page (*continued*)

Field	Description
<b>Connectivity Requirements</b>	<p>Click a connection plan to select the plan for WAN connectivity.</p> <p>A connection plan contains information prepopulated from the device template, and includes the device information, a list of SD-WAN features supported, and the number of links supported.</p> <p><b>NOTE:</b> vSRX as SD-WAN spoke in AWS template supports cloud spoke site for AWS VPC.</p>
Management Connectivity IP Prefix	
IP Prefix	<p>Enter an IPv4 address prefix for the cloud spoke site. The IP address prefix must be unique across the entire network.</p> <p>Example: 192.0.2.10/24</p>
WAN Underlay Links	
WAN_0 WAN_1	Select the check boxes to configure the WAN links. Depending on the connection plan selected, you can configure up to two WAN links per site that support SD-WAN. You can configure these links as MPLS or Internet links.
Type	Displays the connection type for WAN underlays. Only Internet link is supported.
Subscribed Bandwidth	Enter the maximum bandwidth (in Mbps) to be allowed for a specific WAN link.
Provider	Enter the name of the service provider (SP).
Cost/Month	Enter the cost per month of the subscribed bandwidth in the specified currency. In bandwidth-optimized SD-WAN, this information is used to identify the least-expensive link to route traffic if multiple WAN links meet SLA profile parameters. For more information on link switching based on the cost parameter, see <a href="#">“Cost-Based Link Switching” on page 241</a> .
Enable Local Breakout	<p>Click the toggle button to enable local breakout on the WAN link. By default, local breakout is disabled.</p> <p><b>NOTE:</b> If you enable local breakout on a WAN link, the WAN link <i>can be used</i> for local breakout. The decision of whether traffic breaks out locally from the site depends on the breakout profile that is referenced in the SD-WAN policy intent.</p>
Breakout Options	Select whether you want to use the WAN link for both breakout and WAN traffic (default) or only for breakout traffic.

Table 313: Fields on the Add Cloud Spoke Site Page (continued)

Field	Description
Static IP Prefix	<p>Enter the private IPv4 address from the subnet. For example, if the IPv4 CIDR address is 105.0.2.0/24 for a WAN interface in the AWS account, then enter any IP address inside the subnet. The first four IP addresses in the subnet are reserved by AWS. Hence, provide an IP prefix other than the reserved IP prefix.</p> <p>Example: 105.0.2.12/24</p>
Gateway IP	<p>Enter the IPv4 address for the gateway. Typically, the first IP address in the subnet is selected for gateway IP address.</p> <p>Example: 105.0.2.1</p>
Elastic IP	<p>Elastic IP address is a public, static IPv4 address designed for dynamic cloud computing. The public IP address is mapped to the private subnet IP using one-to-one NAT. You must allocate the IP addresses based on the number of WAN links that are enabled. For example, If two WAN links are enabled, then you must allocate two elastic IP addresses.</p> <p>Example: 34.213.255.184</p>
Traffic Type	<p>Select the traffic type. The options available are:</p> <ul style="list-style-type: none"> <li>• DATA_ONLY—Select this option if you want to use the WAN link to transmit only data traffic.</li> <li>• OAM_AND_DATA—Select this option if you want to use the WAN link to transmit both data traffic and management traffic.</li> </ul> <p><b>NOTE:</b> You must select at least one WAN link with the OAM_AND_DATA traffic type.</p>
Connect to Hub	<p>Click the toggle button to specify whether to use the WAN link to connect the spoke site to a hub. By default, this option is disabled for all WAN links.</p> <p><b>NOTE:</b> In real time-optimized deployments, you must enable the Connect to Hubs feature to establish secure OAM IPsec tunnels.</p>
Used for OAM	<p>Click the toggle button to specify whether to use the WAN link to setup OAM tunnel to the OAM hub. By default, this option is disabled for all WAN links.</p> <p><b>NOTE:</b> In bandwidth-optimized deployments, you must enable the Use for OAM Traffic option on at least one WAN link to establish secure OAM IPsec tunnels.</p>
<b>Additional Requirements</b>	<p>Based on the connectivity requirement, the following fields are populated:</p>

Table 313: Fields on the Add Cloud Spoke Site Page (continued)

Field	Description
Default Links	<p>Select the default links that must be used for routing traffic. The site can have multiple default links to the hub site as well as to the Internet.</p> <p>Default links are used primarily for overlay traffic but can be used for local breakout traffic as well. A default link cannot be used exclusively for local breakout traffic. The default link is optional and in case it is not chosen, all links are used through equal-cost multipath (ECMP).</p>
Backup Link	<p>Select a backup link through which traffic can be routed when the primary links are unavailable. You cannot select the default link as the backup link. Note that you cannot assign the backup link for exclusive breakout traffic (the <b>Use only for breakout traffic</b> option). If local breakout is enabled for the site, the breakout traffic is also routed through the backup link when the breakout link is not available.</p> <p>When a primary link comes back online, CSO monitors the performance on the primary link and when the primary link meets the SLA requirements, the traffic is switched back to the primary link. However, note that the SLA data is not monitored for the backup link.</p>
Preferred Breakout Link	Select the preferred link for local breakout. If no link is selected, then the breakout link is chosen using ECMP from the available links.
Enable Hub Multihoming	Select this option to enable multihoming on the site. Multihoming is the ability of a spoke site to connect to multiple hub sites, thereby providing redundancy.\
<b>LAN Segments</b>	Add at least one LAN segment.
Name	Enter a unique string of alphanumeric characters. No spaces are allowed and the maximum length is 15 characters.
Type	<p>Select the type of LAN segment:</p> <ul style="list-style-type: none"> <li>• <b>Directly Connected</b>—Indicates that the LAN segment is directly connected to the site. This is the default.</li> <li>• <b>Dynamic Routed</b>—Indicates that the LAN segment is not directly connected to the site and is reachable by using a dynamic route. If you select this option, you must specify the dynamic routing information.</li> </ul> <p><b>NOTE:</b> You can configure dynamically routed LAN segments only for gateway sites.</p>

Table 313: Fields on the Add Cloud Spoke Site Page (*continued*)

Field	Description
Port	<p>Select one or more port numbers from the list depending on the connection plan that you previously specified.</p> <p><b>NOTE:</b> The ports in LAN segment must be contiguous. For example, If both WAN_0 and WAN_1 are enabled and are using interfaces ge-0/0/0 and ge-0/0/1 respectively, then LAN_0 must use ge-0/0/2. If only WAN_0 is enabled and is using interface ge-0/0/0, the LAN_0 must use ge-0/0/1.</p>
IP Address Prefix	<p>Enter the IP address prefix for the LAN segment. The IP prefix is for the network on the LAN side of the CPE device with vSRX instance. Go to AWS account, check the subnet and provide an IPv4 address within the subnet. The first four IP addresses in the subnet are reserved by AWS. Hence, provide an IP prefix other than the reserved IP prefix.</p> <p>Example: 105.0.4.5/24</p>
Department	<p>Select a department to which the LAN segment is to be assigned. You group LAN segments as departments for ease of management and for applying policies at the department-level. For LAN segments that are dynamically routed, you can assign only a data center department.</p> <p>Alternatively, click <b>Create Department</b> to create a new department and assign the LAN segment to it. See <a href="#">“Adding a Department” on page 739</a>.</p>

## RELATED DOCUMENTATION

[Provisioning a Cloud Spoke Site in AWS VPC | 796](#)
[About the Sites Page | 749](#)
[About the Site Groups Page | 835](#)

## Provisioning a Cloud Spoke Site in AWS VPC

### IN THIS SECTION

- [Add a Cloud Spoke Site | 797](#)
- [Configure the Cloud Spoke Site | 798](#)
- [Download the Cloud Formation Template | 799](#)

- Provision the Device on AWS Server | 799
- Activate the Device | 801

Use the following high-level steps to provision a vSRX cloud spoke site in Amazon Web Services (AWS) virtual private cloud (VPC).

Before you begin:

- Set up your Amazon Web Services (AWS) account.
- Identify the virtual private cloud (VPC) to which the AWS spoke site must be provisioned.
- Install licenses to use vSRX features. Choose any of the following AWS vSRX Image Licenses.
  - Bring Your Own License (BYOL)— If you plan to use a BYOL, then you must install the license to the device before deploying CSO SD-WAN functionality. See <https://aws.amazon.com/marketplace/pp/B01LYWCGDX>.
  - License included. See <https://aws.amazon.com/marketplace/pp/B01NAUWN0G>.
- Ensure that you have the supported software version for the AWS spoke.
- Reserve two elastic IP addresses on AWS.
- Reserve two public IP addresses.

To set up and monitor your network:

### Add a Cloud Spoke Site

To add a cloud spoke site:

1. Select **Sites > Site Management**.

The Sites page appears.

2. On the Sites page, click **Add > Cloud Spoke**.

The Add Cloud Spoke Site page appears.

3. Specify the site information such as, site name, AWS region, VPC ID, management subnet, IP prefix and click **Next**.
4. Specify vSRX as SD-WAN spoke in AWS as the connection plan.

**NOTE:**

- Only Hub-Spoke topology is supported for AWS cloud spoke site.
- Only Internet link is supported for WAN underlay connections.

5. Provide the WAN details and click **Next**.

The WAN traffic page appears, displaying a set of values for the WAN link configuration.

6. Specify additional requirements and click **Next**.

7. Specify LAN segment information and click **Next**.

8. In the **Summary** tab, check the configuration and click **Edit** to modify the settings.

9. Click **OK** to save the changes.

The new cloud spoke site that you created appears in the Sites page.

## Configure the Cloud Spoke Site

To configure a cloud spoke site:

1. Select **Sites > Site Management**.

The Sites page appears.

2. Select the cloud spoke site that you created and click **Configure Site**.

The configure site page appears.

3. In the **Connectivity** tab, specify the primary hub site detail, overlay tunnel information, and WAN interface details.

4. Click **Ok**.

5. Click **Devices** tab and enter the activation code provided by your service provider.

6. Click **Ok**

The site status is changed to **Configured**.

## Download the Cloud Formation Template

To download the cloud formation template:

1. Click **Resources > Devices**.

The Devices page appears.

2. Identify the device that you want to activate.

You can activate a device if it has the status as Expected.

3. Select the device and click **Activate Device**.

The Activate device page appears.

4. Enter the activation code supplied by the service provider.

You can download the cloud formation template after you enter the correct activation code.

5. Click **Download** to download the cloud formation template.

The template is downloaded to your local computer in JSON format.

## Provision the Device on AWS Server

CSO creates cloud formation template with stage-1 configuration bundled in JSON format. You must download this template and then upload to AWS to provision the vSRX. The cloud formation template creates the required resources such as subnet, interface, vSRX and so on and applies the stage-1 configuration.

To provision the device on AWS server:

1. Log in to your AWS account.

- If you have already logged in to your AWS account, the Create Stack page appears.
- If you are not logged into your AWS account, a new Web page opens in your browser, displaying the AWS login information. Log in to your AWS account.

**TIP:** If you do not see the Create Stack page when you log in to or access your AWS account, then search for CloudFormation service.

The Create Stack page appears.

2. Select **CloudFormation > Stacks > Create Stack > Upload a template to Amazon S3**.

3. Click **Choose File** and select the cloud formation template that you downloaded in JSON format .

4. Click **Next**.

5. Specify the Stack name. For example, Oregonstack.

6. Specify the Custom Image Id for the vSRX.

You must ensure that you have the supported software image for the AWS spoke. If the image is unavailable on the AWS marketplace, you must do the following to get the AMI number for your desired region:

a. Log in into the Administration Portal.

b. Select **Resources > Device Templates**.

The Device Template page appears.

c. Select **vSRX as SD-WAN spoke in AWS**.

d. Select **Edit Device Template > Template Settings**.

The Template Settings page appears.

e. Modify the image ID to the AMI ID for your region.

f. Click **Save**.

g. Paste the AMI ID in the **CustomImageId** field.

**NOTE:** You must specify the Custom Image ID field because not doing so results in failure during stack creation or provisioning.

7. In the Parameters section, specify the KeyName for your EC2 instance.

8. Click **Next**.

9. Select **I acknowledge that AWS CloudFormation might create IAM Resources**.

10. Click **Create**.



The Create Stack page displays a list of existing stacks and indicates that it is creating the stack that you requested. The create stack process takes up to 30 minutes. If the process does not complete in 30 minutes, a timeout occurs and you need to retry the process.

## Activate the Device

To activate the device:

1. After the create stack process is complete, return to the Customer Portal and click **Next**.

The Activate Device page displays a status indicating that CSO is detecting the provisioning agent. This process takes up to 30 minutes. If the process does not complete in 30 minutes, a timeout occurs and you need to retry the process.

**NOTE:** You need not download the cloud formation template again. You can log in to the Customer Portal, access the Activate Device page, enter the activation code and click **Next**. After the CREATE\_COMPLETE message is displayed on the AWS server, click Next on the Activate Device page to proceed with device activation.

If the spoke on AWS has been spawned successfully on AWS, it will contact CSO through outbound SSH connection. The device is detected and normal ZTP process is triggered. The rest of the workflow is consistent with the normal on-premise workflow.

On Device Activation page, the device is activated through the following steps:

- Detecting the device
- Applying stage-one configuration to the device
- Bootstrapping of device
- Activating the device

After each successful step, you can see a green check mark. If any of these steps fails, a red exclamation mark appears.

2. After the activation process is complete, click **OK**.

The Sites page appears. To see the device activation status, hover over the device icon on the Sites page.

## RELATED DOCUMENTATION

Adding Cloud Spoke Sites for SD-WAN Deployment | 790

## Adding and Configuring Sites by Importing a JSON File

You can add and configure one or more sites in CSO by uploading a JavaScript Object Notation (JSON) file that contains the parameters for the sites. Because adding and configuring a site are two separate steps in CSO Release 4.1.0, you must first import the JSON file for adding the sites and then import the JSON file for configuring the sites.

Before you begin, ensure that the JSON file contains all the parameters required for each site that you want to add or configure.

**NOTE:** We recommend that you create the JSON file by referring to the sample JSON file provided by CSO. Refer to Step 3 of the procedure for downloading and modifying the sample JSON file.

To add and configure multiple sites by importing JSON files to CSO:

1. Click **Sites > Site Management**.

The Sites page appears.

2. Click **Add** and select **Import Sites**.

The **Import Sites** page appears.

3. (Optional) Download a sample JSON file by clicking the **Download Sample JSON** link. Edit the parameters based on your requirements and save the file.

4. Click **Browse** and navigate to the directory that contains the JSON file.

5. Select the file and click **Open**.

6. Click **Import**.

A message is displayed indicating that the file is imported to CSO. After the file is imported to CSO, you are returned to the Sites page, where you can view the sites that CSO added based on the imported JSON file. The status of the newly added sites is **CREATED**.

7. (Optional) If you also want to configure the newly added sites, repeat the steps starting from step 2 and import the JSON file you saved for configuring the sites in step 4.

After the JSON file is imported successfully, you are returned to the Sites page. On the Sites page, you can view that the status of the newly configured sites is set to CONFIGURED:

- If you enabled automatic activation for the sites, CSO activates and provisions the sites and sets the status of the sites to PROVISIONED.
- If you did not enable automatic activation, CSO sets the status of the sites to CONFIGURED. You must manually activate the sites after which CSO provisions them. See [“Activating a CPE Device” on page 824](#) or [“Activating Dual CPE Devices \(Device Redundancy\)” on page 827](#).

After the sites are activated and provisioned, you can install certificates and create policies for the sites. See [“Installing and Uninstalling Certificates” on page 939](#), [Creating Firewall Policies](#), [“Creating NAT Policies” on page 657](#), [“Creating SD-WAN Policy Intents” on page 620](#),

## RELATED DOCUMENTATION

| [About the Sites Page | 749](#)

## Managing a Single Site

You can use the *Site-Name* page to view the site details and to manage the site configurations for a single site. To access the page, click **Sites > Site Management** and click the site that you want to manage.

You can perform the following tasks from this page:

- On the **Overview** tab, view detailed information about the tenant site, such as geographical location, connection details, device details, alarms, and alerts.
- On the **WAN** tab, view detailed information about the WAN links, such as topology of the hub-site WAN links, total number of hub and spoke links, total number of applications, link utilization details, link metrics based on throughput, and the maximum bandwidth capacity of a WAN link in a site. Hover over the WAN link to view bandwidth capacity.

You can add or delete a VPN tunnel between a source site and destination site. For more information about creating and deleting VPN tunnels between a source site and destination site, see [“Adding On-Demand VPN Tunnels” on page 925](#) and [“Deleting On-Demand VPN Tunnels” on page 926](#).

For sites owned by a tenant in a full mesh topology, you can view all the WAN link connections between WAN interfaces in all the sites. Click a site to see all connections between its WAN interfaces.

- On the **Services** tab, view services, deploy network services, start a service, and disable services for a tenant site. You can also view the topology of the site.

To deploy a network service to a site, select the service, and then select an attachment point in the topology graphic. Alternatively, drag and drop the network service to an attachment point in the topology graphic.

- On the **Policies** tab, view the following details:
  - List of all policies applicable to a tenant site. Click the policy name to view the rules that are applicable for the tenant site. Click the edit icon at the end of the row to edit a policy. You are taken to the **Configuration > Policy** page, where you can edit the policies.
  - Details about the tenant user who last updated the policy.
  - Time when the policy was last updated.
  - Deployment status of the policy—deployed or not deployed.
  - Number of rules applicable to the site compared to the total number of rules applicable to the tenant.
- On the **LAN** tab, view, create, deploy, and delete a LAN segment. In addition, you can use this tab to reassign a LAN segment to a different department. See [“Managing LAN Segments on a Tenant Site” on page 819](#).
- On the **Devices** tab, view a list of devices in your network. See [“About the Devices Page” on page 457](#).

## RELATED DOCUMENTATION

[About the Sites Page | 749](#)

[Dynamic VPN Tunnels Overview | 922](#)

## Configuring a Single Site

After you add a site, you use the Configure Site page to specify the underlay configuration and the device-related configuration.

To configure a site:

1. Click **Sites > Site Management**.

The Sites page appears.

2. Select a site and click the **Configure Site** button .

The **Configure Site Site Name** page is displayed.

3. Complete the configuration settings according to the guidelines provided in:

- [Table 314 on page 805](#) for on-premise spoke sites and gateway sites.

**NOTE:** Fields marked with an asterisk (\*) are mandatory.

4. (Optional) After you complete the site configuration, you can click the **Download as JSON** link to download the configuration (in JavaScript Object Notation [JSON] format) for later use (if needed).

5. Click **OK**.

The site configuration is saved and you are returned to the Sites page. The secure OAM configuration is deployed on the cloud hub or hubs attached to the site.

If no activation code is needed to activate the device, then the Zero Touch Provisioning (ZTP) workflow is started as soon as device communicates with Contrail Service Orchestration (CSO). If an activation code is needed to activate the device, you must enter an activation code to start the ZTP workflow. For more information, see [“Activating a CPE Device” on page 824](#).

**Table 314: Fields on the Configure Site <Site-Name> Page (On-Premise Spoke and Gateway)**

Field	Description	Applicable To
Site Type	Displays the site type.	Gateway On-premise spoke
Management Region	Displays the regional server with which the CPE device communicates based on the information in the device template. This field cannot be modified.	Gateway On-premise spoke
Hub Multihoming	Displays whether multihoming was enabled or disabled on the site during the addition of the site. This field cannot be modified.	Gateway On-premise spoke
Selected Plan	Displays the connection plan that you selected when you created the site. This field cannot be modified.	Gateway On-premise spoke
Device Model	Select a device model from the list. Device models are listed based on the connection plan that you selected while creating the site.  <b>NOTE:</b> This field is applicable only if you select an NFX150 connection plan.	

Table 314: Fields on the Configure Site &lt;Site-Name&gt; Page (On-Premise Spoke and Gateway) (continued)

Field	Description	Applicable To
<i>Configuration</i> —The fields displayed are based on the parameters that you specified during the site addition workflow.		
<b>Connectivity</b>		
Primary Hub Site	Select the hub site (or primary hub site in case of multihoming) to which the gateway site or spoke site must connect.	Gateway On-premise spoke
Secondary Hub Site	If you configured multihoming during site addition, select the secondary hub site to which the gateway site or spoke site must connect.	Gateway On-premise spoke
Gateway Site	Select the gateway site with which you want to associate the on-premise spoke site. If you specify a gateway site, then the initial site-to-site traffic as well as the central breakout (backhaul) traffic (if applicable) is sent through the gateway site instead of the cloud hub site.	On-premise spoke
<b>Management Connectivity</b>		
IP Prefix	Enter the IPv4 prefix to be used for the OAM traffic. This IP address must be unique across the entire management network. <ul style="list-style-type: none"> <li>For NFX150 and NFX250 devices, if the <b>USE_SINGLE_SSH_TO_NFX</b> parameter is disabled in the device template, then enter the IP address prefix as /29 or lower based on the number of VNFs.</li> <li>For all other devices, enter the IP address prefix as /32.</li> </ul>	Gateway On-premise spoke
<b>PPPoE Settings</b>		
Username	Specify the username to be used for authentication with the PPPoE server.	Gateway On-premise spoke
Password	Specify the password to be used for authentication with the PPPoE server.	Gateway On-premise spoke
Authentication Protocol	Select the authentication type to use for PPPoE authentication: <ul style="list-style-type: none"> <li>Password authentication protocol (PAP)</li> <li>Challenge handshake authentication protocol (CHAP).</li> </ul>	Gateway On-premise spoke

Table 314: Fields on the Configure Site &lt;Site-Name&gt; Page (On-Premise Spoke and Gateway) (continued)

Field	Description	Applicable To
<b>WAN_0</b>		
WAN Interface	Displays the interface name configured in the device template. This field cannot be modified.	Gateway On-premise spoke
Link Type	Displays the link type (MPLS or Internet) configured during the site addition workflow. This field cannot be modified.	Gateway On-premise spoke
Use for Fullmesh	Click the toggle button to specify that the WAN link is part of a fullmesh topology.	Gateway On-premise spoke
Mesh Tag	<p><b>NOTE:</b> This field is applicable only if you enable the <b>Use for Fullmesh</b> toggle button.</p> <p>You can associate a WAN link with one or more mesh tags:</p> <ul style="list-style-type: none"> <li>• For an on-premise spoke site, you can select one mesh tag.</li> <li>• For a gateway site you can select one or more mesh tags.</li> </ul> <p>Matching mesh tags are one of the criteria used to form tunnels between sites that support meshing.</p> <p>For more information about mesh tags, see <a href="#">“Mesh Tags Overview” on page 845</a></p>	Gateway On-premise spoke
Mesh Overlay Link Type	<p><b>NOTE:</b> This field is applicable only if you enable the <b>Use for Fullmesh</b> toggle button.</p> <p>If the link type is Internet, by default value the mesh overlay link type is GRE_IPSEC.</p> <p>If the link type is MPLS, select one of the following options:</p> <ul style="list-style-type: none"> <li>• GRE-IPSEC</li> <li>• GRE</li> </ul>	Gateway On-premise spoke

Table 314: Fields on the Configure Site &lt;Site-Name&gt; Page (On-Premise Spoke and Gateway) (continued)

Field	Description	Applicable To
Connects To Hubs	<p>Click the toggle button to specify that the WAN link of the site connects to a hub.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>For sites with a single CPE, you must enable at least one WAN link to connect to the hub so that OAM traffic can be transmitted.</li> <li>For sites with a dual CPE, you must enable at least one WAN link <i>per device</i> to connect to the hub so that OAM traffic can be transmitted.</li> </ul>	<p>Gateway</p> <p>On-premise spoke</p>
Use for OAM Traffic	If you specified that the WAN link is connected to a hub, click the toggle button to enable the WAN link for transmitting OAM traffic. This WAN link is then used to establish the OAM tunnel.	<p>Gateway</p> <p>On-premise spoke</p>
Address Assignment	<p>Select the method of assigning an IP address to the WAN link:</p> <ul style="list-style-type: none"> <li>For spoke sites, you can choose to specify a static IP address or allocate the IP address by using the DHCP server of the service provider of the WAN link.</li> <li>For gateway sites, only static IP address assignment is supported.</li> </ul>	<p>Gateway</p> <p>On-premise spoke</p>
Static IP Prefix	If you configured the address assignment method as static, enter the IP address prefix of the WAN link.	<p>Gateway</p> <p>On-premise spoke</p>
Gateway IP	If you configured the address assignment method as static, enter the IP address of the gateway of the service provider of the WAN link.	<p>Gateway</p> <p>On-premise spoke</p>
Traffic Type	<p>For non-NFX250 devices, this field displays that only data traffic can be transmitted and cannot be modified.</p> <p>For NFX250 devices, you can select whether you want to use the WAN link to transmit only data traffic (<b>DATA_ONLY</b>) or both management traffic and data traffic (<b>OAM_AND_DATA</b>).</p> <p><b>NOTE:</b> To enable communication with CSO for the creation of the gateway router:</p> <ul style="list-style-type: none"> <li>For sites with a single CPE NFX250, at least one WAN link must be configured as <b>OAM_And_DATA</b>.</li> <li>For sites with dual CPE NFX250, at least one WAN link <i>per device</i> must be configured as <b>OAM_And_DATA</b>.</li> </ul>	<p>Gateway</p> <p>On-premise spoke</p>



Table 314: Fields on the Configure Site <Site-Name> Page (On-Premise Spoke and Gateway) (*continued*)

Field	Description	Applicable To
Data VLAN ID	Enter the VLAN ID associated with the WAN link.	Gateway On-premise spoke
Local Breakout	<p>Displays whether local breakout was enabled on the WAN link during addition of the site. This field cannot be modified.</p> <p>If the WAN link is selected to be used for only local breakout traffic, then fields related to the <i>Overlay Tunnel</i> configuration are not displayed.</p>	Gateway On-premise spoke

Table 314: Fields on the Configure Site &lt;Site-Name&gt; Page (On-Premise Spoke and Gateway) (continued)

Field	Description	Applicable To
Autocreate Source NAT Rule	<p>If the WAN link is enabled for local breakout, you can click the toggle button to enable interface-based source NAT on the WAN link. The automatically-created source NAT rule is implicitly defined and applied to the site and is not visible on the NAT Policies page.</p> <p>By default, this field is disabled.</p> <p><b>NOTE:</b> If this option is enabled for a WAN interface <b>W1</b> during the site addition workflow, a series of NAT source rules are automatically created. Each automatically created NAT rule is from a zone to the WAN interface, with a translation of type interface. Each pair of [zone - interface] represents a rule-set.</p> <p>For example, the following zone to <b>W1</b> interface rule-set might be created:</p> <p><b>Zone1 --&gt; W1: Translation=Interface</b></p> <p><b>Zone2 --&gt; W1: Translation=Interface</b></p> <p><b>Zone3 --&gt; W1: Translation=Interface</b></p> <p>To manually override any of these rules, you can create a NAT rule within a particular rule-set. For example, to use a source NAT pool instead of an interface for translation, create a NAT rule within this particular rule-set, that includes the relevant zone and WAN interface as the source and destination. For example:</p> <p><b>Zone1 --&gt; W1 : Translation=Pool-2</b></p> <p>The manually created NAT rule is placed at a higher priority than the corresponding automatically created NAT rule.</p> <p>You can also add other fields (such as addresses, ports, protocols, and so on) as part of the source or destination endpoints. For example:</p> <p><b>Zone1, Port 56578 --&gt; W1: Translation=Pool-2</b></p>	<p>Gateway</p> <p>On-premise spoke</p>
<p><b>Overlay Tunnel or Overlay Tunnel 1</b>—Fields related to this section are displayed only if the <b>Connect to Hubs</b> field is enabled. In addition, if multihoming is enabled on the site, two overlay tunnels must be configured.</p>		
Tunnel Type	Select the tunnel type (GRE or GRE over IPsec) to be used for the creation of overlay tunnels.	<p>Gateway</p> <p>On-premise spoke</p>

Table 314: Fields on the Configure Site &lt;Site-Name&gt; Page (On-Premise Spoke and Gateway) (continued)

Field	Description	Applicable To
Peer Device	Displays the peer hub device to which the site is connected.	Gateway On-premise spoke
Interface Name	Select the interface name of the hub device to which the WAN link of the site is connected.	Gateway On-premise spoke
<b>Overlay Tunnel 2</b> —Fields related to this section are displayed only <b>Connect to Hubs</b> field and multihoming are enabled. Refer to the fields described for <b>Overlay Tunnel 1</b> for an explanation of the fields.		
<b>WAN_1</b>	Depending on the number of WAN links enabled during the site addition workflow, the fields related to those WAN link are displayed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields	Gateway On-premise spoke
<b>WAN_2</b>	Depending on the number of WAN links enabled during the site addition workflow, the fields related to those WAN link are displayed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields	Gateway On-premise spoke
<b>WAN_3</b>	Depending on the number of WAN links enabled during the site addition workflow, the fields related to those WAN link are displayed. Refer to the fields described for <b>WAN_0</b> for an explanation of the fields	Gateway On-premise spoke
<b>Advanced Config</b>		
Name Server IP List	Specify one or more IPv4 addresses of the DNS server. To enter more than one DNS server address, type address, press Enter, and then type the next address, and so on.  DNS servers are used to resolve hostnames into IP addresses.	Gateway On-premise spoke
NTP Server IP List	Specify the fully qualified domain names (FQDNs) or IP addresses of one or more NTP servers.  Example: ntp.example.net  The site must have DNS reachability to resolve the FQDN during site configuration.	Gateway On-premise spoke

Table 314: Fields on the Configure Site &lt;Site-Name&gt; Page (On-Premise Spoke and Gateway) (continued)

Field	Description	Applicable To
Select Time Zone	Select the time zone for the site.	Gateway On-premise spoke
<b>Devices</b>		
<i>Assign CPE Devices</i>		
Serial Number	For a single CPE device, enter the serial number of the CPE device. You can use a unique string of alphanumeric characters. The maximum length is 64 characters. Serial numbers are case-sensitive.	Gateway On-premise spoke
Activation Code	If ZTP is supported on a single CPE device and the device template configuration specifies that an activation code must be provided to activate the device, enter the activation code of the CPE device.	Gateway On-premise spoke
Device Redundancy	Displays whether CPE device redundancy is enabled or disabled for an SD-WAN on-premise spoke site.	Gateway On-premise spoke
Primary Device Serial Number	Enter the serial number of the primary CPE device. You can use a unique string of alphanumeric characters. The maximum length is 64 characters. Serial numbers are case-sensitive.	Gateway On-premise spoke
Primary Device Activation Code	For dual CPE devices, if ZTP is supported on the device and the device template configuration specifies that an activation code must be provided to activate the device, enter the activation code of the primary CPE device.	Gateway On-premise spoke
Secondary Device Serial Number	For dual CPE devices, enter the serial number of the secondary CPE device. You can use a unique string of alphanumeric characters. The maximum length is 64 characters. Serial numbers are case-sensitive.	Gateway On-premise spoke
Secondary Device Activation Code	For dual CPE devices, if ZTP is supported on the device and the device template configuration specifies that an activation code must be provided to activate the device, enter the activation code of the secondary device that your service provider provided.	Gateway On-premise spoke

Table 314: Fields on the Configure Site &lt;Site-Name&gt; Page (On-Premise Spoke and Gateway) (continued)

Field	Description	Applicable To
Boot Image	If you want to upgrade the device image for an SRX Series or an NFX Series device, select the boot image from the list. The boot image is the device image that was previously uploaded to the image management system. The boot image is used to upgrade the device when the CSO starts the ZTP process. If the boot image is not provided, then the device skips the automatic upgrade procedure. The boot image (NFX or SRX) is populated based on the connection profile that you selected when you added the site. See <a href="#">“Uploading a Device Image” on page 197</a> .	Gateway On-premise spoke

## RELATED DOCUMENTATION

| [About the Sites Page](#) | 749

## Upgrading Sites

### IN THIS SECTION

- [Upgrading a Site](#) | 814
- [Upgrading Sites in Bulk](#) | 815

You can upgrade one or more sites from the Customer Portal > Sites page.

**NOTE:** Before you upgrade the site, you must ensure that the device associated with the site is running the supported version of Junos OS. For more information on the supported version of Junos OS, see the *Software Support* section of the *Contrail Service Orchestration Release Notes*.

## Upgrading a Site

### NOTE:

- When you request Request Material Authorization (RMA) on a site that is associated with a single-CPE device and has a version earlier than the CSO version, the site version is upgraded to the CSO version. The site version is upgraded as part of the device activation and zero touch provisioning (ZTP) process of the replacement device that is performed after the RMA.
- On a site associated with an NFX dual-CPE device, if the site version is lower than that of the CSO version, you can perform RMA only at the cluster level. After RMA of the cluster, the version of the site is upgraded to that of CSO as part of the device activation and ZTP process of the replacement devices in the cluster.

To upgrade a site:

1. In Customer Portal, select **Sites > Site Management**.

The Sites page appears.

2. View the list of sites, and based on the Site Status column identify whether the site requires an upgrade.

If the site status is configured or provisioned, the upgrade is optional. If the site status is UPGRADE-REQUIRED, the site upgrade is mandatory.

You cannot upgrade a site if the site status is Created, Provision Failed, Configured, and Activation Failed.

3. Select a site and click **More > Upgrade**. The Upgrade Site:SiteName page appears.

This page displays the following information:

- Prerequisites for upgrading a site.
- Impact of upgrading the site.
- Time required for upgrading a site.
- Post-upgrade tasks.

4. Choose the upgrade time.

- Select **Run** if you want to upgrade the site immediately.
- Select **Schedule at a later time** if you want to schedule the upgrade for a later date and time.

5. Click **Upgrade**.

A job is created. Click the job ID to go to the Jobs page and view the status of the site upgrade.

## Upgrading Sites in Bulk

To upgrade sites in bulk:

1. In the Customer Portal, select **Sites > Site Management**.

The Sites page appears.

2. View the list of sites, and based on the Site Status column identify whether the site requires an upgrade.

If the site status is configured or provisioned, the upgrade is optional. If the site status is UPGRADE-REQUIRED, the site upgrade is mandatory.

You cannot upgrade a site if the site status is Created, Provision Failed, and Activation Failed.

3. Select one or more sites, and click **More > Upgrade**.

The Upgrade Site page appears. This page displays the following information:

- Prerequisites for upgrading sites.
- Impact of upgrading sites.
- Time required for upgrading all sites.
- Post-upgrade tasks.

You can view the upgrade summary of all sites or a specific site.

4. Choose the upgrade time.

- Select **Run now** if you want to upgrade the site immediately.
- Select **Schedule at a later time** if you want to schedule the upgrade for a later date and time.

5. Click **Upgrade**.

A job is created. Click the job ID to go to the Jobs page and view the status of the upgrade.

### RELATED DOCUMENTATION

[Upgrading Sites Overview | 755](#)

[Upgrading a Cloud Hub Device | 128](#)

## Viewing the Sites History

IN THIS SECTION

- [Viewing Jobs Executed to Add and Configure Sites | 816](#)
- [Viewing Jobs Executed to Delete Sites | 817](#)

### Viewing Jobs Executed to Add and Configure Sites

You can view the jobs created to add and configure all the sites in a tenant from the Sites page.

To view the jobs executed to add and configure sites:

1. Click **Sites > Site Management**.

The Sites page appears.

2. On the Sites page, click **More > View Add Site History**.

The Add/Configure Site History page appears. The Add/Configure Site History pane lists the jobs executed for adding and configuring all the sites in a tenant.

[Table 315 on page 816](#) describes the fields displayed on the Add/Configure Site History page.

**Table 315: Fields on the Add/Configure Site History Page**

Field	Description
In Progress	Number of jobs in progress.
Success	Number of jobs that were successfully executed.
Failure	Number of jobs that failed during execution.
Name	<p>Name of the job executed to add a site.</p> <p>Click the hyperlinked name to open the Site History Tasks page, where the tasks executed to complete the job are listed. Click the task link to open the Job Status page, where you can view the date and time when various tasks were executed to complete the job.</p>
Start Date	Date and time that the job was initiated.



Table 315: Fields on the Add/Configure Site History Page *(continued)*

Field	Description
End Date	Date and time that the job completed execution.  If the job is in-progress or failed, no date is displayed.
Status	Indicates whether the job completed successfully (Success) or is in progress (In-progress) or failed (Failed).
Log	Link to the log files generated for the job.  Click the link to open the Job Status page. The Job Status page displays the date and time when the job and various tasks associated with the job were executed in chronological order.

## Viewing Jobs Executed to Delete Sites

To view jobs executed to delete sites from a tenant:

1. Click **Sites > Site Management**.

The Sites page appears.

2. On the Sites page click **More > View Delete History**.

The Delete History page appears. The Delete History page lists the all the jobs executed for deleting sites from a tenant.

[Table 316 on page 817](#) details the fields displayed on the Delete Site History page.

Table 316: Fields on the Site Delete History Page

Field	Description
In Progress	Number of jobs in progress.
Success	Number of jobs that were successfully executed.
Failure	Number of jobs that failed during execution.
Name	Name of the job executed to add a site.  Click the hyperlinked name to open the Site History Tasks page, where the tasks executed to complete the job are listed. Click the task link to open the Job Status page, where you can view the date and time when various tasks were executed to complete the job.

Table 316: Fields on the Site Delete History Page (*continued*)

Field	Description
Start Date	Date and time that the job was initiated.
End Date	Date and time that the job finished executing.  If the job is in-progress or failed, no date is displayed.
Status	Indicates whether the job completed successfully (Success) or not (Failed).
Log	Link to the log files generated for the job.  Click the link to open the Job Status page. The Job Status page displays the date and time when the job and various tasks associated with the job were executed in chronological order.

## SEE ALSO

[About the Sites Page | 749](#)
[Deleting a Site | 833](#)

## Viewing the Stage-1 Configuration

Stage1 configuration refers to the settings (such as name server, timezone, radius-server, interfaces, protocols, firewalls, and VLANs), that are configured on a device in order to deploy the device in a network. The Stage1 configuration is pushed to a device during the zero-touch provisioning (ZTP) process. You can view the Stage1 configuration after the site is configured, that is, the status of the site is CONFIGURED and if the ZTP\_ENABLED attribute is disabled on the device profile.

**NOTE:** You cannot view the Stage1 configuration when the site status is PROVISIONED.

To view the stage1 configuration pushed on to a CPE device:

1. Click **Sites > Site Management**.

The Sites page appears.

2. Select a site and click **More > Stage1 Config**.

The Stage1 config page appears displaying the Stage1 configuration applied on the device.

3. After you view the configuration, click **OK**. You are returned to the Sites page.

## RELATED DOCUMENTATION

| [Workflow for Onboarding a Device Using ZTP | 839](#)

## Managing LAN Segments on a Tenant Site

### IN THIS SECTION

- [Adding LAN Segments | 819](#)
- [Deploying LAN Segments | 822](#)
- [Reassigning a Department to a LAN Segment | 823](#)
- [Deleting LAN Segments | 823](#)

A network on a tenant site is divided into multiple LAN segments to improve traffic management and security. A LAN segment is a small portion of a LAN that is used by a work group. A grouping of multiple LAN segments form a department. LAN segments are separated by a bridge, router, or a switch.

You can view and manage LAN segments from the **Sites > Site Management > Site Name > LAN** tab.

These topics describe how to manage LAN segments on a site.

### Adding LAN Segments

You add LAN segments from the **Site-Name** page.

To add a LAN segment:

1. Click **Sites > Site Management**.

The Sites page appears.

2. Click the name of the site for which you want to add the LAN segment.

The *Site-Name* page appears.

- Click the add icon (+) on the **LAN** tab.

The Add LAN Segment page appears.

- Complete the configuration settings according to the guidelines provided in [Table 317 on page 820](#).

**NOTE:** Fields marked with an asterisk (\*) are mandatory.

- Click **OK**.

You are returned to the *Site-Name* page, where the LAN segment that you added is displayed.

**Table 317: Add LAN Segment Settings**

Field	Description
Name	Enter a unique string of alphanumeric characters. No spaces are allowed and the maximum length is 15 characters.
Type	<p>Select the type of LAN segment:</p> <ul style="list-style-type: none"> <li>Directly Connected—Indicates that the LAN segment is directly connected to the site. This is the default.</li> <li>Dynamic Routed—Indicates that the LAN segment is not directly connected to the site and is reachable by using a dynamic route. If you select this option, you must specify the dynamic routing information.</li> </ul> <p><b>NOTE:</b> You can configure dynamically routed LAN segments only for gateway sites.</p>
Ports	Select one or more port numbers from the list depending on the connection plan that you previously specified.
VLAN ID	<p>Enter the VLAN ID for the LAN segment.</p> <p>Range: 1 through 4094.</p>
IP Address Prefix	Enter the IP address prefix for the LAN segment; for example, 192.0.2.8/24.
Department	<p>Select a department to which the LAN segment is to be assigned. You group LAN segments as departments for ease of management and for applying policies at the department-level. For LAN segments that are dynamically routed, you can assign only a data center department.</p> <p>Alternatively, click <b>Create Department</b> to create a new department and assign the LAN segment to it. See <a href="#">“Adding a Department” on page 739</a>.</p>

Table 317: Add LAN Segment Settings (*continued*)

Field	Description
DHCP	<p>For directly connected LAN segments, click the toggle button to enable DHCP. DHCP is disabled by default.</p> <p>You enable DHCP if you want to assign IP addresses by using a DHCP sever. You disable DHCP if you want to assign a static IP address to the LAN segment.</p> <p><b>NOTE:</b> If you enable DHCP, fields related to DHCP-related parameters appear and must be configured.</p>
[DHCP-Related Fields]	
IP Address Prefix (for DHCP)	Enter the IP prefix of the DHCP IP address pool. For example: 192.0.2.10/24.
Address Range Low	Enter the starting IP address in the range of IP addresses that can be allocated by the DHCP server to the LAN segment.
Address Range High	Enter the ending IP address in the range of IP addresses that can be allocated by the DHCP server to the LAN segment.
Maximum Lease Time	<p>Specify the maximum duration (in seconds) for which a client can request for and hold a lease on the DHCP server.</p> <p>Range: 0 through 4,294,967,295 seconds.</p>
Name Server	Specify one or more IPv4 addresses of the DNS server. To enter more than one DNS server address, type address, press Enter, and then type the next address, and so on. DNS servers are used to resolve hostnames into IP addresses.
Protocol	For dynamically routed LAN segments, select the routing protocol (BGP or OSPF) to be used by the data center department to learn routes from the data center.
<b>BGP Configuration</b>	
Authentication	<p>Select the BGP route authentication method to be used:</p> <ul style="list-style-type: none"> <li>• None—Indicates that no authentication should be used. This is the default.</li> <li>• Use MD5—Indicates that MD5 is to be used for authentication. If you choose this option, you must specify an authentication key.</li> </ul>
Peer IP Address	Enter the IP address of the BGP neighbor.
Peer AS Number	Enter the autonomous system (AS) number BGP neighbor.

Table 317: Add LAN Segment Settings (*continued*)

Field	Description
Auth Key	If you specified that MD5 should be used for authentication, specify an MD5 authentication key (password), which is used to verify the authenticity of BGP packets.
<b>OSPF Configuration</b>	
OSPF Area ID	Specify the OSPF area identifier to be used for the dynamic route.
Authentication	<p>Select the OSPF route authentication method to be used:</p> <ul style="list-style-type: none"> <li>• Password—Indicates that password-based authentication should be used. If you choose this option, you must specify the password. (This is the default).</li> <li>• Use MD5—Indicates that MD5 is to be used for authentication. If you choose this option, you must specify an authentication key.</li> <li>• None—Indicates that no authentication should be used.</li> </ul>
Password	Enter the password to be used to verify the authenticity of OSPF packets.
Confirm Password	Retype the password for confirmation purposes.
MD5 Auth Key ID	<p>If you specified that MD5 should be used for authentication, enter the OSPF MD5 authentication key ID.</p> <p>Range: 1 through 255.</p>
Auth Key	If you specified that MD5 should be used for authentication, enter an MD5 authentication key, which is used to verify the authenticity of OSPF packets.

## Deploying LAN Segments

After you create a LAN segment and assign it to a department, you must deploy the LAN segment. You can deploy LAN segments from the **Site Name** page.

To deploy one or more LAN segments:

1. Click the **LAN** tab.
2. Select one or more LAN segments that you want to deploy and click **Deploy**.

A **Deploy LAN Segment** job is created.

**NOTE:** If a Deploy LAN Segment job is in progress for a site, wait for the job to finish before triggering another Deploy LAN Segment job.

If you attempt to trigger a Deploy LAN segment job when another one is running, the job fails with a message indicating that the previous LAN segment deployment job is in progress.

3. Click **More > Deploy History** to view job status and deployment history of the LAN segment.

The **Deploy LAN Segment History** page displayed.

Alternatively, you can verify the status of the job from the **Monitor > Jobs** page.

### Reassigning a Department to a LAN Segment

You can reassign the department assigned to a LAN segment from the **Site Name** page.

To reassign a department:

1. Click the **LAN** tab.
2. Select a LAN segment and click **Re-assign Department**.

The Re-assign Department page appears.

**NOTE:** You cannot reassign a LAN segment that is already assigned to a department and is deployed.

3. Select the department to which the LAN segment is to be assigned.

4. Click **Deploy**.

The success message **Re-assign department succeeded.** is displayed.

5. Click **OK**.

The LAN segment with the newly assigned department is displayed on the tenant site page.

### Deleting LAN Segments

You can delete a LAN segments from the **Site Name** page.

To delete a LAN segment:

1. Select a LAN segment and click the delete icon (X) icon on the **LAN** tab.

The Delete LAN Segment page appears.

2. Click **OK** to confirm deletion.

The LAN segment is deleted.

## Activating a CPE Device

You can activate SRX300 Services Gateway and NFX250 Network Services Platform devices in the following ways:

- By connecting a computer to the LAN port of the device and entering the activation code through your browser
- By specifying the activation code in Customer Portal

You can activate a vSRX Services Gateway device by copying the configuration available in Customer Portal and pasting the configuration into the SRX Series device console. To copy the configuration in Customer Portal, click **Sites > Stage-1 Config**.

To activate a device through your web browser:

1. Connect a computer to the LAN port of the CPE device and power on the device.

Refer to the documentation for the CPE device for more information.

2. Open a Web browser in your computer.

Because the CPE device is preconfigured with a management address, the browser displays the login page.

3. Enter the activation code that you have received during the shipping process.

4. Click **OK**.

On successful authentication, the Phone-Home server pushes the initial configuration to the CPE device.



To activate a device through Customer Portal:

**NOTE:** If you activate the CPE device through Customer Portal, you do not need to activate it through a browser.

1. Log in to Customer Portal.

2. Click the Sites page in Customer Portal.

After you use Customer Portal to add a site that uses a CPE device, the CPE device icon on the Sites page is gray if the device is inactive. When you hover over the CPE device icon on the Monitor page, you should see the message **Device Status: Expected**, which indicates that the device is ready to be activated. If you see the message **Device Status: Undefined**, contact your service provider for assistance.

3. On the Device Status column, click **Activate Device**.

The Activate Device page appears. The Activate Device page consists of Device Information and Device Activation.

4. On Device Information page, view the site details, device details, and recipient details, and specify the activation code. For more information see, [Table 318 on page 826](#).

5. Click **Next**.

On Device Activation page, the device is activated through the following steps:

- Detecting the device
- Applying stage-one configuration to the device
- Bootstrapping of device
- Activating the device

After each successful step, you can see a green check mark. If any of these steps fail, a red exclamation mark appears.

6. After the activation process is complete, click **OK**.

The Sites page appears. To see the device activation status, hover over the device icon on the Sites page. You see one of the following statuses:

- **EXPECTED**—Device is ready for activation.
- **ACTIVE**—Device is authenticated but not yet operational.
- **ACTIVATION\_FAILED**—Device is not authenticated.

- **GWR\_SPAWNED**—Device gateway component spawning is successful.
- **GWR\_SPAWN\_FAILED**—Device gateway component spawning fails.
- **PROVISIONED**—Device is operational.
- **PROVISION\_FAILED**—Device failed to become operational. Contact your service provider for assistance.

**NOTE:** When a device is provisioned successfully, a job to install the default trusted certificates, which are packaged with Junos OS, on the device is triggered. You can view the details of the job (of type **default trustedcertificate**) on the Jobs page (**Monitor > Jobs**).

We recommend that you check the job status to verify that the default trusted certificates were successfully installed. If, however, the job failed and if you want to use the SSL proxy feature, manually install the trusted certificates on the device by using the following procedure:

- Log in to the device and access the Junos OS CLI (operational mode).
- Execute the **request security pki ca-certificate ca-profile-group load ca-group-name DEFAULT\_CSO filename default** command.

The installation takes between 2–5 minutes to complete, so wait until it is done.

- Exit the Junos OS CLI and log out of the device.

**Table 318: Fields on the Activate Device Page**

Field	Description
Site Name & Type	Name of the site on which the CPE device is activated.
Connected Hub	Name of the hub to which the CPE device is connected.
Device Model	Device model of the CPE device.
Serial Number	Serial number of the CPE device.
Activation Code	Activation code that your service provider supplied for the CPE device.
Expiry Duration	Specify how long you must wait to activate the device after it boots up. You can set a duration in the range 1 through 600 seconds. The default is 120 seconds.

Table 318: Fields on the Activate Device Page (*continued*)

Field	Description
Recipient	Recipient details.

## RELATED DOCUMENTATION

[http://www.juniper.net/techpubs/en\\_US/release-independen  
t/junos/information-products/pathway-pages/nfx-series/product/](http://www.juniper.net/techpubs/en_US/release-independen<br/>t/junos/information-products/pathway-pages/nfx-series/product/)

About the Sites Page | 749

Adding On-Premise Spoke Sites for SD-WAN Deployment | 768

Configuring a Single Site | 804

About the Certificates Page | 935

## Activating Dual CPE Devices (Device Redundancy)

You can activate a device after the device status is changed to **EXPECTED** in the Sites page. When you see the device status is **EXPECTED**, it indicates that the device is ready to be activated. If you see the device status as **Undefined**, contact your service provider for assistance.

**NOTE:** You must activate both the primary and the secondary devices simultaneously.

You must use the same device model for both primary and secondary devices and the devices must have the same version of Junos OS installed.

To activate dual CPE devices used as a cluster:

1. Log in to Customer Portal.

2. Select **Sites**.

The Sites page appears.

3. Click on the *Site Name*.

The *Site Name* page appears.

4. On **Devices** tab, select the cluster device and click **Activate Device**.

The Activate Device page appears. The Activate Device page consists of Device Information and Device Activation tabs.

**NOTE:** You can also activate the device through **Resource > Devices** page.

5. On **Device Information** page, complete the configuration according to the guidelines provided in [Table 319 on page 828](#).

Table 319: Fields on the Activate Device Page

Field	Description
Site Name & Type	View the name of the site on which the CPE device is activated.
Connected Region	View the name of the region to which the CPE device is connected.
Primary Device Serial Number	View the serial number of the primary CPE device.
Primary Device Activation Code	<p>Enter the activation code of the primary device that your service provider supplied for the device.</p> <p><b>NOTE:</b> If you do not want to specify an activation code, on the <b>Resources &gt; Edit Template &gt; Template Settings</b> page, disable the ACTIVATION_CODE_ENABLED field and save the changes.</p>
Secondary Device Serial Number	View the serial number of the secondary CPE device.
Secondary Device Activation Code	<p>Enter the activation code of the secondary device that your service provider supplied for the device.</p> <p><b>NOTE:</b> If you do not want to specify an activation code, on the <b>Resources &gt; Edit Template &gt; Template Settings</b> page, disable the ACTIVATION_CODE_ENABLED field and save the changes.</p>

6. Click **Next**.

The Activate Device page appears.

7. On **Activate Device** page, the cluster device (both primary and secondary) is activated through the following steps:

- Device is detected
- Stage-one configuration apply on device is successful
- Bootstrap of device success
- Activation of device is successful
- Device is modelled and is expected to be activated
- Device is active
- Device gateway component is spawned
- Device gateway router is put into cluster mode.
- Device is successful provisioned

After each successful step, you can see a green check mark. If any of these steps fail, a red exclamation mark appears.

8. After the activation process is complete, click **OK**.

The *Site Name* page appears. If the device activation is successful, the management status of the cluster device is changed to **PROVISIONED**. You can also see the following device states:

- **EXPECTED**—Device is ready for activation.
- **ACTIVE**—Device is authenticated but not yet operational.
- **ACTIVATION\_FAILED**—Device is not authenticated.
- **GWR\_SPAWNED**—Device gateway component spawning is successful.
- **GWR\_SPAWN\_FAILED** —Device gateway component spawning fails.
- **PROVISIONED**—Device is operational.
- **PROVISION\_FAILED**—Device failed to become operational. Contact your service provider for assistance.

**NOTE:** The **GWR\_SPAWNED** and **GWR\_SPAWN\_FAILED** statuses are not applicable for dual CPE SRX Series Services Gateway devices.

## RELATED DOCUMENTATION

[Device Redundancy Support Overview | 752](#)

[Activating a CPE Device | 824](#)

[About the Sites Page | 749](#)

[Adding On-Premise Spoke Sites for SD-WAN Deployment | 768](#)

[Configuring a Single Site | 804](#)

[About the Certificates Page | 935](#)

## Viewing the History of Tenant Device Activation Logs

You can use the Activation Logs page to view the history of device activation logs. You can also view the details of the activation logs and their status.

To view the tenant device activation logs:

1. Click **Resources > Tenant Devices**.

The Tenant Devices page appears, which list all devices.

2. Select a device and click **More > Activation Logs**.

The Activation Logs page is displayed. [Table 49 on page 112](#) describes the fields on the Activation Logs page.

3. Click a task name.

The ZTP Logs page appears. [Table 50 on page 113](#) describes the fields on the ZTP Logs page.

4. Click the Task Name.

The Job Status page appears. [Table 51 on page 113](#) describes the fields on the Job Status page.

5. Click **OK** to return to the previous page.

**Table 320: Fields on the ZTP History Page**

Field	Description
In progress	View the number of activated tasks that are in progress.
Success	View the number of activated tasks that are successful.
Failure	View the number of activated tasks that have failed.
Name	View the name of the task.  Example: csp.tssm_ztp-Juniper-site-17-NFX-250-8052cc9451914be28c7c98fb64fd0db3

Table 320: Fields on the ZTP History Page (*continued*)

Field	Description
Start Date	View the start date and time of the task.
End Date	View the end date and time of the task.
Status	View the status of the task to know whether the task succeeded or failed.
Log	View the import logs. Click a log to access more detailed information about the imported log.

Table 321: Fields on the ZTP Logs Page

Field	Description
Task Name	View the ID created for the task.  Example: install-license-to-device
Status	View the status of the task to know whether the task succeeded or failed.

Table 322: Fields on the Job Status Page

Field	Description
Name	View the name of the task.
Actual Start Time	View the start date and time of the task.
User	View the name of the user who activated the task.
End Time	View the end date and time of the task.
State	View the status of the task to know whether the task succeeded or failed.

## RELATED DOCUMENTATION

[About the Tenant Devices Page](#) | 101

# Configuring VRFs and PNE Details for a Site in a Centralized Deployment

If you use a physical network element (PNE) for a centralized deployment, you can use the Device Configuration page to configure the virtual routing and forwarding instances for your customer sites if you have not done so in Contrail and in Junos OS on the MX Series router.

To configure a VRF and PNE details for a site:

1. Click **Sites**.

The Sites page appears.

2. Select the site name.

3. Click **More > Advanced Configuration**.

The Device Configuration page appears.

4. Complete the configuration according to the guidelines provided in [Table 323 on page 832](#).

5. Click **OK**.

**Table 323: Fields on the Device Configuration Page**

Field	Description
Site VRF Name	Specify the name of the virtual routing and forwarding (VRF) instance for the tenant.  Example: tenantA-VRF
Interface Name	Specify the MX Series router interface that connects to the customer site. This value matches the interface that you configure for the MX Series router physical network element (PNE).  Example: xe-2/2/2
Interface VLAN	(Optional) Specify a valid VLAN identifier, which is an integer in the range 1 to 4094. Specifying a VLAN identifier enables VLAN tagging. If you do not specify a value, the VLAN is untagged.  Example: 52
Interface Address	(Optional) Specify an IPv4 address with a network mask for the VLAN interface.  Example: 192.0.2.16/24



Table 323: Fields on the Device Configuration Page (*continued*)

Field	Description
Default Gateway	(Optional) Specify the IPv4 address for the default route for Internet traffic.  Example: 192.0.2.20
Route Target	Specify the route target for the site. This value matches the route target value that you configure for the MX Series router PNE.  Example: 64512:1102
Route Distinguisher	Specify a unique route distinguisher for the site. You can specify any unique route distinguisher, such as the route target for the site.  Example: 64512:1102

## RELATED DOCUMENTATION

[Adding On-Premise Spoke Sites for SD-WAN Deployment](#) | 768

## Deleting a Site

You can delete a site from the Sites page (**Site > Site Management**) in the Customer Portal.

The following are applicable when you want to delete a site:

- You can delete only one site at a time.
- You cannot delete a gateway or hub site when spoke sites are connected to it. You must first delete the spoke sites associated with the gateway site or hub site and then delete the gateway or hub site.
- You cannot delete a site that is associated with site-specific policies. You must first delete the intents in the policy that are associated with the site, redeploy the policy, and then delete the site.
- You must delete service instances before attempting to delete the site.

To delete a site:

1. Click **Sites > Site Management**.

The Sites page appears.

2. Select the site that you want to delete and click the delete (trash can) icon.

The Remove Site Options dialog box appears.

3. Select one of the following options:

- **Load Recovery Configuration**—Use this option to back up any custom configuration on the device. CSO restores the custom configuration when you reinstall the device.
- **Zeorize the device**—Use this option to reset the device to the factory default configuration.

4. Click **OK**.

A job to remove the site is created. After the job completes successfully, a message appears on top of the Sites page indicating that the site is deleted.

If the delete site operation is successful, configurations associated with the site are deleted from the hub, a peer site, and virtual Route Reflectors (VRRs).

**NOTE:**

- The time taken to delete a site is dependant on the device template attached to the site.
- If the delete site operation is unsuccessful, you cannot add a new site using the same site name.

## RELATED DOCUMENTATION

[About the Sites Page | 749](#)

[Contrail Service Orchestration Monitoring and Troubleshooting Guide](#)

# Managing Site Groups

IN THIS CHAPTER

- About the Site Groups Page | 835
- Creating Site Groups | 836

## About the Site Groups Page

To access this page, click **Sites > Site Groups**.

You can use the **Site Groups** page to view, create, and delete site groups for a tenant. Site groups enable you to group sites logically, thereby easing site management. You can use site groups to apply policies at the site group level.

You must be a Tenant Administrator user to access the **Site Groups** page.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View existing site groups. See [“Viewing Object Details” on page 16](#).
- Create site groups. See [“Creating Site Groups” on page 836](#).
- Edit site groups. Select a site group and click the edit icon.
- Delete site groups. To delete a site group, select it on the Site Groups page and click the delete (X) icon.

### Field Descriptions

[Table 324 on page 835](#) shows the descriptions of the fields on the **Site Groups** page.

Table 324: Fields on the Site Groups Page

Field	Description
Name	Displays the name of the site group.

Table 324: Fields on the Site Groups Page (continued)

Field	Description
Sites	Displays the names of the sites that are members of a site group.

RELATED DOCUMENTATION

| [Creating Site Groups](#) | 836

## Creating Site Groups

You can use the **Create Site Group** page to create a new site group for a tenant and add sites to it.

To create a site group:

1. Click **Sites > Site Groups**.  
The Site Groups page appears.
2. Click the add icon (+).  
The **Create Site Group** page appears.
3. Enter a unique name for the site group.
4. From the list of sites in the **Available** column, select the sites that you want to include in the new group and click the greater-than icon (>).  
The selected sites are moved to the **Selected** column.
5. Click **OK**. If you want to discard your changes, click **Cancel** instead.  
The new site group is displayed on the **Site Groups** page.

RELATED DOCUMENTATION

| [About the Site Groups Page](#) | 835

# Zero Touch Provisioning

## IN THIS CHAPTER

- [Zero Touch Provisioning Overview | 837](#)
- [Workflow for Onboarding a Device Using ZTP | 839](#)
- [Using the Redirect Server for Zero Touch Provisioning | 842](#)

## Zero Touch Provisioning Overview

## IN THIS SECTION

- [\[xref target has no title\]](#)
- [Devices Supported | 838](#)
- [Benefits | 839](#)

Zero Touch Provisioning (ZTP) enables you to configure and provision devices automatically, and thus reduces the manual intervention required for adding devices to a network.

In Contrail Service Orchestration (CSO), the ZTP of a device involves the following high-level steps:

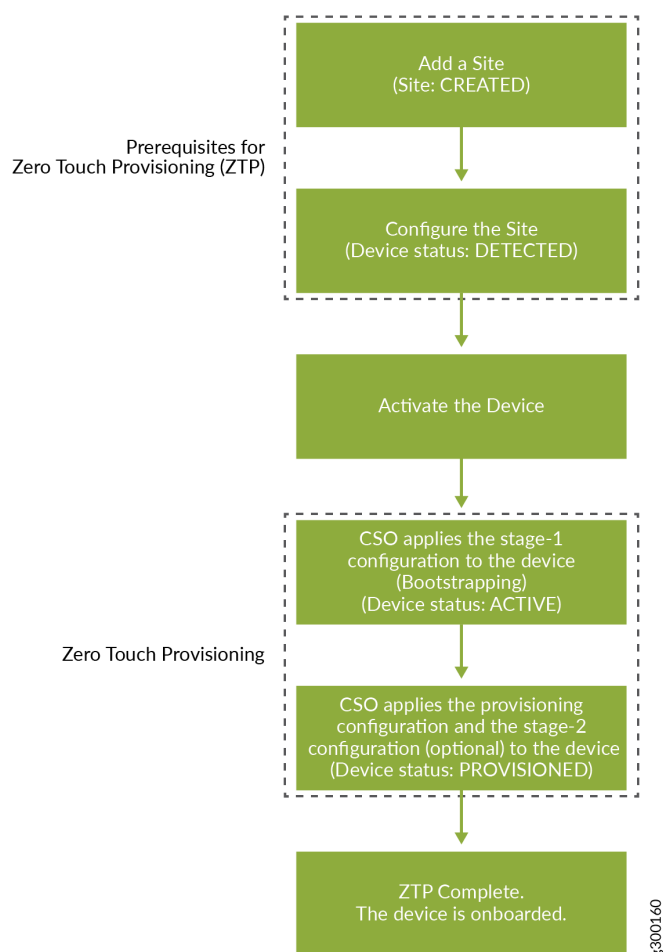
1. Activate the device that is associated with the site.
2. The device contacts CSO through the Redirect Server or Phone Home Client (PHC) and the stage-1 (initial) configuration is automatically applied to the device, allowing CSO to establish a secure management connection with the device. The process of applying the stage-1 configuration to the device is called as bootstrapping.
3. CSO automatically applies the provisioning configuration on the device after the completion of the bootstrapping process.

The provisioning configuration is generated by CSO and is applied on a device to make it functional and ready for the intended functionality. For example, provisioning configuration can include IPsec or GRE tunnel configurations, virtual route reflector (vRR) configuration, routing configuration, and so on.

For additional functionality, you can create the stage-2 configuration and apply the configuration to the device by using the CSO GUI. For example, the stage-2 configuration can include LAN configuration, firewall policies, and so on.

After the ZTP process is complete, the device is provisioned.

**Figure 17: Overview of Zero Touch Provisioning in CSO**



## Devices Supported

In CSO, you can add the following devices (including dual CPE devices, if applicable), by using ZTP:

- NFX150 and NFX250 Series
- SRX300, SRX320, SRX340, SRX345, SRX550 High Memory(SRX550M), and SRX1500,
- vSRX on an x86 server

## Benefits

Using ZTP offers the following benefits:

- Simplified, faster, and automated deployment of configurations.
- Auto-generated configurations that are more accurate.
- Faster scaling of the network because you need not manually apply configuration on each device in the network.

## RELATED DOCUMENTATION

| [Workflow for Onboarding a Device Using ZTP](#) | 839

## Workflow for Onboarding a Device Using ZTP

Zero Touch Provisioning (ZTP) enables you to configure and provision devices automatically, minimizing the manual intervention required for adding devices to a network.

This topic provides a sequential list of tasks that you need to perform for successfully onboarding a device to the network using ZTP:

1. From Customer Portal, add an on-premise site (SD-WAN deployment or a Hybrid WAN deployment) or a gateway site, and associate a device with the site . Choose the appropriate device template, WAN links, and so on.

For more information, see [“Adding On-Premise Spoke Sites for SD-WAN Deployment” on page 768](#) and [“Adding Spoke Sites for Hybrid WAN Deployment” on page 761](#).

After you add a site, the site status is set to Created.

2. Configure the site that you created in the previous step.

After you configure the site:

- CSO prepares the stage-1 configuration.
- The status of the device changes to Detected, which indicates the device is ready for activation.

For more information, see [“Configuring a Single Site” on page 804](#).

3. For CSO to establish a communication with the device, you must configure the Redirect Server or a phone-home client (PHC):

- If you use the Juniper Networks Redirect Server, see [“Using the Redirect Server for Zero Touch Provisioning” on page 842](#).
- If you use a phone-home client:
  - a. Contact your SP administrator or OpCo administrator for the phone-home server URL and the certificate.
  - b. Log in to the CLI of the device and enter the configuration mode.
  - c. Configure the phone-home server and commit.

CSO will be able to establish a communication with the device.

If you are using GUI installer with a custom-generated certificate to install CSO, the fully qualified domain name (FQDN) hostname for the central or regional microservice might be different.

4. Activate the device:

- To activate NFX250 and NFX150 Series, and SRX300, SRX320, SRX340, SRX345, SRX1500, and SRX550 High Memory (SRX550M) devices:

- a. Select **Sites > Site Management**.

The Sites page appears.

- b. Hover over the device icon on the Site page. Proceed to [c](#) if you see the message **Device Status: Expected**, which indicates that the device is ready to be activated.

If you see the message **Device Status: Undefined**, contact Juniper Networks for assistance. If the device icon is gray, the device is inactive.

- c. On the Device Status column, click **Activate Device**.

The Activate Device page appears. The Activate Device page consists of Device Information and Device Activation pages.

- d. On Device Information page, specify the activation code.

- e. Click **Next**.

On the Device Activation page, the device is activated through the following steps:



- Detecting the device
- Applying stage-1 configuration to the device
- Bootstrap process of device
- Activating the device

After each step is successful a green check mark appears. If any of these steps fails, a red exclamation mark appears.

f. Click **OK**.

The device is activated.

- To activate a vSRX or SRX4X00 Services Gateway devices:

1. Select **Sites > Site Management**.

The Sites page appears.

2. Click the site that you want to activate.

The *Site-Name* page appears.

3. On the Devices tab, select the device that you want to activate and click **Stage1 Config**.

A new page appears displaying the stage-1 configuration of the device.

4. Click **Copy to Clipboard** to copy the stage-1 configuration of the device.

5. Log in to the CLI of the device and enter the configuration mode.

6. Paste the stage-1 configuration and commit.

The Phone-Home client or the Redirect Server that you have configured authenticates the device and establishes a communication between the device and CSO.

After the device activation is complete, CSO applies the stage-1 configuration. The status of the device is changed from Expected to Active, which indicates the device is authenticated but not yet operational.

5. After authenticating the device, CSO automatically triggers a job to push the provisioning and stage-2 (optional) configurations.

You can use the Activation Logs page (**Resources > Tenant Devices > More > Activation Logs**) to view bootstrap logs (stage-1 configuration and device activation) and ZTP logs (provisioning and stage-2 configurations), and their status.

After the job is completed successfully:

- The provisioning configuration and stage-2 configuration (optional) are applied.
- The device state changes from Active to Provisioned, which indicates that the device is functional.

**NOTE:** To prevent ZTP from timing out on low-bandwidth connections such as satellite links, manually stage the image to a device before deploying the image. You can use the **Stage** button in the Images page of the Administration Portal to manually stage the image to a device. For more information about staging an image to a device, see [Staging an Image](#).

The newly-added device is provisioned and is onboarded to the network. You can apply SD-WAN and security policies, if applicable.

## RELATED DOCUMENTATION

[Zero Touch Provisioning Overview](#) | 837

## Using the Redirect Server for Zero Touch Provisioning

The Redirect Server provides authentication and authorization of remote devices (NFX Series and SRX Series) that requests a boot image and initial configuration files.

The Redirect Server authenticates a remote device and establishes communication between the remote device and the assigned regional or central server (in your CSO deployment), after which CSO automatically pushes the stage-1 configuration to the device.

In the Redirect Server, you must specify the following information for the device to obtain the stage-1 configuration from CSO:

- CSO regional or central VM IP address
  - For large deployments, IP address of the csp-regional-lbvm1 or csp-regional-lbvm2, or the regional virtual IP (VIP) address.
  - For medium deployments, IP address of the csp-central-lbvm1 or csp-central-lbvm2, or the central VIP address.
  - For small deployments, the central microservices VM.

For more information about VMs, see *CSO Deployment Guide*.

- Server certificate, and
- Serial number of the device

To add information on servers, certificates, and serial number:

1. Login to the Redirect Server.

You need an account to login to the Redirect Server. To create an account, contact your sales representative.

2. Add server details and upload the SSL certificate.

a. On the Redirect Server page, click **Manage Servers**.

The Manage Servers page appears

b. Click **Add New Server**.

The Add a Server panel appears. Specify the following information:

- **Hostname**—Specify the IP address or fully qualified domain name (FQDN) of the regional or central server.
- **Port**—Specify the port configured to communicate with the remote devices.
- **Trust Anchor**—Specify the SSL certificate for the central or regional server. The certificate is located in the `/etc/pki/tls/certs` directory on the central or regional server.

c. Click **Add Server**.

d. Click **Done**.

On the Redirect Server, the server details are listed.

3. Add devices:

a. On the Redirect Server page, click **Add Devices**.

The Add Device page appears.

b. Add devices through the GUI or by uploading a comma-separated values (CSV) file

- To add devices by uploading a CSV file, click **Load CSV File** and select the CSV file from the local drive.
- To add devices through the GUI, in the **Serial Number** field, specify the serial numbers of the devices, separated by commas.

c. Click **Add Device**.

The device details are listed on the Redirect Server page.

The stage-1 configuration is applied to the device and the device is ready for provisioning.

## RELATED DOCUMENTATION

| [Workflow for Onboarding a Device Using ZTP](#) | 839

# Managing Mesh Tags

## IN THIS CHAPTER

- [Mesh Tags Overview | 845](#)
- [About the Mesh Tags Page | 846](#)
- [Creating User-defined Mesh Tags | 847](#)

## Mesh Tags Overview

A mesh tag is a label that you associate with a WAN link of a spoke site. Mesh tags provide you the flexibility to establish overlay tunnels between WAN links of two different spoke sites. If WAN links are associated with same mesh tags, CSO creates a VPN tunnel between WAN links of spoke sites (gateway site to gateway site, on-premise spoke site to gateway site).

**NOTE:** Mesh tags are applicable only for SD-WAN sites in the Real-time optimized mode (Full mesh).

Mesh tags can be predefined (MPLS and Internet) or user-defined. You can create user-defined mesh tags on the **Administration > Mesh Tags** page. User-defined mesh tags take precedence over predefined mesh tags.

**NOTE:** With mesh tags, you can connect two WAN links even if the link types (MPLS and Internet) are different.

For example, consider that a tenant has two sites—Site A and Site B. Site A has four WAN links (WAN\_A0 through WAN\_A3) and Site B has three WAN links (WAN\_B0 through WAN\_B2). WAN\_A0 and WAN\_B0 are associated with MPLS (predefined mesh tag), and WAN\_A1 and WAN\_B1 are associated with Internet (predefined mesh tag).

A tunnel is established between WAN-A0 and WAN-B0 because they are associated with the same predefined mesh tags.

If you create two user-defined mesh tags—Gold and Silver—and if WAN\_A0 and WAN\_B1 are associated with Gold, a tunnel is established between WAN\_A0 and WAN\_B1 (instead of WAN\_A1 and WAN\_B1), because user-defined mesh tags take precedence over predefined mesh tags.

**NOTE:** You can associate mesh tags for up to three WAN links.

RELATED DOCUMENTATION

- [About the Mesh Tags Page | 846](#)
- [Creating User-defined Mesh Tags | 847](#)

About the Mesh Tags Page

To access this page, select Sites> Mesh Tags in Customer Portal.

Use this page to view predefined mesh tags and create user-defined mesh tags. Mesh tags connect WAN links of different sites. CSO creates a tunnel between WAN links if they are associated with the same mesh tag (user-defined or predefined).

Tasks You Can Perform

You can perform the following tasks from this page:

- Create a mesh tag—See [“Creating User-defined Mesh Tags” on page 847](#).
- Delete a mesh tag. Select a mesh tag and click the delete icon.

Field Descriptions

[Table 325 on page 846](#) describes the fields on the Mesh Tags page.

Table 325: Fields on the Mesh Tag Page

Field	Description
Name	Displays the name of the mesh tag.
Tenant	Displays the tenant name to which the site is associated.

Table 325: Fields on the Mesh Tag Page *(continued)*

Field	Description
Type	Displays whether the mesh tag is a predefined or a user-defined.

RELATED DOCUMENTATION

| [Mesh Tags Overview](#) | 845

## Creating User-defined Mesh Tags

CSO creates a tunnel between WAN links of two different sites if they are associated with the same mesh tag (user-defined or predefined).

To create a user-defined mesh tag:

1. Select Sites> Mesh Tags.  
The Mesh Tags page appears.
2. Click the add icon (+) to create a mesh tag.  
The Create New Mesh Tag page appears.
3. Complete the configuration according to the guidelines provided in [Table 326 on page 847](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK** to save the changes.  
The user-defined mesh tag is created.  
If you want to discard your changes, click **Cancel** instead.

Table 326: Fields on the Create New Mesh Tag Page

Field	Description
Name	Enter a unique name for the mesh tag.

Table 326: Fields on the Create New Mesh Tag Page *(continued)*

Field	Description
Description	Enter a description for the mesh tag.

RELATED DOCUMENTATION

| [About the Mesh Tags Page](#) | 846



# Security Reports

## IN THIS CHAPTER

- [Reports Overview | 849](#)
- [About the Security Report Definitions Page | 850](#)
- [Scheduling, Generating, Previewing, and Sharing Security Reports | 853](#)
- [About the Security Generated Reports Page | 856](#)
- [Creating Log Report Definition | 857](#)
- [Creating Bandwidth Report Definition | 861](#)
- [Creating ANR Report Definition | 863](#)
- [Editing, Deleting, and Cloning Log Report Definitions | 866](#)
- [Editing, Deleting, and Cloning Bandwidth Report Definitions | 868](#)
- [Editing, Deleting, and Cloning ANR Report Definitions | 870](#)

## Reports Overview

Reports are generated based on the summary of network activity (such as Virus Detected) and overall network status. To generate report definitions, you can use the predefined report definitions as is, or you can create custom report definitions that meet your needs for specific data.

Using report definitions, you can:

- Generate reports based on the defined filters.
- Generate reports based on the available predefined report definition.
- Generate reports with multiple sections, where each section has its own criteria.

The generated report contains a table of contents (TOC) with links to each section of the report. The designated recipients, whose e-mail addresses are included in the report definition, receive the report in PDF format.

You can generate two categories of reports:

Security reports—Provide information about network activity and network status.

SD-WAN reports—Provide information about SLA performance of all sites or specific sites in a tenant.

The following are the types of security reports:

- **Log Reports**—Enable you to analyze event history based on the data criteria (such as filters, aggregation criteria, time span, etc.) that you select.
- **Bandwidth Reports**—Enable you to analyze the bandwidth usage of an application or a user.
- **ANR Reports**—Enable you to analyze business risks in the network, based on application usage and resource usage.

The following are the types of SD-WAN reports:

- **SD-WAN Tenant Performance Reports**—Enable you to analyze tenant performance based on the parameters (top applications by bandwidth, top sites not meeting the SLA, top sites meeting the SLA with switching, sites meeting the SLA without switching, top sites by packet loss, and top sites by latency) that measure the SLA performance across all sites in a tenant.
- **SD-WAN Site Performance Reports**—Enable you to analyze site performance based on the parameters (top 10 applications, link utilization (by bandwidth) by applications, top profiles not meeting the SLA, and top SLA profiles switching links) that measure the SLA performance of specific sites in a tenant. You can select a maximum of five sites for which you want to generate the report.

## RELATED DOCUMENTATION

[About the Security Report Definitions Page | 850](#)

[About the SD-WAN Report Definitions Page | 873](#)

## About the Security Report Definitions Page

To access the Security Report Definitions page, click **Customer Portal > Reports > Report Definitions > Security**.

The **Security Report Definitions** page appears.

The Security Report Definitions page displays a list of predefined and custom report definitions. To generate reports, you can use the predefined report definitions as is, or you can create custom report definitions.

**NOTE:** From CSO Release 4.1.0 onward, an Application and Network Risk (ANR) report is the only predefined report definition available on the Security Report Definitions page.

The ANR report provides information about data usage and network risks. The information is consolidated from various predefined report definitions available in the release prior to CSO Release 4.1.0.

Tasks You Can Perform

You can perform the following tasks from this page:

- Create a report definition:
  - To create a log report definition, see [“Creating Log Report Definition” on page 857](#).
  - To create a bandwidth report definition, see [“Creating Bandwidth Report Definition” on page 861](#).
  - To create an application and network risk report definition, see [“Creating ANR Report Definition” on page 863](#)
- Edit, delete, or clone report definitions:
  - To edit, delete, or clone a log report definition, see [“Editing, Deleting, and Cloning Log Report Definitions” on page 866](#).
  - To edit, delete, or clone a bandwidth report definition, see [“Editing, Deleting, and Cloning Bandwidth Report Definitions” on page 868](#).
  - To edit, delete, or clone an application and network risk report definition, see [“Editing, Deleting, and Cloning ANR Report Definitions” on page 870](#).
- To schedule, generate reports, preview reports as PDF, and send the reports through e-mail, see [“Scheduling, Generating, Previewing, and Sharing Security Reports” on page 853](#).
- To view all the parameters of a report definition, right click the report definition that you want to see the detailed view for and select **Detailed View**, or select the report definition and click **More > Detailed View**. Alternatively, hover over the report definition name and click the Detailed View icon that appears before it.

The Report Definition Details page appears, displaying the same values that you specified for each parameter in the selected report definition.

Field Descriptions

[Table 327 on page 852](#) describes the fields on the Security Report Definitions page.

Table 327: Fields on the Security Report Definitions Page

Field	Description
Name	Name of the report definition.
Description	Description of the report definition.  For example: Report of data usage by application and network risk.
Type	Type of report definition—ANR, Bandwidth, or Log.
Definition Type	Indicates whether the report definition is predefined (system-generated) or custom (user-created).
Report Content	Details of the sections in the report.  For example: Count, Time Duration.
Schedule	Indicates whether the report generation is scheduled at the current time (Now) or for a later date and time (Once).
Recipients	E-mail addresses of recipients to whom the generated report is sent.
Last Generated	Date and time when the report was last generated.
Job ID	Using the job ID, you can view the status of the task on the Jobs page.

## RELATED DOCUMENTATION

[Reports Overview | 849](#)
[Creating Log Report Definition | 857](#)
[Creating Bandwidth Report Definition | 861](#)
[Creating ANR Report Definition | 863](#)

## Scheduling, Generating, Previewing, and Sharing Security Reports

### IN THIS SECTION

- [Editing Report Generation Schedule | 853](#)
- [Generating Reports | 854](#)
- [Previewing Reports in PDF | 855](#)
- [Sharing Reports through E-mail | 855](#)

You can schedule report generation, generate reports, preview reports as PDF, and share the reports through e-mail.

To perform these actions on a report definition:

1. Select **Reports > Report Definitions**.

The Security Report Definitions page appears.

2. Select or right-click the report definition on which you want to perform an action and click **More**.

A list of actions that you can perform on the report definition is displayed.

3. Select the appropriate action from the list:

### Editing Report Generation Schedule

You can edit the report generation schedule of the selected report definition from the Security Report Definitions page:

1. Select the report definition for which you want to edit the report generation schedule.
2. Click **More > Edit Schedule**. Alternatively, right-click on the selected report definition and select **Edit Schedule**.

The Edit Report Schedule page appears.

3. Specify whether you want to generate the report at the current time or schedule it for a later date and time:

- **Run now**—Select this option to schedule the report generation at the current time.

- Schedule at a later time—Select this option to schedule the report generation for a later date and time in MM/DD/YYYY and HH:MM:SS formats.

4. Click **OK** to save your changes.

You are returned to the Security Report Definitions page on which a confirmation message, indicating that the report generation schedule is updated successfully, appears.

## Generating Reports

You can generate a report at the current time, with either saved settings or custom settings. You can select **Saved Settings** to generate a report based on the values specified in the report definition for the selected report or select **Custom Settings** to modify the values for the Number of Top Logs and the Time Span settings, and generate a report based on the modified values.

**NOTE:** The modified values are applicable only for the report that is being generated and are not saved in the report definition.

To generate a report:

1. From the Security Report Definitions page, select the report definition based on which you want to generate the report.
2. Click **Run Now** on the Security Report Definitions page. Alternatively, click **More > Run Now** or right-click on the report definition and click **Run Now**.

The Run Report page appears.

3. Do one of the following:
  - Select **Saved Settings** to generate a report based on the values already specified in the report definition.
  - Select **Custom Settings** to modify the values for the Number of Top Logs and Time Span settings, and generate a report based on the modified values.

**NOTE:** The values that you modify are applicable only for the report that is being generated and are not saved in the report definition.

4. Click **OK** to save your changes.

The Run Report page appears indicating the progress of the report generation. After the report is generated, the **Download PDF Report** link appears on the Run Report page.

5. Click **Download PDF Report**.

Follow your browser instructions to view or save the report in PDF.

## Previewing Reports in PDF

You can preview and download the selected report in PDF:

1. Select the report definition based on which you want to generate the PDF of the report.
2. Click **More > Preview as PDF**. Alternatively, right-click on the report definition and select **Preview as PDF**.

The Preview as PDF page appears.

3. Click **Download PDF Report** to view the report in PDF. or click **Cancel** to cancel previewing the report.

You are returned to the Security Report Definitions page.

## Sharing Reports through E-mail

You can share the generated report through e-mail:

1. Select the report definition based on which the report is to be generated and shared through e-mail.
2. Click **More > Send Report**. Alternatively, right-click on the report definition and select **Send Report**.

The Edit Recipients page appears:

- **Recipients**—Enter or select one or more e-mail addresses of users to whom you want to send the report.

By default, you can search by first name and select registered users. You can also enter external e-mail addresses.

- **Subject**—Enter the subject line for the e-mail. The maximum length is 2048 characters.
- **Comments**—Enter the text to be included in the body of the e-mail.

The maximum length allowed is 2048 characters.

3. Click **OK** to save your changes.

You are returned to the Security Report Definitions page.

RELATED DOCUMENTATION

| [About the Security Report Definitions Page](#) | 850

## About the Security Generated Reports Page

To access this page, click **Customer Portal > Reports > Generated Reports > Security**.

Use this page to view the list of reports that are generated from the Security Report Definitions page. You must click on the report to view the report in PDF format.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Delete the generated report.
- Open the generated report.

### Field Descriptions

[Table 328 on page 856](#) provides guidelines on using the fields on the Generated Reports page.

**Table 328: Fields on the Generated Reports Page**

Field	Description
Report PDF Name	View the name of the report (user created or predefined).
Generated Time	View the date and time when the report was generated.
Description	View the description of the report.
Definition Name	View the name of the report definition.
Generated By	View the name of who generated the report.
Recipients	View the recipients of the generated reports.

RELATED DOCUMENTATION



## Creating Log Report Definition

You can use the Create Log Report Definition page to create log report definitions and generate the corresponding log reports. Log reports are generated based on the data criteria, which are derived from one or more filters that you select. These reports help you to analyze business risks based on logs from services such as unified threat management (UTM) and firewalls.

To create a log report definition:

1. Select **Reports > Report Definitions > Security**.  
The Security Report Definitions page appears.
2. Click **Create > Log Report Definitions**.  
The Create Log Report Definition page appears.
3. Complete the configuration according to the guidelines provided in [Table 329 on page 857](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK** to save the log report definition.  
You are returned to the Security Report Definitions page on which a confirmation message, indicating that the report definition was successfully created, appears.  
You can perform various actions on the report definition. See [“Scheduling, Generating, Previewing, and Sharing Security Reports” on page 853](#).

Table 329: Fields on the Create Log Report Definition Page

Field	Description
<b>General</b>	
Report Name	Enter a unique name for the report definition. The name can be a string of alphanumeric characters, some special characters (colons, periods, dashes, and underscores); no spaces are allowed and the maximum length is 63 characters.

Table 329: Fields on the Create Log Report Definition Page (*continued*)

Field	Description
Description	Enter a description for the report definition; the maximum length (including spaces) is 1024 characters.
<b>Content</b>	
Data Criteria	<p>Click <b>Filters</b> to select one or more filters.</p> <p>The <b>Use Data Criteria From Filter</b> page appears.</p> <p>The list of default and custom filters, which are saved from the Security Events page, is displayed in a tabular format. The table displays the Filter Name, Filter Description, Time Span, and Group By and Filter By criteria for each filter.</p> <p>Select one or more filters from the list as per your requirement, and click <b>OK</b>.</p> <p>You are returned to the Create Log Report Definition page.</p> <p>When you select one or more filters, new fields appear on the Create Log Report Definition page. The fields are populated with values from the filters. You can either retain the values or change the values if needed. See <a href="#">Table 330 on page 859</a> for an explanation of the fields.</p>
<b>Schedule</b>	
Schedule Report	<p>Click <b>Add Schedule</b> to schedule the report generation.</p> <p>The <b>Add Report Schedule</b> page appears.</p> <p>Specify whether you want to generate the report immediately or schedule it for a later date and time:</p> <ul style="list-style-type: none"> <li>• <b>Run now</b>—Select this option to schedule the report generation at the current time, and click <b>OK</b>.</li> <li>• <b>Schedule at a later time</b>—Select this option to schedule the report generation for a later date and time (in MM/DD/YYYY and HH:MM:SS formats) and click <b>OK</b>.</li> </ul> <p>You are returned to the Create Log Report Definition page on which the details of the report generation schedule appear.</p>
<b>E-Mail</b>	

Table 329: Fields on the Create Log Report Definition Page (continued)

Field	Description
E-Mail Recipients	<p>Click <b>Add Email Recipients</b> to add e-mail addresses of recipients to whom you want to send the log report.</p> <p>The Add Recipients page appears.</p> <ul style="list-style-type: none"> <li>Recipients—Enter or select one or more e-mail addresses of users to whom you want to send the report. By default, you can search by first name and select registered users. You can also enter external e-mail addresses (e-mail addresses that are not registered with CSO).</li> <li>Subject—Enter the subject line for the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> <li>Comment—Enter the text to be included in the body of the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> </ul>

Table 330 on page 859 displays the additional fields that appear on the Create Log Report Definition page when you select one or more filters.

Table 330: Additional Fields on the Create Log Report Definition Page

Section	<p>Section number in the log report for a selected filter.</p> <p>Click <b>Delete Section</b> to remove the section and the corresponding filter.</p>
Section Title	<p>Name of the section in the log report.</p> <p>The section title is based on the selected filter.</p>
Section Description	<p>Description for the section in the log report.</p>
Group By	<p>Criteria, such as <b>Nested Application</b>, based on which logs are aggregated.</p> <p>You can select a maximum of two data criteria from the <b>Group By</b> drop-down list.</p>
Time Span (Last)	<p>Duration for which the report is to be generated.</p> <p>The default time span is 3 hours.</p> <p>You can specify the duration in minutes, hours, days, weeks, months, or specify a custom duration.</p>

Table 330: Additional Fields on the Create Log Report Definition Page (*continued*)

	<p>If you select <b>Custom</b>, the <b>Custom Time Range Selection</b> page appears. You must specify the <b>From</b> date and time, and <b>To</b> date and time (in MM/DD/YYYY and HH:MM:SS formats).</p>
<b>Filter By</b>	<p>Filter criteria (such as filtering applications based on http and https protocols) based on which the log report is to be generated.</p> <p>You can use AND, OR, Equal to (=), and Not Equal to (!=) logical operators as values to generate the report.</p> <p>For example: If you want to generate a report with the event category as antivirus and event name as AV_VIRUS_Detected_MT, then the value must be:</p> <p>Event Category = antivirus AND Event Name = AV_VIRUS_DETECTED_MT</p>
<b>Chart</b>	<p>Type of chart to graphically present data on the report.</p> <p>The available options are Bar (default), Comparison Bar, Timeline, Grid, Grouped Grid, Donut, and Bubble chart.</p>
<b>Number of Top Logs</b>	<p>Specify the number of events that you want to retrieve and display for each section in the report.</p> <p>Range: 1 through 20.</p> <p>Default: 10.</p>

## RELATED DOCUMENTATION

[About the Security Report Definitions Page | 850](#)
[Creating Bandwidth Report Definition | 861](#)
[Creating ANR Report Definition | 863](#)

## Creating Bandwidth Report Definition

You can use the Create Bandwidth Report Definition page to create bandwidth report definitions and generate the corresponding bandwidth reports. Bandwidth reports are used to analyze the bandwidth usage of an application or a user.

To create a bandwidth report definition:

1. Select **Reports > Report Definitions > Security**.

The Security Report Definitions page appears.

2. Click **Create > Bandwidth Report Definitions**.

The Create Bandwidth Report Definition page appears.

3. Complete the configuration according to the guidelines provided in [Table 331 on page 861](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK** to save the bandwidth report definition.

The report definition is saved and you are returned to the Security Report Definitions page.

You can perform various actions on the report definition. See [“Scheduling, Generating, Previewing, and Sharing Security Reports” on page 853](#).

**Table 331: Fields on the Create Bandwidth Report Definition Page**

Field	Description
<b>General</b>	
Report Name	Enter a unique name for the report definition. The name can be a string of alphanumeric characters, some special characters (colons, periods, dashes, and underscores); no spaces are allowed and the maximum length is 63 characters.
Description	Enter a description for the report definition; the maximum length (including spaces) is 1024 characters.
<b>Content</b>	

Table 331: Fields on the Create Bandwidth Report Definition Page (*continued*)

Field	Description
Number of Top Logs	<p>Specify the number of events that you want to retrieve and display for each section in the report.</p> <p>Range: 1 through 20.</p> <p>Default: 10.</p>
Time Span (Last)	<p>Specify the duration (Custom, last 3 hours, last 6 hours, last 12 hours, or last 24 hours) for which you want the report to be generated.</p> <p>If you select <b>Custom</b>, the <b>Custom Time Range Selection</b> page appears. You must specify the <b>From</b> date and time, and <b>To</b> date and time (in MM/DD/YYYY and HH:MM:SS formats).</p>
<b>Schedule</b>	
Add Schedule	<p>Click <b>Add Schedule</b> to schedule the report generation.</p> <p>The <b>Add Report Schedule</b> page appears.</p> <p>Specify whether you want to generate the report immediately or schedule it for a later date and time:</p> <ul style="list-style-type: none"> <li>• Run now—Select this option to schedule the report generation at the current time, and click <b>OK</b>.</li> <li>• Schedule at a later time—Select this option to schedule the report generation for a later date and time (in MM/DD/YYYY and HH:MM:SS formats), and click <b>OK</b>.</li> </ul> <p>You are returned to the Create Bandwidth Report Definition page on which the details of the report generation schedule appear.</p>
<b>E-Mail</b>	

Table 331: Fields on the Create Bandwidth Report Definition Page (*continued*)

Field	Description
Add E-Mail Recipients	<p>Click <b>Add Email Recipients</b> to add e-mail addresses of recipients to whom you want to send the Bandwidth report.</p> <p>The Add Recipients page appears.</p> <ul style="list-style-type: none"> <li>Recipients—Enter or select one or more e-mail addresses of users to whom you want to send the report. By default, you can search by first name and select registered users. You can also enter external e-mail addresses.</li> <li>Subject—Enter the subject line for the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> <li>Comment—Enter the text to be included in the body of the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> </ul>

## RELATED DOCUMENTATION

[About the Security Report Definitions Page | 850](#)

[Creating Log Report Definition | 857](#)

[Creating ANR Report Definition | 863](#)

## Creating ANR Report Definition

You can use the Create ANR Report Definition page to create Application and Network Risk (ANR) report definitions and generate the corresponding ANR reports. ANR reports help you to analyze business risks in a network, based on application usage and resource usage.

To create an ANR report definition:

1. Select **Reports > Report Definitions > Security**.

The Security Report Definitions page appears.

2. Click **Create > ANR Report Definition**.

The Create ANR Report Definition page appears.

3. Complete the configuration according to the guidelines provided in [Table 332 on page 864](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK** to save the ANR report definition.

The report definition is saved and you are returned to the Security Report Definitions page.

You can perform various actions on the report definition. See [“Scheduling, Generating, Previewing, and Sharing Security Reports” on page 853](#).

**Table 332: Fields on the Create ANR Report Definition Page**

Field	Description
<b>General</b>	
Report Name	Enter a unique name for the report definition. The name can be a string of alphanumeric characters, some special characters (colons, periods, dashes, and underscores); no spaces are allowed and the maximum length is 63 characters.
Description	Enter a description for the report definition; the maximum length (including spaces) is 1024 characters.
<b>Content</b>	
Number of Top Logs	Specify the number of events that you want to retrieve and display for each section in the report.  Range: 1 through 20.  Default: 10.
Time Span (Last)	Specify the duration (Custom, last 3 hours, last 6 hours, last 12 hours, or last 24 hours) for which you want the report to be generated.  If you select <b>Custom</b> , the <b>Custom Time Range Selection</b> page appears. You must specify the <b>From</b> date and time, and <b>To</b> date and time (in MM/DD/YYYY and HH:MM:SS formats).
<b>Schedule</b>	



Table 332: Fields on the Create ANR Report Definition Page (*continued*)

Field	Description
Schedule Report	<p>Click <b>Add Schedule</b> to schedule the report generation.</p> <p>The <b>Add Report Schedule</b> page appears.</p> <p>Specify whether you want to generate the report immediately or schedule it for a later date and time:</p> <ul style="list-style-type: none"> <li>• <b>Run now</b>—Select this option to schedule the report generation at the current time, and click <b>OK</b>.</li> <li>• <b>Schedule at a later time</b>—Select this option to schedule the report generation for a later date and time (in MM/DD/YYYY and HH:MM:SS formats), and click <b>OK</b>.</li> </ul> <p>You are returned to the Create ANR Report Definition page on which the details of the report generation schedule appear.</p>
<b>E-Mail</b>	
E-Mail Recipients	<p>Click <b>Add Email Recipients</b> to add e-mail addresses of recipients to whom you want to send the ANR report.</p> <p>The Add Recipients page appears.</p> <ul style="list-style-type: none"> <li>• <b>Recipients</b>—Enter or select one or more e-mail addresses of users to whom you want to send the report. By default, you can search by first name and select registered users. You can also enter external e-mail addresses.</li> <li>• <b>Subject</b>—Enter the subject line for the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> <li>• <b>Comment</b>—Enter the text to be included in the body of the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> </ul>

## RELATED DOCUMENTATION

[About the Security Report Definitions Page | 850](#)

[Creating Bandwidth Report Definition | 861](#)

[Creating Log Report Definition | 857](#)

## Editing, Deleting, and Cloning Log Report Definitions

### IN THIS SECTION

- [Editing the Log Report Definition | 866](#)
- [Deleting Log Report Definitions | 866](#)
- [Cloning Log Report Definitions | 867](#)

You can edit, delete, and clone log report definitions.

### Editing the Log Report Definition

You can edit custom log report definitions from the Security Report Definitions page.

To edit the custom log report definition:

1. Select **Reports > Report Definitions > Security**.

The Security Report Definitions page appears.

2. Select the log report definition that you want to edit, and click the edit icon (pencil).

The **Edit Log Report Definition** page appears, displaying the same fields that are presented when you create a log report definition.

3. Modify the log report definition fields as needed.

4. Click **OK** to save the changes or click **Cancel** to discard the changes.

You are returned to the Security Report Definitions page.

If you click OK, a confirmation message, indicating that the report definition is updated, appears on top of the Security Report Definitions page.

### Deleting Log Report Definitions

You can use the Security Report Definitions page to delete one or more custom log report definitions.

To delete one or more log report definitions:

1. Select **Reports > Report Definitions > Security**.

The **Security Report Definitions** page appears.

2. Select the log report definitions that you want to delete, and click the delete icon. Alternatively, right click on the report definitions that you want to delete and select **Delete Report**.

The **Delete Report Definition** page appears.

3. Click **Yes** to delete the selected log report definitions or click **No** to cancel the deletion.

You are returned to the Security Report Definitions page.

If you click Yes, the selected log report definitions are deleted. A confirmation message, indicating that the selected report definitions are deleted, appears on top of the Security Report Definitions page.

## Cloning Log Report Definitions

Cloning enables you to easily create a new log report definition based on an existing one.

**NOTE:** You can clone predefined and custom log report definitions.

To clone a log report definition:

1. Select **Reports > Report Definitions > Security**.

The **Security Report Definitions** page appears.

2. Right-click on the log report definition that you want to clone and select **Clone**. Alternatively, select the log report definition and then select **More > Clone**.

The **Clone log Report Definition** page appears, displaying the same fields that are presented when you create a log report definition.

3. Modify the log Report Definition fields as needed.
4. Click **OK** to save your changes or click **Cancel** to discard the changes.

You are returned to the Security Report Definitions page.

If you click OK, a confirmation message, indicating that the selected report definition was cloned successfully, appears on top of the Security Report Definitions page.

You can perform various actions on the cloned report definition. See [“Scheduling, Generating, Previewing, and Sharing Security Reports” on page 853](#).

## RELATED DOCUMENTATION

[Creating Log Report Definition | 857](#)

[About the Security Report Definitions Page | 850](#)

## Editing, Deleting, and Cloning Bandwidth Report Definitions

### IN THIS SECTION

- [Editing Bandwidth Report Definitions | 868](#)
- [Deleting Bandwidth Report Definitions | 869](#)
- [Cloning Bandwidth Report Definitions | 869](#)

You can edit, delete, and clone bandwidth report definitions.

### Editing Bandwidth Report Definitions

You can edit custom bandwidth report definitions from the Security Report Definitions page.

To edit the custom bandwidth report definition:

1. Select **Reports > Report Definitions > Security**.

The Security Report Definitions page appears.

2. Select the bandwidth report definition that you want to edit, and click the edit icon (pencil).

The **Edit Bandwidth Report Definition** page appears, displaying the same fields that are presented when you create a bandwidth report definition.

3. Modify the bandwidth report definition fields as needed.

4. Click **OK** to save the changes or click **Cancel** to discard the changes.

You are returned to the Security Report Definitions page.

If you click OK, a confirmation message, indicating that the report definition is updated, appears on top of the Security Report Definitions page.

## Deleting Bandwidth Report Definitions

You can use the Security Report Definitions page to delete one or more custom bandwidth report definitions.

To delete one or more bandwidth report definitions:

1. Select **Reports > Report Definitions > Security**.

The **Security Report Definitions** page appears.

2. Select the bandwidth report definitions that you want to delete, and click the delete icon. Alternatively, right click on the report definitions that you want to delete and select **Delete Report**.

The **Delete Report Definition** page appears.

3. Click **Yes** to delete the selected bandwidth report definitions or click **No** to cancel the deletion.

You are returned to the Security Report Definitions page.

If you click Yes, the selected bandwidth report definitions are deleted. A confirmation message, indicating that the selected report definitions are deleted, appears on top of the Security Report Definitions page.

## Cloning Bandwidth Report Definitions

Cloning enables you to easily create a new bandwidth report definition based on an existing one.

**NOTE:** You can clone predefined and custom bandwidth report definitions.

To clone a bandwidth report definition:

1. Select **Reports > Report Definitions > Security**.

The **Security Report Definitions** page appears.

2. Right-click on the bandwidth report definition that you want to clone and select **Clone**. Alternatively, select the bandwidth report definition and then select **More > Clone**.

The **Clone Bandwidth Report Definition** page appears, displaying the same fields that are presented when you create a bandwidth report definition.

3. Modify the bandwidth report definition fields as needed.

4. Click **OK** to save your changes or click **Cancel** to discard the changes.

You are returned to the Security Report Definitions page.

If you click OK, a confirmation message, indicating that the selected report definition was cloned successfully, appears on top of the Security Report Definitions page.

You can perform various actions on the cloned report definition. See [“Scheduling, Generating, Previewing, and Sharing Security Reports” on page 853](#).

## RELATED DOCUMENTATION

[About the Security Report Definitions Page | 850](#)

[Creating Bandwidth Report Definition | 861](#)

## Editing, Deleting, and Cloning ANR Report Definitions

### IN THIS SECTION

- [Editing ANR Report Definitions | 870](#)
- [Deleting ANR Report Definitions | 871](#)
- [Cloning ANR Report Definitions | 871](#)

You can edit, delete, and clone ANR report definitions.

### Editing ANR Report Definitions

You can edit custom ANR report definitions from the Security Report Definitions page.

To edit the custom ANR report definition:

1. Select **Reports > Report Definitions > Security**.

The Security Report Definitions page appears.

2. Select the ANR report definition that you want to edit, and click the edit icon (pencil).

The **Edit ANR Report Definition** page appears, displaying the same fields that are presented when you create an ANR report definition.

3. Modify the ANR Report Definition fields as needed.
4. Click **OK** to save the changes or click **Cancel** to discard the changes.

You are returned to the Security Report Definitions page.

If you click OK, a confirmation message, indicating that the report definition is updated, appears on top of the Security Report Definitions page.

## Deleting ANR Report Definitions

You can use the Security Report Definitions page to delete one or more custom ANR report definitions.

To delete one or more ANR report definitions:

1. Select **Reports > Report Definitions > Security**.

The **Security Report Definitions** page appears.

2. Select the ANR report definitions that you want to delete, and click the delete icon. Alternatively, right click on the report definitions that you want to delete and select **Delete Report**.

The **Delete Report Definition** page appears.

3. Click **Yes** to delete the selected ANR report definitions or click **No** to cancel the deletion.

You are returned to the Security Report Definitions page.

If you click Yes, the selected ANR report definitions are deleted. A confirmation message, indicating that the selected report definitions are deleted, appears on top of the Security Report Definitions page.

## Cloning ANR Report Definitions

Cloning enables you to easily create a new ANR report definition based on an existing one.

**NOTE:** You can clone predefined and custom ANR report definitions.

To clone an ANR report definition:

1. Select **Reports > Report Definitions > Security**.

The **Security Report Definitions** page appears.

2. Right-click on the ANR report definition that you want to clone and select **Clone**. Alternatively, select the ANR report definition and then select **More > Clone**.

The **Clone ANR Report Definition** page appears, displaying the same fields that are presented when you create an ANR report definition..

3. Modify the ANR Report Definition fields as needed.
4. Click **OK** to save your changes or click **Cancel** to discard the changes.

You are returned to the Security Report Definitions page.

If you click OK, a confirmation message, indicating that the selected report definition was cloned successfully, appears on top of the Security Report Definitions page.

You can perform various actions on the cloned report definition. See [“Scheduling, Generating, Previewing, and Sharing Security Reports” on page 853](#).

#### RELATED DOCUMENTATION

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[About the Security Report Definitions Page | 850](#)

[Creating ANR Report Definition | 863](#)



# SD-WAN Reports

## IN THIS CHAPTER

- [About the SD-WAN Report Definitions Page | 873](#)
- [Editing and Deleting SD-WAN Report Definitions | 874](#)
- [Creating SD-WAN Tenant Performance Report Definitions | 876](#)
- [Creating SD-WAN Site Performance Report Definitions | 880](#)
- [About the SD-WAN Generated Reports Page | 883](#)

## About the SD-WAN Report Definitions Page

To access this page, click **Customer Portal > Reports > Report Definitions > SD-WAN**.

Use this page to view and manage predefined and custom report definitions and generate reports based on the definitions. You can also preview a report in PDF and send reports to recipients. An SD-WAN report includes SLA performance of top applications by bandwidth, top sites not meeting SLA, top sites meeting SLA with switching, and sites meeting SLA without switching. You can generate an SLA performance report for all sites in a tenant or for specific sites in a tenant.

You can perform various actions on reports such as run a report immediately, edit a schedule, edit e-mail recipients, preview a report in PDF, send reports, and clone reports, using this page.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create SD-WAN tenant performance report definitions. See [“Creating SD-WAN Tenant Performance Report Definitions” on page 876](#)
- Create SD-WAN site performance report definitions. See [“Creating SD-WAN Site Performance Report Definitions” on page 880](#)
- Run a report immediately, edit a schedule, edit e-mail recipients, preview a report in PDF, send reports, and clone reports. See [“Scheduling, Generating, Previewing, and Sharing Security Reports” on page 853](#)

## Field Descriptions

Table 333 on page 874 provides guidelines on using the fields on the SD-WAN Report Definitions page.

**Table 333: Fields on the SD-WAN Report Definitions Page**

Field	Description
Name	View the name of the SD-WAN report.
Description	View the description of the SD-WAN report definition.
Type	View the type of SD-WAN report. The report type can be SD-WAN tenant performance SD-WAN site performance.
Definition Type	View the type of SD-WAN report definition. The report definition type can be predefined or custom.
Schedule	View the report generation schedule, whether the report is scheduled to generate immediately or scheduled it for a later date and time.
Recipients	View the recipients of the generated reports.
Job ID	View the last generated job ID of the report.

## RELATED DOCUMENTATION

[Editing and Deleting SD-WAN Report Definitions | 874](#)

[Creating SD-WAN Tenant Performance Report Definitions | 876](#)

[Creating SD-WAN Site Performance Report Definitions | 880](#)

## Editing and Deleting SD-WAN Report Definitions

### IN THIS SECTION

● [Editing the SD-WAN Report Definition | 875](#)

● [Deleting SD-WAN Report Definitions | 875](#)

You can edit and delete SD-WAN report definitions from the SD-WAN definitions page. This topic has the following sections:

## Editing the SD-WAN Report Definition

To edit the SD-WAN report definition:

**NOTE:** You cannot modify the predefined report definition.

1. Select **Reports > Report Definitions > SD-WAN**.

The SD-WAN Report Definitions page appears.

2. Select the check box of the SD-WAN custom report definition that you want to modify, and click the edit icon.

The Update SD-WAN Performance Report Definition page appears. The options available on the Create SD-WAN Performance Report Definition page are available for editing.

3. Update the configuration as needed.

4. Click **OK** to save the changes.

The SD-WAN report definition information that you updated appears on the SD-WAN report definition page.

Alternatively, If you want to discard your changes, click **Cancel** .

## Deleting SD-WAN Report Definitions

You can clear all unwanted report definitions that are not used anywhere in your network. Use the delete icon (X) in the top right corner of a page to delete one or more SD-WAN report definitions.

**NOTE:** You can delete only custom SD-WAN report definitions.

To delete an SD-WAN report definition:

1. Select **Reports > Report Definitions > SD-WAN**.

The SD-WAN Report Definitions page appears.

2. Select the SD-WAN report definition or right click on the report definition that you want to delete and click the delete icon (X).

The Confirm Delete page appears.

3. Click **Yes** to delete the SD-WAN report definition or **No** to cancel the deletion.

The SD-WAN report definition is deleted from the main page.

## RELATED DOCUMENTATION

[About the SD-WAN Report Definitions Page](#) | 873

## Creating SD-WAN Tenant Performance Report Definitions

Use this page to create SD-WAN tenant performance report definitions for all sites in a tenant and generate reports based on the definitions. You can also schedule report generation and add one or more recipients to whom you want to send the reports.

The SD-WAN tenant performance report includes the following information:

- Top applications by bandwidth
- Top sites not meeting SLA
- Top sites meeting SLA with switching
- Sites meeting SLA without switching
- Top sites by current active tunnels
- Top sites by highest packet loss
- Top sites by highest latency
- Top sites by highest jitter

**NOTE:** Only users with the SP Administrator or Tenant Administrator role can create SD-WAN tenant performance report definitions.

To create an SD-WAN tenant report definition:

1. Select **Reports > Report Definitions > SD-WAN**.

The SD-WAN Report Definitions page appears.

2. Click **Create > Performance**.

The Create SD-WAN Tenant Performance Report Definition page appears.

3. Complete the configuration according to the guidelines provided in [Table 334 on page 877](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK** to save the report definition.

An SD-WAN tenant performance report definition is created and listed on the report definitions page.

Alternatively, if you want to discard your changes, click **Cancel**.

**Table 334: Fields on the Create Tenant Performance Report Definition**

Field	Description
<b>General</b>	
Report Name	Enter a unique string of alphanumeric characters and some special characters (: . -). No spaces are allowed and the maximum length is 63 characters.
Description	Enter a description for the report definition; maximum length is 1024 characters.
<b>Content</b>	
Time Span	Specify the duration (custom, last 24 hours, last 7 days, or last 30 days) for which the report is generated. When you select the custom option, you must specify start ( <b>From</b> ) and end ( <b>To</b> ) of the time span (in MM/DD/YYYY and HH:MM:SS formats).
<b>NOTE:</b> The <b>From</b> and <b>To</b> fields are listed only when you select the <b>Custom</b> duration.	
From	Specify the start date and time from which the report should be generated.
To	Specify the end date and time up to which the report should be generated.
Number of Top Logs	Enter the number of SLA events (1 through 20) that you want to retrieve and display for each section in the report.

Table 334: Fields on the Create Tenant Performance Report Definition (*continued*)

Field	Description
Report Content	<p>Select the content that you want to view in the report.</p> <ul style="list-style-type: none"> <li>• <b>Top Applications By Bandwidth</b>—Displays a report on top applications by bandwidth.</li> <li>• <b>Top Sites Not Meeting SLA</b>—Displays a report on top sites not meeting the SLA performance.</li> <li>• <b>Top Sites Meeting SLA with Switching</b>—Displays a report on top sites meeting SLA performance with link switching.</li> <li>• <b>Sites Meeting SLA without Switching</b>—Displays report on sites meeting SLA performance without switching.</li> <li>• <b>Current Active Tunnels</b>—Displays a report on top 10 sites that have the maximum number of active DVPN tunnels.</li> <li>• <b>Top Sites by Highest Packet Loss</b>—Displays a report on top 10 sites based on the highest cumulative average packet loss across all the links.</li> <li>• <b>Top Sites by Highest Latency</b>—Displays report on top 10 sites based on the highest cumulative average latency across all the links.</li> <li>• <b>Total Sites by Highest Jitter</b>—Displays report on top 10 sites based on the highest cumulative average jitter across all the links.</li> </ul> <p>For more information about SLA parameters and DVPN tunnels, see <i>SLA Profiles and SD-WAN Policies Overview</i> and <i>Dynamic VPN Tunnels Overview</i> in <i>Contrail Service Orchestration User Guide</i>.</p>
<b>Schedule Report</b>	
Add Schedule	<p>Click <b>Add Schedule</b> to schedule the report generation.</p> <p>The Add Report Schedule page is displayed.</p> <p>Specify whether you want to generate the report immediately or schedule it for a later date and time.</p> <ul style="list-style-type: none"> <li>• <b>Run now</b>—Select this option to generate the report immediately.</li> <li>• <b>Schedule at a later time</b>— Select this option to generate the report at a later date and time (in MM/DD/YYYY and HH:MM:SS format).</li> </ul>
<b>Email Recipients</b>	

Table 334: Fields on the Create Tenant Performance Report Definition (*continued*)

Field	Description
Add Email Recipients	<p>Click <b>Add Email Recipients</b> to add e-mail addresses of recipients to whom you want to send the SD-WAN reports.</p> <p>The Add Recipients page is displayed.</p> <ul style="list-style-type: none"> <li>• <b>Recipients</b>—Select e-mail addresses of users to whom you want to send the report. You can select more than one e-mail address.</li> <li>• <b>Subject</b>—Enter the subject line for the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> <li>• <b>Comment</b>—Enter the text to be included in the body of the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> </ul>

## RELATED DOCUMENTATION

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[Creating SD-WAN Site Performance Report Definitions | 880](#)


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[About the SD-WAN Report Definitions Page | 873](#)


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[Editing and Deleting SD-WAN Report Definitions | 874](#)


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## Creating SD-WAN Site Performance Report Definitions

Use this page to create SD-WAN site performance report definitions for specific sites of a tenant and generate the report based on the definitions. You can also schedule report generation and add one or more recipients to whom you want to send the reports.

The SD-WAN site performance report includes the following information:

- Top 10 applications for site
- Link utilization for site
- Top profiles not meeting SLA
- Top profiles switching links
- Top applications by highest packet loss
- Top applications by highest latency
- Top applications by highest jitter

**NOTE:** Only users with the SP Administrator or Tenant Administrator role can create SD-WAN site performance report definitions.

To create an SD-WAN site performance report definition:

1. Select **Reports > Report Definitions > SD-WAN**.

The SD-WAN Report Definitions page appears.

2. Click **Create > Site Performance**.

The Create SD-WAN Site Performance Report Definition page appears.

3. Complete the configuration according to the guidelines provided in [Table 335 on page 881](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK** to save the report definition.

A report definition is created and listed on the SD-WAN report definitions page.

Alternatively, if you want to discard your changes, click **Cancel**.



Table 335: Fields on the Site Performance Report Definition Page

Field	Description
<b>General</b>	
Report Name	Enter a unique string of alphanumeric characters and some special characters (: . -). No spaces are allowed and the maximum length is 63 characters.
Description	Enter a description for the report definition; maximum length is 1024 characters.
<b>Content</b>	
Duration	Specify the duration (custom, last 24 hours, last 7 days, or last 30 days) for which the report is generated. When you select the custom option, you must specify the start ( <b>From</b> ) and end ( <b>To</b> ) of the time span.
<b>NOTE:</b> The <b>From</b> and <b>To</b> fields are listed only when you select the <b>Custom</b> duration.	
From	Specify the start date and time from which the report should be generated.
To	Specify the end date and time up to which the report should be generated.
Number of Top Logs	Enter the number of SLA events (1 through 20) that you want to retrieve and display for each section in the report.
Sites	Select one or more sites for which you want to generate the report. You can select up to five sites.

Table 335: Fields on the Site Performance Report Definition Page (*continued*)

Field	Description
Report Content	<p>Select the content that you want to view in the report.</p> <ul style="list-style-type: none"> <li>• <b>Top 10 Applications and Link Utilization</b>—Displays a report on top 10 applications and link utilization for the selected sites.</li> <li>• <b>Top Profiles Not Meeting SLA</b>—Displays a report on top SLA profiles not meeting SLA for the selected sites.</li> <li>• <b>Top Profiles Switching Links</b>—Displays a report on top SLA profiles switching links for the selected sites.</li> <li>• <b>Top Applications by Packet Loss</b>—Displays report on top 10 applications based on the selected site that has the highest average packet loss across SLA profiles.</li> <li>• <b>Top Applications by Latency</b>—Displays report on top 10 applications based on the selected site that has the highest average latency across SLA profiles.</li> <li>• <b>Total Applications by Jitter</b>—Displays report on top 10 applications based on the selected site that has the highest average jitter across SLA profiles.</li> </ul> <p>For more information about SLA parameters and DVPN tunnels, see <i>SLA Profiles and SD-WAN Policies Overview</i> and <i>Dynamic VPN Tunnels Overview</i> in <i>Contrail Service Orchestration User Guide</i>.</p>
<b>Schedule</b>	
Add Schedule	<p>Click <b>Add Schedule</b> to schedule the report generation.</p> <p>The Add Report Schedule page is displayed.</p> <p>You must specify whether you want to generate the report immediately or schedule it for a later date and time.</p> <ul style="list-style-type: none"> <li>• <b>Run now</b>—Select this option to generate the report immediately.</li> <li>• <b>Schedule at a later time</b>— Select this option to generate the report at a later date and time (in MM/DD/YYYY and HH:MM:SS formats).</li> </ul>
<b>E-Mail</b>	
Add E-Mail Recipients	<p>Click <b>Add Email Recipients</b> to add e-mail addresses of recipients to whom you want to send the SD-WAN reports.</p> <p>The Add Recipients page is displayed.</p> <ul style="list-style-type: none"> <li>• <b>Recipients</b>—Select e-mail addresses of users to whom you want to send the report.</li> <li>• <b>Subject</b>—Enter the subject line for the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> <li>• <b>Comment</b>—Enter the text to be included in the body of the e-mail that is sent with the generated report. The maximum length is 2048 characters.</li> </ul>

RELATED DOCUMENTATION

<a href="#">Creating SD-WAN Tenant Performance Report Definitions   876</a>
<a href="#">About the SD-WAN Report Definitions Page   873</a>
<a href="#">Editing and Deleting SD-WAN Report Definitions   874</a>

About the SD-WAN Generated Reports Page

To access this page, click **Customer Portal > Reports > Generated Reports > SD-WAN**.

Use this page to view the list of tenant and site performance reports that are generated from the SD-WAN Report Definitions page. You must click on the report to view the report in PDF format. You can view the generated report up to 30 days and the report will be deleted after 30 days.

Tasks You Can Perform

You can perform the following tasks from this page:

- Open the generated report.
- Select and delete the generated report.

Field Descriptions

[Table 336 on page 883](#) provides guidelines on using the fields on the SD-WAN Generated Reports page.

Table 336: Fields on the SD-WAN Generated Reports Page

Field	Description
Name	View the name of the SD-WAN report.
Description	View the description of the report.
Generated Time	View the date and time when the report was generated.
Definition Name	View the name of the report definition.
Generated By	View the name of the tenant administrator who generated the report.
Recipients	View the recipients of the generated reports.

## RELATED DOCUMENTATION

[Reports Overview | 849](#)

[About the SD-WAN Report Definitions Page | 873](#)

# Managing Tenant Users

## IN THIS CHAPTER

- [Role-Based Access Control Overview | 885](#)
- [About the Users Page in Customer Portal | 886](#)
- [Adding Tenant and OpCo Tenant Users | 888](#)
- [Editing and Deleting Tenant and OpCo Tenant Users | 890](#)
- [Resetting the Password for Tenant Users | 892](#)

## Role-Based Access Control Overview

Contrail Service Orchestration supports the authentication and authorization of users. Both service provider and tenant users access the pages within the unified Administration and Customer Portal based on their role and access permissions.

In addition to predefined roles, CSO enables you to add object-based custom roles. You can create custom roles and assign access privileges (read, create, update, delete, and other actions) to each role.

[Table 337 on page 885](#) shows predefined service provider, tenant, and OpCo roles and their access privileges.

**Table 337: Roles and Access Privileges**

Role	Role Scope	Access Privileges
SP Admin	Service Provider	<p>Users with the SP Admin role have full access to the Administration Portal UI or API capabilities. They can use the UI or APIs to add one or more users with SP Admin, SP Operator, and custom roles. They can onboard tenants, and add the first tenant user during the tenant onboarding process. They can also add tenant administrators or operators by switching the scope to a specific tenant.</p> <p><b>NOTE:</b> When the SP administrator creates one or more operating companies under the service provider, the service provider is called a global service provider and the SP administrator is called the global SP administrator.</p>
SP Operator	Service Provider	<p>Users with the SP Operator role have read-only access to the Administration Portal UI and APIs.</p>

Table 337: Roles and Access Privileges (*continued*)

Role	Role Scope	Access Privileges
Tenant Admin	Tenant	Users with the Tenant Admin role have full access to the Customer Portal UI and APIs. They can add one or more users with the Tenant Administrator or Tenant Operator roles.
Tenant Operator	Tenant	Users with the Tenant Operator role have read-only access to the Customer Portal UI and APIs.
OpCo Admin	Operating Company	Users with the OpCo Admin role have full access to the OpCo's Administration Portal UI or API capabilities. They can use the UI or APIs to add one or more users with OpCo Admin, OpCo Operator, and custom roles. They can onboard tenants, and add the first tenant user during the OpCo's tenant onboarding process. They can also add tenant administrators or operators by switching the scope to a specific tenant.
OpCo Operator	Operating Company	Users with the OpCo Operator role have read-only access to the OpCo's Customer Portal UI and APIs.
Configure Site	Tenant	Only users with SP Admin role can configure a site by switching the scope to a specific tenant. By default, a tenant administrator cannot configure a site.

## RELATED DOCUMENTATION

| [About the Users Page in Customer Portal](#) | 886

## About the Users Page in Customer Portal

To access the Users page for a tenant or OpCo tenant, click **Administration > Users** in the Customer Portal.

Use this page to manage tenants and OpCo tenant users in the Tenant and OpCo scopes respectively. In the Tenant scope, the SP Admin, SP Operator, Tenant Admin, and Tenant Operator can access the Users page for tenants. The SP Admin and the SP Operator can switch scope from all tenants to a specific tenant.

In the OpCo scope, the SP Admin, SP Operator, OpCo Admin and OpCo Operator can access the OpCo Tenant Users page.

For information about the predefined roles and access permissions of OpCo tenant users and tenant users, see ["Role-Based Access Control Overview"](#) on page 298.

The information listed on the Users page changes depending on the authentication mode configured:

- **Local Authentication** —The **Users** page lists local users that you can add, edit, and delete.
- **Authentication and Authorization with SSO Server**—The **Users** page is not displayed because users are externally managed in the single sign-on (SSO) server.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Add a tenant user or an OpCo tenant user. See [“Adding Tenant and OpCo Tenant Users” on page 888](#).
- Edit or delete a tenant user or an OpCo tenantuser. See [“Editing and Deleting Tenant and OpCo Tenant Users” on page 890](#).
- View details of users in the respective scope. See [Table 338 on page 887](#).
- Show or hide columns about users. See [“Sorting Objects” on page 17](#).
- Reset password for a user. See [“Resetting the Password for Service Provider and Tenant Users” on page 306](#).
- Search for a user. See [“Searching for Text in an Object Data Table” on page 16](#).

### Field Descriptions

[Table 338 on page 887](#) describes the fields on the Users page for the Tenant and OpCo scopes in the Customer Portal.

**Table 338: Fields on the Users Page**

Field	Description
Username	Username of the user.  Example: <i>abc@example.com</i>
First Name	First name of the user.
Last Name	Last name of the user.
Status	Indicates whether the user is enabled (can log in to CSO) or disabled (cannot log in to CSO).

Table 338: Fields on the Users Page (continued)

Field	Description
Role	<p>Depending on the scope selected, indicates the roles assigned to the tenant or OpCo tenant user.</p> <p>By default, this column lists only one role assigned to the user. When a user is assigned more than one role, a +&lt;integer&gt; icon (for example: +2) appears to the right of the role. The integer indicates the number of additional roles assigned to the user. Click on the integer to view the additional roles.</p>
Last Login	<p>Date and time of the last login. The format is MM/DD/YYYY HH:MM.</p> <p>Example: 07/22/2017 20:07</p> <p>A date and time is not displayed when a user has not logged in to the Customer Portal.</p>

RELATED DOCUMENTATION

<a href="#">About the Users Page in Administration Portal   299</a>
<a href="#">Adding Service Provider and OpCo Users   301</a>
<a href="#">Switching the Tenant Scope   372</a>

## Adding Tenant and OpCo Tenant Users

Use the Add Tenant User page and Add OpCo Tenant User page in the Customer Portal to add tenant users and OpCo tenant users respectively to Contrail Service Orchestration (CSO). After you add a user, the user receives an e-mail with the initial login credentials.

**NOTE:** To add users, you should be assigned a role, such as Tenant Admin, that allows you to add users.



To add a tenant user or an OpCo tenant user:

1. Select **Administration > Users**.

The Users page appears.

2. Click the add icon (+) or click **Add User button**. The Add User button appears when there are no users configured in the scope.

In the Tenant scope, the Add Tenant User page appears. In the OpCo scope, the Add OpCo Tenant User page appears.

3. Complete the configuration as described in [Table 339 on page 889](#).

4. Click **OK** to save the changes. If you want to discard the changes, click **Cancel**.

If you click OK, a confirmation message indicating that the user account is created appears and the user account is listed on the Users page.

To enhance the security related to login credentials, an automatically generated password is sent to the e-mail address that you have specified for the user. You are prompted to change the password when you login to the portal with the automatically generated password. For more information about changing the password on first login, see [“Changing the Password on First Login” on page 375](#).

**Table 339: Fields on the Add Tenant User and Add OpCo Tenant User Pages**

Field	Description
<b>First Name</b>	Enter the first name as a string of alphanumeric characters, some special characters [underscore (_) and period(.)], and spaces. The maximum length allowed is 32 characters.
<b>Last Name</b>	Enter the last name as a string of alphanumeric characters, some special characters [underscore (_) and period(.)] and spaces. The maximum length allowed is 32 characters.
<b>Username (E-mail)</b>	Enter a valid e-mail address in the <i>user@domain</i> format.
<b>Status</b>	Click the toggle button to enable or disable the user.  By default, the status is enabled. A user can log in to CSO only when the status is enabled.

Table 339: Fields on the Add Tenant User and Add OpCo Tenant User Pages (continued)

Field	Description
Role	<p>Select one or more roles (both predefined and custom) that you want to assign to the tenant or OpCo tenant user.</p> <p>The following predefined roles are available—Tenant Operator, Tenant Admin, and ConfigureSite. To know more about the predefined roles for tenant users and OpCo tenant users, see <a href="#">“Role-Based Access Control Overview” on page 298</a>.</p> <p>Click the right-arrow icon to move the selected roles from the <b>Available</b> column to the <b>Selected</b> column. Note that you can use the search icon on the top right of each column to search for role names.</p> <p>Click the role name to preview the access privileges assigned to the tenant user.</p>

RELATED DOCUMENTATION

<a href="#">Adding Service Provider and OpCo Users   301</a>
<a href="#">Editing and Deleting Service Provider and OpCo Users   305</a>

Editing and Deleting Tenant and OpCo Tenant Users

IN THIS SECTION

- [Editing Tenant and OpCo Tenant Users | 891](#)
- [Deleting Tenant and OpCo Tenant Users | 891](#)

You can edit the information of tenant and OpCo tenant users and delete one or more users.

**NOTE:** To edit and delete users, you should be assigned a role, such as Tenant Admin, that allows you to edit and delete users.

## Editing Tenant and OpCo Tenant Users

To modify a tenant user or an OpCo tenant user:

1. Select **Administration > Users**.

The Users page appears.

2. Select the user that you want to modify, and click the edit icon.

In the Tenant scope, the Edit Tenant User page appears. In the OpCo scope, the Edit OpCo Tenant User page appears.

3. Modify the parameters following the guidelines provided in [Table 339 on page 889](#).

**NOTE:** You cannot modify the **Username (E-mail)** field.

4. Click **OK** to save the changes or click **Cancel** to discard your changes.

If you click OK, a confirmation message indicating that the user information is modified appears on top of the Users page.

## Deleting Tenant and OpCo Tenant Users

To delete one or more tenant users and OpCo tenant users:

1. Select **Administration > Users**.

The Users page appears.

2. Select the users that you want to delete and click the delete icon.

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the users or click **No** to cancel the deletion.

If you click **Yes**, a confirmation message indicating that the selected users account are deleted from CSO appears on top of the Users page.

## RELATED DOCUMENTATION

[About the Users Page in Administration Portal | 299](#)

[Adding Service Provider and OpCo Users | 301](#)

[Editing and Deleting Service Provider and OpCo Users | 305](#)

## Resetting the Password for Tenant Users

Users with the Tenant Administrator role can reset the password for tenant users. Also, users with the Update capability for Users objects can reset the password for tenant users.

To reset the password:

1. Select **Administration > Users** in Customer Portal.

The Users page appears, displaying a list of tenant users.

2. Select the username for which you want to reset the password, and then select **More > Reset Password**.

An alert message appears, asking you to confirm the reset password operation.

3. Click **Yes** to confirm the reset password operation.

A confirmation message appears, indicating that the password has been successfully reset, and an e-mail with a new system-generated password is sent to the user.

The user can use the new system-generated password to log in to CSO.

## RELATED DOCUMENTATION

[About the Users Page in Customer Portal | 886](#)

# Managing Audit Logs

## IN THIS CHAPTER

- [Audit Logs Overview | 893](#)
- [About the Audit Logs Page | 894](#)
- [Viewing the Details of an Audit Log | 895](#)
- [Exporting Audit Logs | 898](#)
- [Purging Audit Logs \(After Archiving or Without Archiving\) | 899](#)

## Audit Logs Overview

An audit log is a record of a sequence of activities that have affected a specific operation or procedure. Audit logs are useful for tracing events and for maintaining historical data.

Audit logs contain information about tasks initiated by using the Contrail Service Orchestration (CSO) GUI or APIs. In addition to providing information about the resources that were accessed, audit log entries usually include details about user-initiated tasks, such as the name, role, and IP address of the user who initiated a task, the status of the task, and date and time of execution.

**NOTE:** Device-driven tasks (that is, tasks not initiated by the user) are not recorded in audit logs.

Administrators can use audit logs to review events. For example, administrators can identify the user accounts associated with an event, determine the chronological sequence of events. For audit log entries that have an associated job, you can click the hyperlinked job ID to go to the Jobs page, where you can view the details of the job.

## RELATED DOCUMENTATION

[About the Audit Logs Page | 894](#)

[Exporting Audit Logs | 898](#)

# About the Audit Logs Page

To access this page, select **Administration > Audit Logs**.

Use the Audit Logs page to view tasks that you have initiated either by using the Contrail Service Orchestration (CSO) GUI or APIs. You can also export audit logs as a comma-separated values (CSV) file and purge audit logs after archiving them or without archiving them.

## Tasks You Can Perform

You can perform the following tasks from this page:

- View the details of various user-initiated tasks by selecting **More > Details**. You can also mouse over the audit log and click on the **Detailed View** icon. See [“Viewing the Details of an Audit Log” on page 895](#).
- Export audit logs as a CSV file—See [“Exporting Audit Logs” on page 898](#).
- Purge audit logs—See [“Purging Audit Logs \(After Archiving or Without Archiving\)” on page 899](#).
- Search for audit logs by using keywords—Click the search icon and enter the search term in the text box and press Enter. The search results are displayed on the same page.
- Sort and filter audit logs:

**NOTE:** Sorting and filtering is applicable only to some fields.

- Click a column name to sort the audit logs based on the column name.
- Click the filter icon and select whether you want to show or hide column filters or apply a quick filter. For example, you can use audit log filtering to track user accounts that were added on a specific date, track configuration changes across a particular type of device, view services that were provisioned on specific devices, monitor user login and logout activities over time, and so on.
- Show or hide columns—Click the **Show Hide Columns** icon at the top right corner of the page and select the columns that you displayed on the Audit Logs page.

[Table 340 on page 894](#) provides description of the fields on the Audit Logs page.

**Table 340: Fields on the Audit Logs Page**

Field	Description
Username	Displays the username of the user who initiated the task.

Table 340: Fields on the Audit Logs Page (*continued*)

Field	Description
User IP	Displays the IP address of the client from which the user initiated the task. For tasks that do not have an associated user IP address, this field is blank.
Object Name	Displays the name of the object on which the task was initiated. An object can be a tenant, site, device, device image, template, and so on.
Task	Displays the name of the task that triggered the audit log. For example, tenant.create, device.create, site.configure, site.provision, tenant.update, and so on.
Description	Displays details about the task.
Status	<p>Displays the status of the task that triggered the audit log:</p> <ul style="list-style-type: none"> <li>• Success—Job or task was completed successfully.</li> <li>• Failure—Job or task failed and was terminated.</li> <li>• Job Scheduled—Job is scheduled but has not yet started.</li> <li>• Recurring Job Scheduled—Recurring job is scheduled.</li> </ul>
End Time	Displays the date and time at which the execution of the task was completed. This timestamp is stored in UTC time in the database, but is mapped to the local time zone of the client computer.
Job ID	<p>For tasks that have associated jobs, displays the ID of the job associated with the task.</p> <p>You can click the job ID to go to the Jobs page, where you can view the status of the job.</p>

## RELATED DOCUMENTATION

[About the Jobs Page](#) | 450

## Viewing the Details of an Audit Log

Use the Audit Log Details pane to view details of an audit log.

To view the details of an audit log:

1. Select **Administration** > **Audit Logs**.

The Audit Logs page appears displaying the audit logs.

- 2. Select the audit log for which you want to view details and click **More > Details**. Alternatively, you can mouse over the audit log, and click on the **Detailed View** icon.

The Audit Log Details pane appears on the right side of the Audit Logs page. [Table 341 on page 896](#) provides descriptions the fields on the Audit Log Details pane.

- 3. Click the close icon (X) to close the Audit Log Details pane.

You are returned to the Audit Logs page.

[Table 341 on page 896](#) provides descriptions the fields on the Audit Log Details pane.

Table 341: Fields on the Audit Log Details Pane

Field	Description
<b>Details</b>	
<b>User</b>	
Username	Displays the username of the user who initiated the task.
User IP	Displays the IP address of the client from which the user initiated the task. For tasks that do not have an associated user IP address, this field is blank.
<b>Task</b>	
Task	Displays the name of the task that triggered the audit log. For example, tenant.create, device.create, site.configure, site.provision, tenant.update, and so on.
Status	Displays the status of the task that triggered the audit log: <ul style="list-style-type: none"><li>• Success—Job or task was completed successfully.</li><li>• Failure—Job or task failed and was terminated.</li><li>• Job Scheduled—Job is scheduled but has not yet started.</li><li>• Recurring Job Scheduled—Recurring job is scheduled.</li></ul>
Description	Displays details about the task.
<b>Affected Objects</b>	



Table 341: Fields on the Audit Log Details Pane (*continued*)

Field	Description
Object Name	<p>Displays the name of the affected object on which the task was initiated. An affected object can be a tenant, site, device, device image, template, and so on.. Click the hyperlinked object name to view details of the object:</p> <ul style="list-style-type: none"> <li>• If the affected object is a site, the Sites page appears. See <a href="#">“About the Sites Page” on page 749</a>.</li> <li>• If the affected object is a device, the Tenant Devices page appears. See <a href="#">“About the Devices Page” on page 457</a>.</li> <li>• If the affected object is a tenant, clicking on the tenant name displays an error message as you do not have permission to view this page.</li> </ul> <p><b>NOTE:</b> If the object is deleted or if you do not have permissions to view it, an error message is displayed.</p>
Object UUID	Displays the Universally Unique Identifier (UUID) of the affected object.
<b>Log Info</b>	
Audit Log ID	Displays the automatically-generated unique ID of the audit log associated with the task.
Job ID	<p>For tasks that have associated jobs, displays the ID of the job associated with the task.</p> <p>You can click the job ID to go to the Jobs page, where you can view the status of the job.</p>
End Time	Displays the date and time at which the execution of the task was completed. This timestamp is stored in UTC time in the database, but is mapped to the local time zone of the client computer.
<b>Raw Audit Log</b>	
Microservice	Displays the name of the microservice that initiated the execution of the task.
Raw Audit Log	Displays all the fields of the audit log that are stored in the database. The raw audit log typically contains additional details or parameters associated with the audit log.

## RELATED DOCUMENTATION

[Audit Logs Overview](#) | 893

## Exporting Audit Logs

You can export audit logs as a comma-separated values (CSV) file that can be opened or edited using an application such as Microsoft Excel. You can view and analyze the exported audit logs, as needed.

To export the audit logs:

1. Select **Administration > Audit Logs**.

The Audit Logs page appears displaying the audit logs.

2. Click **Export**.

The Export Audit Logs page appears.

3. Specify the time period for which you want to export the audit logs according to the guidelines provided in [Table 342 on page 898](#).

**NOTE:** You can export audit logs for a maximum of 30 days prior to the current date and time. For example, if the current date is May 31, 2018, you can export the audit logs starting from May 1, 2018.

4. Click **OK** to export the audit logs.

Depending on the settings of the browser that you are using, the CSV file containing the audit logs for the specified time period is either downloaded directly, or you are asked to open or save the file.

You are returned to the Audit Logs page.

After the file is downloaded, you can open the CSV file in an application such as Microsoft Excel and view and analyze the logs as required.

**Table 342: Fields on the Export Audit Logs Page**

Field	Description
Start Date and Time	Specify the date and time (in MM/DD/YYYY and HH:MM:SS 24-hour or AM/PM formats) from when the audit logs should be exported.
End Date and Time	Specify the date and time (in MM/DD/YYYY and HH:MM:SS 24-hour or AM/PM formats) up to when the audit logs should be exported.

RELATED DOCUMENTATION

- [Audit Logs Overview | 893](#)
- [About the Audit Logs Page | 894](#)
- [Viewing the Details of an Audit Log | 895](#)

Purging Audit Logs (After Archiving or Without Archiving)

You can manage the volume of audit log data stored by purging log files from the CSO database without archiving them or by purging log files after archiving them. You can purge audit logs immediately or schedule the purging for a later date and schedule the purging on a recurring basis.

To purge audit logs after archiving or without archiving them:

1. Select **Administration > Audit Logs**.  
The Audit Logs page appears displaying the audit logs.
2. Click **Purge**.  
The Purge Audit Logs page appears.
3. Complete the configuration according to the guidelines provided in [Table 343 on page 899](#).

**NOTE:** Fields marked with an asterisk (\*) are mandatory.

4. Click **OK**.  
You are returned to the Audit Logs page and one of the following operations occur:
  - If you triggered a purge of the audit logs without archiving, a job to purge the audit logs is created.
  - If you triggered a purge of the audit logs after archiving, a job is created to archive the audit logs and then purge the audit logs after archiving.After the audit logs are purged successfully, the Audit Logs page refreshes automatically and displays only the audit logs that were not purged.

Table 343: Purge Audit Logs Settings

Field	Description
Purge Options	

Table 343: Purge Audit Logs Settings (*continued*)

Field	Description
<b>Purge Logs</b>	<p>Select one of the following options to purge audit logs:</p> <ul style="list-style-type: none"> <li>• Purge audit logs that were generated before a specified date and time—If you select this option, you must enter a date and time in the <b>Before</b> field.</li> <li>• Purge generated audit logs that are older than a specified number of days—If you select this option, you must specify the number of days in the <b>Older than</b> field.</li> </ul>
<b>Before</b>	<p>To purge audit logs before a specified date and time, enter the date (in MM/DD/YYYY format) and time (in HH:MM:SS 24-hour or AM/PM format)</p> <p>You specify the time in the local time zone of the client computer.</p>
<b>Older than</b>	<p>To purge generated audit logs older than a specified number of days, enter the number of days (from 1 through 90)</p>
<b>Archive Logs Before Purging</b>	<p>To archive audit logs <i>before</i> purging them, select this check box. By default, this check box is cleared, which means that audit logs are purged without archiving them.</p> <p><b>CAUTION:</b> If you choose not to archive the audit logs before purging, the audit logs are deleted from the CSO database and cannot be recovered.</p>
<b>Archive Mode</b>	<p>Specify whether you want to archive the log files locally (<b>local</b>) or on a remote server (<b>remote</b>).</p> <p>If you archive the logs on a remote server, which is the default option, you must enter access and login details for the remote server.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Archived log files are saved in a single file in compressed comma-separated values (CSV) format (extension .zip).</li> <li>• When you archive data locally, the archived log files are saved on the central microservices virtual machine (VM).</li> </ul>
<b>Username</b>	Enter a valid username to access the remote server.
<b>Password</b>	Enter a valid password to access the remote server on which the audit logs will be archived.
<b>Confirm Password</b>	For confirmation, re-enter the password to access the remote server.
<b>Remote Server IP Address</b>	Enter the IPv4 address of the remote server; for example, 192.0.2.10.

Table 343: Purge Audit Logs Settings (*continued*)

Field	Description
<b>Remote Server Path</b>	Enter the directory path on the remote server on which to store the archived log files. The directory that you specify must already exist on the remote server.
<b>Schedule Purge</b>	
<b>Type</b>	<p>Specify whether the audit logs should be purged immediately (<b>Run now</b>) or schedule the purge for later (<b>Schedule at a later time</b>).</p> <p>If you schedule the purge for later, enter the date (in MM/DD/YYYY format) and time (in HH:MM:SS 24-hour or AM/PM format) that you want the purge to occur.</p> <p>You specify the time in the local time zone of the client computer.</p>
<b>Recurrence</b>	<p>To specify whether the purge operation should occur on a recurring basis, select this check box.</p> <p><b>NOTE:</b> This option is enabled only if you choose to archive and purge audit logs older than a specified number of days.</p>
<b>Repeat</b>	Specify the periodicity of the recurrence. Currently, a weekly periodicity is the only option supported.
<b>On</b>	For purges that recur every week, specify one or more days on which you want the purge to recur.
<b>Time</b>	<p>Enter the time (in HH:MM:SS 24-hour or AM/PM format) that you want the recurring purge to occur. By default, the purge recurs at 12.00 AM.</p> <p>You specify the time in the local time zone of the client computer.</p>
<b>Ends</b>	<p>Specify whether the recurring purge ends or not:</p> <ul style="list-style-type: none"> <li>• Select <b>Never</b> to continue (without an end date) the recurring purge operation at the specified recurrence interval.</li> <li>• Select <b>On</b> and enter the date (in MM/DD/YYYY format) and time (in HH:MM:SS 24-hour or AM/PM format) on which to stop the recurring purge operation.</li> </ul> <p>You specify the time in the local time zone of the client computer.</p>

## RELATED DOCUMENTATION



# Managing Tenant User Roles

## IN THIS CHAPTER

- [Roles Overview | 903](#)
- [About the Tenant Roles Page | 906](#)
- [Adding User-Defined Roles for Tenant Users | 907](#)
- [Editing, Cloning, and Deleting User-Defined Roles for Tenant Users | 909](#)
- [Access Privileges for Role Scopes \(Service Provider, Tenant, and Operating Company\) | 911](#)

## Roles Overview

### IN THIS SECTION

- [Types of Roles | 903](#)
- [Role Scopes | 904](#)
- [Access Privileges | 905](#)
- [Relationship Between User, Roles, and Access Privileges | 905](#)
- [Benefits of role-based access control \(RBAC\) | 905](#)

A role is a function assigned to a user that defines the tasks that the user can perform within CSO. Each user can be assigned one or more roles depending on the tasks that the user is expected to perform.

User roles enable you to classify users based on the privileges to perform tasks on CSO objects. Roles assigned to a user determine the tasks and actions that the user can perform.

This topic contains the following sections:

### Types of Roles

There are two types of roles: predefined roles and custom roles.

- **Predefined roles**—System-defined roles with a set of predefined access privileges assigned to a user to perform tasks within the CSO application. Predefined roles are created in the system during CSO installation. For more information about predefined roles, see [“Role-Based Access Control Overview” on page 298](#).
- **Custom roles**—Object-based user-defined roles with a set of access privileges assigned to a user to perform tasks within the CSO application. Objects include menu and submenu items (for example, Resources, Devices, Images, and POPs) in the CSO application, from which you can create, edit, clone, and delete objects.

Custom roles can be created by:

- A Service Provider (SP) Administrator, an OpCo Administrator, or a Tenant Administrator.
- An SP user with the Create Role privilege. This user can create custom roles for service provider, tenant, and OpCo users.
- A tenant user with the Create Role privilege. This user can create custom roles for tenant users.
- An OpCo user with the Create Role privilege. This user can create custom roles for both OpCo and tenant users.

You can create custom roles and assign access privileges to each role by using the Roles page (**Administration > Roles**).

You can assign one or more roles to a user when you create or edit a user account. Each role can have one or more access privileges.

## Role Scopes

A role scope defines the specific scope, which is assigned to the role, such as service provider, OpCo, or tenant. An SP Administrator can assign service provider, OpCo, and tenant roles to service provider users and tenant roles to tenant users. A Tenant Administrator can assign tenant roles only to tenant users. A role can have the following scopes:

- **Service provider**—Represents a provider that offers services to other service providers and customers. A service provider could be a global service provider that provides services to its operating companies in different geographical locations. The operating companies act as service providers and provide services to its tenants. An SP Administrator with access privileges can view and access resources across OpCos.
- **Tenant**—Represents a customer that can view, configure, and manage its sites through Customer Portal.
- **Operating Company (OpCo)**—Similar to a service provider that can manage its own tenants. Tenants managed by one OpCo are isolated from tenants of another OpCo. An OpCo can manage all activities related to its own tenants.



## Access Privileges

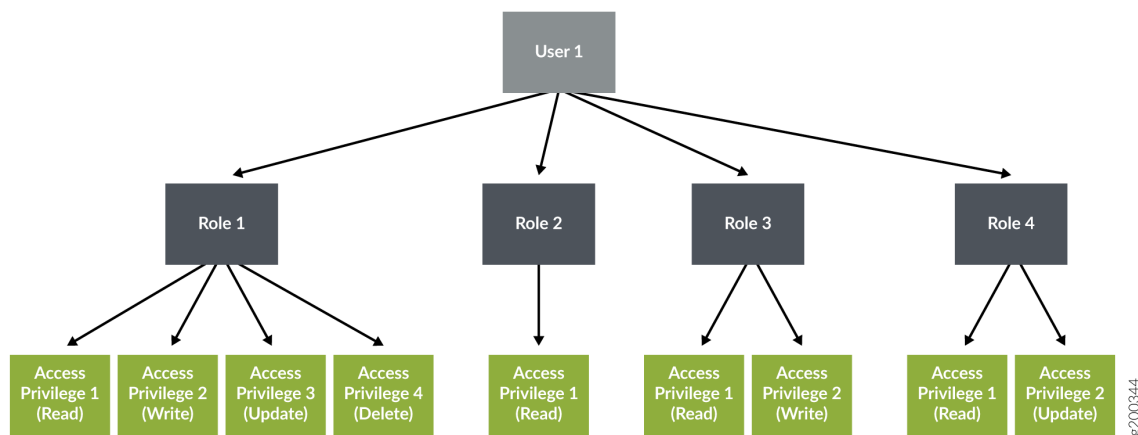
The following access privileges and actions can be assigned to a user role:

- Read
- Create
- Update
- Delete
- Other actions (Example: For device templates object, the following other actions are supported: Clone and Edit Device Template) .

## Relationship Between User, Roles, and Access Privileges

Figure 11 on page 320 shows the relationship between a user, user roles, and access privileges. A user can have one or more roles and each role can have one or more access privileges.

Figure 18: Relationship Between User, Roles, and Access Privileges



## Benefits of role-based access control (RBAC)

- CSO provides pre-defined and user-defined set of roles for day-to-day system operations on the unified Administration and Customer portal.
- Controls which system users can view, read, write, and execute objects based on certain business and operation needs.
- Provides granular level access control on CSO objects within each navigation menu.

- Helps service providers in upselling advanced features to their tenants as a power user.
- CSO supports RBAC and authenticate users using local authentication and the external Single Sign On (SSO) server.

RELATED DOCUMENTATION

<a href="#">About the Tenant Roles Page   906</a>
<a href="#">Adding User-Defined Roles for Tenant Users   907</a>
<a href="#">Editing, Cloning, and Deleting User-Defined Roles for Tenant Users   909</a>

## About the Tenant Roles Page

To access this page, select **Administration > Roles** in the Customer Portal.

You can use the Roles page to view a list of predefined (system-defined) and custom (user-defined) roles that can be assigned to tenant users. You can create, edit, or delete custom roles and clone both custom and predefined roles.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a custom role for the tenant users. See [“Adding User-Defined Roles for Tenant Users” on page 907](#).
- Edit, clone, or delete a custom role. See [“Editing, Cloning, and Deleting User-Defined Roles for Tenant Users” on page 909](#).

### Field Descriptions

[Table 344 on page 906](#) describes the fields on the Roles page.

Table 344: Fields on the Roles Page

Field	Description
Role Name	Displays the name of the role.
Role Scope	Displays the scope of the role.
Role Type	Displays whether the role is a predefined role or a custom role.

Table 344: Fields on the Roles Page (continued)

Field	Description
Created By	Displays the name of the user that created the role.

RELATED DOCUMENTATION

<a href="#">Roles Overview   903</a>
<a href="#">Role-Based Access Control Overview   885</a>
<a href="#">Adding User-Defined Roles for Tenant Users   907</a>
<a href="#">Editing, Cloning, and Deleting User-Defined Roles for Tenant Users   909</a>

## Adding User-Defined Roles for Tenant Users

Use the Add Role page to create custom (user-defined) roles and assign access privileges (read, create, update, delete, and other actions) to the tenant user roles.

A Tenant Administrator or a user with the Create Role privilege can create custom roles for tenant users.

To create a custom role:

1. Select **Administration > Roles** in Customer Portal.  
The Roles page appears.
2. Click the add icon (+) to create a new role.  
The Add Role page appears.
3. Complete the configuration according to the guidelines provided in [Table 345 on page 907](#).
4. Click **OK**.  
A new role is created and listed on the Roles page.

Table 345: Fields on the Add Role Page

Field	Description
Role Name	Enter a unique role name. The name can contain alphanumeric characters, underscore, period, and space.

Table 345: Fields on the Add Role Page (continued)

Field	Description
Description	Enter a description for the role.
Role scope (Visibility)	<p>Select the scope of the role.</p> <p>If you select the scope as Tenant, then the Privileges section of the page displays all the objects of Customer Portal.</p>
Privileges	<p><b>All Objects</b>—Displays the objects of the Customer Portal. You must select the check box against each object and then select the type of privileges (read, create, update, delete, and other actions (schedule, deploy, reboot, activate, retry, schedule update, schedule delete, and so on)) that you want to assign the user for the selected object. You can select one or more access privileges to assign to the tenant user role.</p> <p><b>NOTE:</b> You must assign at least one access privilege to a role.</p> <p>If you select the first-level objects, the submenu items that belong to the main object and the corresponding access privileges are selected by default.</p> <p>The following access privileges can be assigned to a user role:</p> <ul style="list-style-type: none"> <li>• <b>Read</b>—Enables the user to read existing objects.</li> <li>• <b>Create</b>—Enables the user to create new objects.</li> <li>• <b>Update</b>—Enables the user to modify existing objects.</li> <li>• <b>Delete</b>—Enables the user to delete existing objects.</li> </ul> <p>You can also assign other actions to tenant roles. The other actions include retry, schedule update, schedule delete, activate, reboot, push license, RMA, deploy, schedule, start, disable, deploy, move, run, send, preview, renew, configure, and download.</p>

## RELATED DOCUMENTATION

[Roles Overview | 903](#)

[Role-Based Access Control Overview | 885](#)

[About the Tenant Roles Page | 906](#)

[Editing, Cloning, and Deleting User-Defined Roles for Tenant Users | 909](#)

## Editing, Cloning, and Deleting User-Defined Roles for Tenant Users

### IN THIS SECTION

- [Editing Roles | 909](#)
- [Cloning Roles | 910](#)
- [Deleting Roles | 910](#)

You can edit and delete custom (user-defined) roles for tenant users from the Roles page. This topic has the following sections:

**NOTE:** You cannot modify or delete the predefined roles.

### Editing Roles

To modify the parameters configured for a role.

1. Select **Administration > Roles**.

The Roles page appears, displaying the existing role names.

2. Select the role that you want to edit and click the edit icon (pencil) to modify the parameters.

The Edit Role page appears. The fields on the Edit Role page are available for editing.

**NOTE:** You cannot modify the role name and role scope.

3. Modify the role description and privileges as needed.

4. Click **OK** to save the changes.

A confirmation message appears, indicating the status of the edit operation.

## Cloning Roles

You can clone a role (both custom and predefined) when you want to quickly create a copy of an existing role and modify its access privileges.

**NOTE:** You cannot modify the role name and role scope.

1. Select **Administration > Roles**.

The Roles page appears, displaying the existing role names.

2. Select the role that you want to clone and then click the **Clone** button at the top-right corner of the page.

The Clone Role: *Role-Name* page appears.

3. Specify an appropriate name for the new clone role.

4. Click **OK** to save your changes.

A confirmation message appears, indicating the status of the clone operation.

The name of the clone role is displayed on the Roles page.

5. Select the new clone role and click the edit icon (pencil) to modify its parameters.

The Edit Role page appears.

6. Select the objects, and modify the access privileges of the role, as needed.

7. Click **OK** to save your changes.

A confirmation message appears, indicating the status of the edit operation.

## Deleting Roles

To delete a role name:

1. Select **Administration > Roles**.

The Roles page appears, displaying the existing role names.

2. Select the role name that you want to delete and then click the delete icon (X).

An alert message appears, asking you to confirm the delete operation.

3. Click **Yes** to delete the selected role name.

A confirmation message appears, indicating the status of the delete operation.

RELATED DOCUMENTATION

<a href="#">About the Roles Page   321</a>
<a href="#">Adding User-Defined Roles for Service Provider, OpCo, and Tenant Users   322</a>

**Access Privileges for Role Scopes (Service Provider, Tenant, and Operating Company)**

This topic describes the access privileges for the service provider, tenant, and Operating company (OpCo) role scopes. For more information about roles and role scopes, see [“Roles Overview” on page 903](#).

[Table 126 on page 327](#) shows the access privileges for service provider scope.

[Table 127 on page 330](#) shows the access privileges for operating company scope.

[Table 128 on page 332](#) shows the access privileges for tenant scope.

Table 346: Access Privileges for Service Provider Scope

Role Scope	Menu Name	Actions	Other Actions
Service Provider	SP Geo Map	Read	-
	Tenants SLA Performance	Read	-
	Alerts	Read and Delete	-
	Alarms	Read and Delete	-
	SD-WAN Alerts Definitions	Read, Create, Update, and Delete	-
	Security Alert Definitions	Read	-
	Jobs	Read	Retry Schedule Update Schedule Delete
	POPs	Read, Create, Update, and Delete	-
	Cloud Hub Devices	Create, Read, and Delete	Activate Upgrade Reboot



Table 346: Access Privileges for Service Provider Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Tenant Devices	Read	Reboot Push License
	Device Templates	Read, Create, Update, and Delete	Clone Edit Template
	Images	Read, Create, and Delete	Deploy Upgrade History
	Flex Services	Read, Create, Update, and Delete	-
	Application SLA Profiles	Read, Create, Update, and Delete	-
	Application Traffic Type Profiles	Read, Create, Update, and Delete	-
	Network Services	Read	Allocate Detach
	Tenants	Read, Create, Update, and Delete	-
	OpCos	Read, Create, Update, and Delete	-
	Users	Read, Create, Update, and Delete	-
	Audit Logs	Read	-
	Roles	Read, Create, Update, and Delete	-
	Authentication	Read, Create, Update, and Delete	-
	Licenses	Read, Create, Update, and Delete	Push
	Signature Database	Read	Settings Download
	SMTP	Read and Update	-

Table 346: Access Privileges for Service Provider Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Email Templates	Read and Update	-
	Preferences	Read and Update	-
	Getting Started	Read	-
	What's New	Read	-
	Help Center	Read	-
	FAQ	Read	-
	Release Notes	Read	-
	About	Read	-

Table 347: Access Privileges for Operating Company Scope

Role Scope	Menu Name	Actions	Other Actions
Operating company (OpCo)	SP Geo Map	Read	-
	Tenants SLA Performance	Read	-
	Alerts	Read and Delete	-
	Alarms	Read	-
	SD-WAN Alerts Definitions	Read	-
	Security Alert Definitions	Read	-
	Jobs	Read	Retry Schedule Update Schedule Delete
	POPs	Read	-
	Cloud Hub Devices	Read	-
	Tenant Devices	Read	-
	Device Templates	Read, Create, Update, and Delete	Clone Edit Template
	Images	Read	-
	Application SLA Profiles	Read, Create, Update, and Delete	-
	Application Traffic Type Profiles	Read	-
	Tenants	Read, Create, Update, and Delete	-
	Users	Read, Create, Update, and Delete	-

Table 347: Access Privileges for Operating Company Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Roles	Read, Create, Update, and Delete	-
	Authentication	Read, Create, Update, and Delete	-
	Licenses	Read, Create, Update, and Delete	Push License
	Signature Database	Read	-
	SMTP	Read, Create, Update, and Delete	-
	Email Templates	Read and Update	-
	Getting Started	Read	-
	What's New	Read	-
	Help Center	Read	-
	FAQ	Read	-
	Release Notes	Read	-
	About	Read	-

Table 348: Access Privileges for Tenant Scope

Role Scope	Menu Name	Actions	Other Actions
Tenant	Tenant GeoMap	Read	-
	Link Switch Events	Read	-
	Jobs	Read	Retry Schedule Update Schedule Delete
	SD-WAN Alert Definitions	Read	-
	Security Alert Definitions	Read, Create, Update, and Delete	-
	Alerts	Read and Delete	Jump to Event Viewer
	Alarms	Read and Delete	
	Security Events	Read	Manage Filter Create Alert Create Report
	Application Visibility	Read	-
	Threats Map (Live)	Read	-
	Application SLA Performance	Read	-
	Devices	Read	Activate Push License Reboot RMA
	Images	Read	-
	Deployments	Read	

Table 348: Access Privileges for Tenant Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
			Deploy Schedule
	Network Services	Read, Update, and Delete	Start Disable
	SD-WAN Policy	Read and Update	Deploy
	Tenant Application SLA Profiles	Read, Create, Update, and Delete	-
	Firewall Policy	Read, Create, Update, and Delete	Deploy
	SSL Policy	Read, Create, Update, and Delete	Deploy
	NAT	Read, Create, Update, and Delete	Deploy
	UTM	Read, Create, Update, and Delete	-
	Schedule	Read, Create, Update, and Delete	-
	Address	Read, Create, Update, and Delete	-
	Department	Read, Create, and Delete	-
	Service	Read, Create, Update, and Delete	-
	Application Signature	Read, Create, Update, and Delete	-
	Site Management	Read, Create, and Delete	Configure Upgrade
	Site Groups	Read, Create, Update, and Delete	
	Site LAN Segment	Read, Create, and Delete	Deploy Deploy History Re-assign

Table 348: Access Privileges for Tenant Scope (continued)

Role Scope	Menu Name	Actions	Other Actions
	Report Definitions - Security	Read, Create, Update, and Delete	Run/Preview Send
	Report Definitions - SD-WAN	Read, Create, Update, and Delete	Run/Preview Send
	Generated Reports -Security	Read and Delete	-
	Generated Reports SD-WAN	Read and Delete	-
	Users	Read, Create, Update, and Delete	-
	Roles	Read, Create, Update, and Delete	-
	Licenses	Read, Create, Update, and Delete	Push License
	Tenant Signature Database	Read	Install
	Certificates	Read, Create, Update, and Delete	-
	VPN Authentication	Read	Renew
	Identity Management	Read and Update	-
	Getting Started	Read	-
	What's New	Read	-
	Help Center	Read	-
	FAQ	Read	-
	Release Notes	Read	-
	About	Read	-

## RELATED DOCUMENTATION

[About the Tenant Roles Page | 906](#)

[Role-Based Access Control Overview | 885](#)



# Managing Dynamic VPN Tunnels

## IN THIS CHAPTER

- [Dynamic VPN Tunnels Overview | 922](#)
- [Configuring Dynamic VPN Tunnels Thresholds for all Sites in a Tenant | 923](#)
- [Adding On-Demand VPN Tunnels | 925](#)
- [Deleting On-Demand VPN Tunnels | 926](#)

## Dynamic VPN Tunnels Overview

cp-about-vpn-threshold

In releases earlier than CSO 4.1.0, static tunnels are established between spoke sites during the Zero Touch Provisioning (ZTP) process.

Starting with Release 4.1.0, during ZTP only the following static tunnels are established:

- Between an on-premise spoke site and the corresponding gateway site
- Between an on-premise spoke site and hub (Primary hub or secondary hub)
- Between two gateway sites

Therefore, the communication between two on-premise spoke sites is established only through the gateway site or the hub.

CSO can dynamically create or delete a VPN tunnel between two spoke sites (without passing through a gateway site or hub), if:

- The number of sessions closed between two spoke sites crosses the threshold value, and
- The WAN links of spoke sites have matching mesh tags.

**NOTE:** This feature is applicable only for SD-WAN sites in Real Time-Optimized mode (Full mesh).

The default threshold value for creating a dynamic VPN tunnel (maximum number of sessions closed in a two-minute duration) is 5. The default threshold value for deleting a dynamic VPN tunnel (minimum number of sessions closed in a 15-minute duration) is 2.

The tenant administrator can modify the default threshold value on the following pages:

- The **Administration > Dynamic VPN** page of Customer portal (Global Level)
- The Add On-Premise Spoke Site page (Site-level)
- The Add Gateway Site page (Site-level)

The threshold value that you specify at site-level takes precedence over the global-level threshold values.

That is, the threshold value that you specify on the Add Site page (On-premise or gateway) overrides the threshold value that you specified on the Dynamic VPN page of Customer Portal.

CSO also provides the flexibility for the tenant administrator to create or delete dynamic VPN tunnels between a source site and a destination site by using the CSO GUI in Customer Portal.

## RELATED DOCUMENTATION

| [Configuring Dynamic VPN Tunnels Thresholds for all Sites in a Tenant](#) | 923

## Configuring Dynamic VPN Tunnels Thresholds for all Sites in a Tenant

CSO dynamically creates or deletes a VPN tunnel (that does not pass through a gateway site or hub) between two spoke sites, if the following conditions are met:

- The number of sessions closed between two spoke sites crosses the threshold value.
- The WAN links of the spoke sites have matching mesh tags.

For more information on dynamic VPN tunnels, see [“Dynamic VPN Tunnels Overview” on page 922](#).

**NOTE:** The Dynamic VPN page appears only for tenants with real-time optimized SD-WAN mode.

To modify threshold values at the tenant-level:

1. Select **Administration** > **Dynamic VPN**.

The Dynamic VPN page appears.

2. Complete the configuration according to the guidelines [Table 349 on page 924](#).

**NOTE:** Fields marked with \* are mandatory.

3. Click **Save** to save the changes.

A confirmation message appears indicating that the threshold values are saved and you are returned to the Dynamic VPN page.

The threshold values that you specify are immediately applicable for all sites (including gateway sites or enterprise hubs) in the tenant.

**NOTE:** You can also modify the threshold values while adding a spoke site or a enterprise hub site. The threshold value that you specify on the Add Site page (On-premise or gateway site) overrides the threshold value that you specified on the Dynamic VPN page of the Customer Portal.

**Table 349: Fields on the Dynamic VPN page**

Field	Description
Threshold	Select this check box to customize the dynamic VPN threshold value that will override threshold value specified at the global level (for all tenants).
Threshold for Creating a Tunnel	
Sessions Closed	<p>Specify the number of sessions closed (for a duration of 2 minutes) between two spoke sites.</p> <p>If the number of sessions closed (for a duration of 2 minutes) is greater than or equal to the value that you specified, a dynamic VPN tunnel is created between two spoke sites.</p> <p>The default threshold value (the number of sessions closed for 2 minutes) is 5.</p> <p>For example, if you specify the number of sessions closed as 10, dynamic VPN tunnels are created if the number of sessions closed between two spoke sites in 2 minutes is greater than or equal to 10.</p>
Threshold for Deleting a Tunnel	
Sessions Closed	<p>Specify the number of sessions closed (for a duration of 15 minutes) between two spoke sites.</p> <p>If the number of sessions closed (for a duration of 15 minutes) is lesser than or equal to the value that you specified, a dynamic VPN tunnel is deleted between two spoke sites.</p> <p>The default threshold value (the number of sessions for 15 minutes) is 2.</p> <p>For example, if you specify the number of sessions closed as 10, dynamic VPN tunnels are deleted if the number of sessions closed between two spoke sites in 15 minutes is less than or equal to 10.</p>

## RELATED DOCUMENTATION

[Dynamic VPN Tunnels Overview](#) | 922

## Adding On-Demand VPN Tunnels

An SP administrator or the Tenant administrator can create a VPN tunnel between a source site and destination site by using the CSO GUI in Customer Portal.

To create a VPN tunnel between the source site and a destination site:

1. Select **Sites> Site Management**.

The Sites page appears.

2. Click the site to which you want to add VPN tunnels.

The *SiteName* page appears.

3. On the WAN tab, click +.

The Add On-Demand VPN Tunnel page appears.

4. Complete the configuration according to the guidelines [Table 350 on page 925](#).

5. Click **Ok** to save the changes. If you want to discard the changes, click **Cancel** instead.

A tunnel is created between the source site and a destination site.

**Table 350: Fields on the On-demand VPN Tunnel page**

Field	Description
Add Tunnel Threshold	
Source Site	Displays the name of the source site.
Destination Site	Select the destination site from the list.
Delete Tunnel	
Displays the threshold value (sessions closed) below which a tunnel is deleted between two sites.	
Enable Threshold	By default, this toggle button is disabled. That is, even if the threshold value (sessions closed) is met, CSO does not delete VPN tunnels. You have to manually delete the VPN tunnel that you created.
Sessions Closed	Displays the number of sessions closed for 15 minutes.

RELATED DOCUMENTATION

| [Dynamic VPN Tunnels Overview](#) | [922](#)

## Deleting On-Demand VPN Tunnels

An SP administrator or the Tenant administrator can delete a VPN tunnel between a source site and destination site by using the CSO GUI in Customer Portal.

To delete a VPN tunnel between a source site and a specific destination site:

1. Select **Sites> Site Management**.  
The Sites page appears.
2. Click the site from which you want to delete VPN tunnels.  
The *SiteName* page appears.
3. On the WAN tab, click **+**.  
The Delete On-Demand VPN Tunnel page appears.
4. Complete the configuration according to the guidelines [Table 351 on page 926](#).
5. Click **Ok** to save the changes. If you want to discard the changes, click **Cancel** instead.  
A VPN tunnel is deleted between the source site and a specific destination site.

Table 351: Fields on the Delete On-Demand VPN Tunnel page

Field	Description
Delete Tunnel Threshold	
Source Site	Displays the name of the source site.
Destination Site	Select the destination site from the list.
Delete Tunnel	
Displays the threshold value (sessions closed) below which a tunnel is deleted between two spokes.	

Table 351: Fields on the Delete On-Demand VPN Tunnel page *(continued)*

Field	Description
Enable Threshold	By default, this toggle button is disabled. That is, even if the threshold value (sessions closed) is met, CSO does not create VPN tunnels. You have to manually create the VPN tunnel that you deleted.
Sessions Closed	Displays the number of sessions closed for 2 minutes. .

RELATED DOCUMENTATION

[Dynamic VPN Tunnels Overview](#) | 922

# Licenses

IN THIS CHAPTER

- [About the Licenses Page | 928](#)

## About the Licenses Page

To access this page, click **Administration > Licenses**.

You can use the Licenses page to view information about uploaded licenses for virtual network services from your local file system. The license key is required to enable application-based routing, application monitoring, and other vSRX security features.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View details about a license. Click the details icon that appears when you hover over the name of an image or click **More > Details**. See [“Viewing Object Details” on page 385](#).
- Show or hide columns about the license. See [“Sorting Objects” on page 384](#).
- Search an object about the license. See [“Searching for Text in an Object Data Table” on page 385](#).

### Field Descriptions

[Table 352 on page 928](#) describes the fields on the License Files page.

Table 352: Fields on the License Files Page

Field	Description
License Name	View the filename of the license.  Example: license_Image_v1



Table 352: Fields on the License Files Page (*continued*)

Field	Description
Build	View the build name of the license.  Example: 1
Version	View the version number of the license.  Example: 1.1
Vendor	View the vendor name of the license.  Example: Juniper Networks
Family	Select the device family of the license.  Example: SRX
Model	View the model number of the license.  Example: 1
Description	View the description of the license.  Example: The license is applicable for SRX340 device.
Uploaded By	View the administrator who uploaded the license.  Example: test_admin
Last Uploaded	View the date and time when the license was uploaded.  Example: 11/18/2016 19:15

## RELATED DOCUMENTATION

[Viewing Object Details](#) | 16

# Signature Database

## IN THIS CHAPTER

- [Signature Database Overview | 930](#)
- [About the Active Database Page | 931](#)
- [Installing Signatures | 932](#)

## Signature Database Overview

The Application Firewall signature database includes signature definitions of attacks and applications that can be used to identify applications for tracking firewall policies and quality-of-service (QoS) prioritization.

Contrail Service Orchestration (CSO) enables you to download the signature database. During a download, the complete signature database is downloaded, and the download might take some time to complete. You can track the progress of the download by using job details.

All of the downloaded signatures are created as a default project in read-only mode. The configurations that are downloaded are also saved as a default project.

## RELATED DOCUMENTATION

[About the Active Database Page | 931](#)

[Installing Signatures | 932](#)

## About the Active Database Page

To access this page, select **Administration > Signature Database**. The **Active Database** page appears.

Use the **Active Database** page to download and install the Application Firewall signature database to security devices. This database includes signature definitions of attacks and applications that can be used to identify applications for tracking firewall policies, SD-WAN flows, and QoS prioritization.

### Tasks You Can Perform

You can perform the following task from this page:

- Install signatures. See [“Installing Signatures” on page 932](#).

### Field Descriptions

The **Active Database** page provides an overall, high-level view of your signature database settings. The **Latest List of Signatures** table provides a search option that you can use to search for the signature you want. [Table 353 on page 931](#) describes the fields on this page.

Table 353: Fields on the Active Database Page

Field	Description
<b>Active Database</b>	
Database Version	Version of signature database.
Publish Date	Date when the signature database was published.
Update Job	Job ID of the last successful download signatures job.
Installed Device Count	Number of devices installed.
Detectors	Version number of the protocol detector currently running on the device.
Action	Install signature database configuration.
<b>Latest List of Signatures</b>	
Database Version	Version of latest signature database.
Publish Date	Date when the signature database was published.

Table 353: Fields on the Active Database Page (*continued*)

Field	Description
Update Summary	List of updated signature details for the selected database.
Detectors	Version number of the protocol detector currently running on the device.
Action	Full Download—Download the complete signature database; the download might take a while to complete.

## RELATED DOCUMENTATION

[Signature Database Overview | 930](#)
[Installing Signatures | 932](#)

## Installing Signatures

After the signature database is downloaded, you can install the active database.

To install the signature database:

1. Select **Administration > Signature Database**.

2. Click **Install Signatures**.

The **Install Signatures** page appears.

3. You can view the summary of active signature database version, which will be installed on your device.

4. Click the check box next to the devices on which you want to install the signature database.

You can also search, sort, or filter this information.

5. Select **Run now** to set the signature database to automatically install immediately.

6. Select **Schedule at a later time** to set the signature database to automatically download at the specified time and to take the following actions:

- a. Choose a date by clicking the date picker icon.

- b. Enter the time.
- c. Select the time format from the drop-down list.

7. Click **OK**.

The signature database installation is complete.

#### RELATED DOCUMENTATION

[Signature Database Overview | 930](#)

[About the Active Database Page | 931](#)

# Managing Certificates

## IN THIS CHAPTER

- [Certificates Overview | 934](#)
- [About the Certificates Page | 935](#)
- [Importing a Certificate | 936](#)
- [Installing and Uninstalling Certificates | 939](#)
- [About the VPN Authentication Page | 940](#)

## Certificates Overview

SSL uses public-private key technology that requires a private key paired with an authentication certificate for the SSL service. An SSL certificate includes identifying information such as a public key and a signature issued by a certificate authority (CA).

CAs are entities that validate identities and issue certificates. A CA can issue multiple certificates in the form of a tree structure. A root certificate is the topmost certificate of the tree, the private key of which is used to sign other certificates. All certificates immediately below the root certificate inherit the signature or trustworthiness of the root certificate. This is somewhat like the notarizing of an identity. You can configure a root CA certificate by first obtaining a root CA certificate (by either generating a self-signed one or importing one) and then applying it to an SSL proxy profile.

**NOTE:** SSL certificates are used for the SSL forward proxy feature in CSO.

## RELATED DOCUMENTATION

[SSL Forward Proxy Overview | 687](#)

[About the SSL Proxy Profiles Page | 704](#)

## About the Certificates Page

To access this page, select **Administration > Certificates** in Customer Portal.

Use this page to view and manage SSL certificates. You can import a root certificate or a trusted certificate (directly from a file or by pasting the content) and install a certificate on a site.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View information about the existing certificates; see [Table 354 on page 935](#).
- Import a certificate—Select **More > Import Certificate**. See [“Importing a Certificate” on page 936](#).
- View the sites on which a certificate is installed—Select a certificate and then select **More > View Installed Sites**.

The View Installed Sites page appears, displaying the list of sites on which the selected certificate is installed. Click **OK** to close the page and return to the Certificates page.

- Install a certificate on a site—Select a certificate and then select **More > Install Certificate**. See [“Installing and Uninstalling Certificates” on page 939](#).
- Uninstall a certificate from a site—Select a certificate and then select **More > Uninstall Certificate**. See [“Installing and Uninstalling Certificates” on page 939](#).
- View details about a certificate—Select a certificate and then select **More > Detailed View**. The Detailed View page appears. See [Table 355 on page 936](#) for an explanation of fields on this page.

### Field Descriptions

[Table 354 on page 935](#) displays the fields on the Certificates page.

Table 354: Fields on the Certificates Page

Field	Description
Certificate Name	Name of the certificate.
Type	Type of the certificate: <ul style="list-style-type: none"><li>• Root certificate</li><li>• Trusted certificate</li></ul>
Description	Description of the certificate.

Table 355: Fields on the Detailed View Page

Field	Description
Certificate Name	See <a href="#">Table 354 on page 935</a> .
Type	See <a href="#">Table 354 on page 935</a> .
Valid From	Date and time (UTC) from which the certificate is valid.
Valid Upto	Date and time (UTC) until which the certificate is valid.
Serial Number	Serial number of the certificate.
Signature Algorithm	Algorithm used to sign the certificate.
Issuer Details	Details of the authority that issued the certificate, including details such as name, country, organization, and so on.
Version	X.509 version of the certificate.

## RELATED DOCUMENTATION

[About the SSL Proxy Profiles Page](#) | 704

## Importing a Certificate

You can import an SSL certificate (directly from a file or by pasting the content) from the Import Certificate page.

**NOTE:** If you want to use the SSL proxy feature, you must import at least one root certificate for a tenant; the certificate can be used in one or more sites.



To import a certificate:

1. Select **Administration > Certificates** in Customer Portal.

The Certificates page appears.

2. Select **More > Import Certificate**.

The Import Certificate page appears.

3. Complete the configuration according to the guidelines provided in [Table 356 on page 937](#).

**NOTE:** Fields marked with \* are mandatory.

4. Click **OK** to import the certificate.

You are taken to the Certificates page. If the certificate content that you imported is validated successfully, a confirmation message is displayed; if not, an error message is displayed.

After importing a certificate, you can use it when you create an SSL proxy profile.

**Table 356: Import Certificate Settings**

Setting	Guideline
<b>Certificate Name</b>	Enter the certificate name, which must be a unique string of alphanumeric characters and some special characters ( _ -). No spaces are allowed and the maximum length is 32 characters.
<b>Certificate Type</b>	Select an option to specify whether the certificate that you are importing is a root certificate ( <b>Root CA</b> ) or a trusted certificate ( <b>Trusted CA</b> ).
<b>Passphrase</b>	Enter the passphrase to protect the private key or key pair of the Privacy-Enhanced Mail (PEM) certificate file.
<b>Description</b>	Enter a description for the certificate.
<b>Certificate Content</b>	Select an option to specify whether you want to import the certificate content from a file or whether you want to paste the certificate content.

Table 356: Import Certificate Settings (continued)

Setting	Guideline
Paste Certificate Content	<p>Depending on the method you choose in the preceding field, do one of the following:</p> <ul style="list-style-type: none"> <li>Import the certificate content directly from a file—Click <b>Browse</b>, and in the File Upload dialog, select a file and click <b>Open</b>. The filename of the file that you uploaded is displayed.</li> <li>Paste the certificate content directly from a file—Copy the certificate content from the file and paste it in the text box.</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>The following certificate file extensions are supported: <b>.cert</b>, <b>.pem</b>, and <b>.txt</b>.</li> <li>The certificate content must be in the X.509 ASCII format.</li> <li>If the certificate type is <b>Root CA</b>, then the both the certificate content and private key must be specified.</li> </ul>

The following is an example of root certificate content.

```

-----BEGIN PRIVATE KEY-----
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
-----END PRIVATE KEY-----
-----BEGIN CERTIFICATE-----
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
-----END CERTIFICATE-----

```

RELATED DOCUMENTATION

## Installing and Uninstalling Certificates

### IN THIS SECTION

- [Installing a Certificate | 939](#)
- [Uninstalling a Certificate | 940](#)

You can install and uninstall certificates from the Certificates page. This topic has the following sections:

### Installing a Certificate

Use the Install Certificate page to install certificates on one or more sites.

To install a certificate on one or more sites:

1. Select **Administration > Certificates** in Customer Portal.

The Certificates page appears, displaying the existing certificates.

2. Select the certificate that you want to install, and then select **More > Install Certificate**. Alternatively, right-click a certificate and select **Install Certificate**.

The Install Certificate page appears, displaying a list of sites.

3. Select the sites on which you want to install the certificate.
4. Click **Install** to install the certificate on the selected sites.

You are taken to the Certificates page. A job is created and a confirmation message appears with the ID of the job. Click the job ID to go to the Jobs page, where you can view the status of the job.

## Uninstalling a Certificate

If a certificate's validity has expired or if you want to remove a certificate from a site, you can uninstall the certificate from that site.

To uninstall a certificate from one or more sites:

1. Select **Administration > Certificates** in Customer Portal.

The Certificates page appears, displaying the existing certificates.

2. Select the certificate that you want to uninstall, and then select **More > Uninstall Certificate**.  
Alternatively, right-click a certificate and select **Uninstall Certificate**.

The Uninstall Certificate page appears, displaying only those sites on which the certificate was previously installed.

3. Select the sites from which you want to uninstall the certificate.

4. Click **Uninstall** to uninstall the certificate from the site.

You are taken to the Certificates page. A job is created and a confirmation message appears with the ID of the job. Click the job ID to go to the Jobs page, where you can view the status of the job.

### RELATED DOCUMENTATION

| [Importing a Certificate](#) | 936

## About the VPN Authentication Page

To access this page, select **Administration > Certificate Management > VPN Authentication** in Customer Portal.

Use this page to change the method of renewing public key infrastructure (PKI) certificates for a tenant, view PKI certificates for a specific site, update the CRL URL for a PKI certificate, renew a PKI certificate, and change the method of renewing a PKI certificate for a specific site.

### Task You Can Perform

You can perform the following tasks from this page:

- View information about the existing certificates. See [Table 357 on page 941](#).
- Change the method of renewing public key infrastructure (PKI) certificates for a tenant by clicking the **Change** link.

**NOTE:** You can change the default settings of the **Auto Renew** and **Renew before expiry** fields on the VPN Authentication page only if the **Auto Renew** toggle button for a tenant is enabled.

- Update the CRL URL—Select a certificate and then select **Update CRL URL**. The Edit Tenant Certificate CRL page appears. Update the CRL URL and click **OK**.
- Manually renew a certificate on a site—Select a certificate and then select **Renew Certificate**. The Confirm Renew Certificate page appears. Click **Yes** to manually renew the certificate.
- Change the renewal method of a certificate on all sites in a tenant—Select a certificate and then select **Change Renewal Method**. Choose the renewal method (Set Auto Renew or Set Manual Renew). The Edit Certificate Renew Method page appears. Click **Yes** to change the renewal method.

**NOTE:** At the tenant-level if you have set the renewal method as Manual Renew, you cannot change the renewal method to Auto Renew at the site-level. That is, the renewal method can be changed at the site-level only if you have set the renewal method as Auto Renew at the tenant-level.

## Field Descriptions

[Table 357 on page 941](#) displays the fields on the VPN Authentication page.

**Table 357: Fields on the VPN Authentication Page**

Field	Description
<b>Certificate ID</b>	ID of the PKI certificate.
<b>Used In</b>	Displays the site name to which the PKI certificate is associated.
<b>Device</b>	Displays the device name to which the PKI certificate is associated.
<b>Status</b>	Displays the remaining time duration for the certificate to expire.  For example, <b>Less than 2 weeks before expiry</b> .

Table 357: Fields on the VPN Authentication Page (*continued*)

Field	Description
<b>Expires On</b>	Date and time at which the PKI certificate expires.
<b>Renewal Method</b>	Displays the renewal method of a PKI certificate: <ul style="list-style-type: none"><li>• Auto</li><li>• Manual</li></ul>

# Managing Juniper Identity Management Service

## IN THIS CHAPTER

- [Juniper Identity Management Service Overview | 943](#)
- [About the Identity Management Page | 946](#)
- [Configuring CSO and JIMS Connection | 947](#)
- [Configuring JIMS for an SRX Device | 949](#)

## Juniper Identity Management Service Overview

### IN THIS SECTION

- [Access Token Query | 944](#)
- [Batch or Periodic Query | 944](#)
- [IP Address Query | 945](#)
- [User Mapping Query | 945](#)

Juniper Identity Management Service (JIMS) provides a robust and scalable user identification and IP address mapping implementation that includes endpoint context and machine ID. JIMS collects user identity information from different authentication sources, for SRX Series devices.

JIMS collects user identity information from a configured Active Directory and makes it available to SRX Series devices or vSRX instances. You can download and install Juniper Identity Management Service (JIMS), configure the CSO client on JIMS to obtain user identity information from the configured Active Directory, and use CSO and JIMS to manage user-based firewall policy intents on SRX Series devices and vSRX instances.

The SRX Series devices communicate with JIMS through HTTP or HTTPS connection. Use HTTP connection for debugging and HTTPS for deployments. SRX Series devices consist of primary and secondary JIMS configurations. These devices must always query the primary JIMS. The secondary JIMS is available as a

fall back option with limited resources. The secondary JIMS must be used when the HTTP GET query or a number of queries to the primary JIMS fails. SRX Series devices constantly scrutinize the failed primary JIMS and revert to the primary JIMS, once it is up and running.

When you request a JIMS report, the SRX Series device specifies the timestamp. JIMS forms an HTTPS response from the earliest known report since the requested timestamp. SRX Series devices request for the maximum number of reports to include in the response from JIMS. Along with the requested reports, JIMS always returns a cookie. In the subsequent requests to JIMS, SRX Series devices include cookies instead of timestamp to indicate the same context, same beginning timestamp, and to resume the same response from where it has stopped the previous time.

**NOTE:**

- IP and user mapping information might be inaccurate, if the user identities in JIMS are cleared, delayed, or missing.
- SRX firewall authentication can also push the authentication entries to JIMS.

The SRX Series device communicates with JIMS through HTTP or HTTPS messages to obtain the access token and query for user identities. The following different query modes are available and all queries can happen simultaneously.

### Access Token Query

JIMS requires OAuth 2.0 protocol to authenticate or authorize. The SRX Series device user query function requires an access token to query the JIMS server. The SRX Series device uses the client credentials such as client ID and client secret to obtain an access token. These parameters must be consistent with the API client configured on JIMS.

### Batch or Periodic Query

At the beginning, SRX Series device sends the batch queries to JIMS sequentially to obtain all the expected user identities. When there are no more entries in JIMS, SRX Series device periodically queries for the newly generated reports with the configured interval.

The timestamp is mentioned in the query to restart the response. The timestamp is expected in the query under the following circumstances:

- SRX Series device queries the JIMS server for the first time
- SRX Series device switches over to the secondary JIMS
- SRX Series device does the error recovery because of an internal error or upon receiving error response from JIMS



For all the other cases, SRX Series device provides the received cookie information in the query instead of a timestamp.

### IP Address Query

SRX Series device can provide another query to JIMS specifying the IP address, if it has missed the data for the existing IP address flow. If there are many IP address queries in the queue, SRX Series device can keep multiple concurrent HTTP or HTTPS connections with JIMS to increase the throughput. However, the number of concurrent connections are restricted to less than or equal to 20 connections to reduce the load on JIMS.

### User Mapping Query

SRX Series device can engage Captive Portal to obtain the user ID to authenticate the user. Once the user is authenticated, SRX Series device can issue another query to JIMS specifying the user ID and IP address to obtain user information. The firewall authentication uses the `https://<JIMS>/<query-api>/user/ip=<ip>&id=<id>&domain=<domain>` API to push an authentication success entry to JIMS with the user IP, user ID, and the domain. JIMS responds with the user information.

The difference between the IP address query and user query is that the IP address query does not have the user ID. Both these queries insert the user information to the internal cache of JIMS , and all SRX devices are updated with user information.

## RELATED DOCUMENTATION

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[About the Identity Management Page | 946](#)

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[Configuring CSO and JIMS Connection | 947](#)

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[Configuring JIMS for an SRX Device | 949](#)

## About the Identity Management Page

To access this page, select **Administration > Identity Management**.

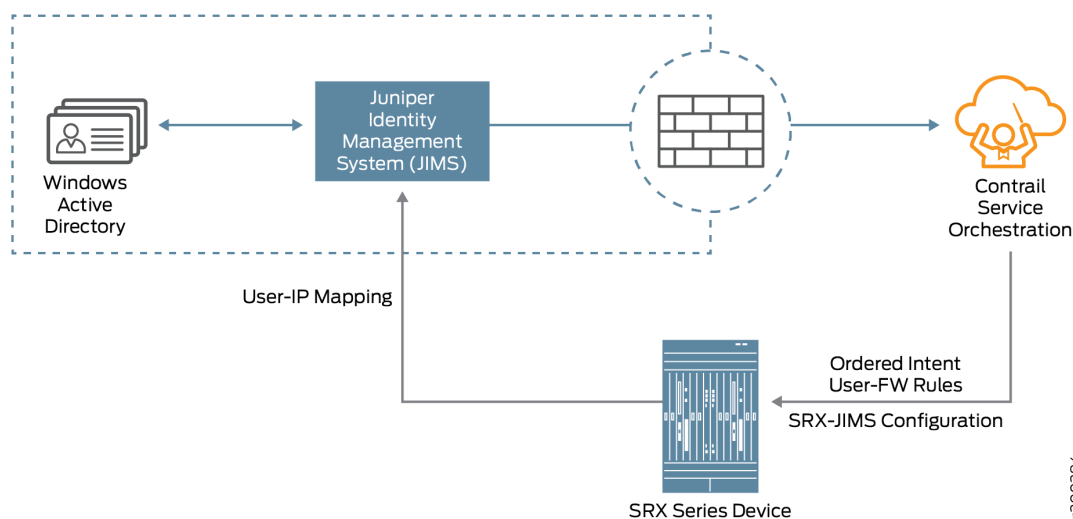
### NOTE:

- For information on system requirements for installing JIMS, see [System Requirements for Installing Juniper Identity Management Service](#)
- For information on installing JIMS on your Windows server, see [Installing Juniper Identity Management Service](#).

Use the **Identity Management** page to download and install JIMS, interface JIMS with CSO to obtain advanced user identity an active directory, and use CSO to push the JIMS configuration to SRX Series devices.

[Figure 19 on page 946](#) illustrates the connectivity between, CSO, JIMS, and an SRX Series device.

**Figure 19: CSO-JIMS-SRX Connectivity Configuration**



## Tasks You Can Perform

You can perform the following tasks from this page:

- Download the JIMS executable to your Windows server using **Download JIMS**. Run the JIMS executable to install JIMS on your Windows server machine. See [System Requirements for Installing Juniper Identity Management Service](#) and [Installing Juniper Identity Management Service](#).

After you have successfully installed JIMS, you can login into JIMS using your Windows user ID and password.

- Configure the connection between CSO and JIMS to import user and group lists from an Active Directory (AD) of your choice, using **JIMS to CSO**. See [“Configuring CSO and JIMS Connection” on page 947](#).
- Configure the connection between JIMS and an SRX Series device. See [“Configuring JIMS for an SRX Device” on page 949](#).

## RELATED DOCUMENTATION

[Juniper Identity Management Service Overview | 943](#)

[Configuring CSO and JIMS Connection | 947](#)

[Configuring JIMS for an SRX Device | 949](#)

[Preparing CSO Identity Management](#)

[JIMS v1.1 Feature Guide](#)

## Configuring CSO and JIMS Connection

Before you begin to configure the connection between CSO and JIMS, ensure that you have downloaded and installed JIMS. See [System Requirements for Installing Juniper Identity Management Service](#) and [Installing Juniper Identity Management Service](#).

To configure a connection between CSO and JIMS:

1. Select **Administration > Identity Management**.

The **Identity Management** page appears.

2. Click **JIMS-to-CSO Configuration** or the greater-than (>) symbol beside it.

The **JIMS-to-CSO Configuration** panel expands. The panel displays a system-generated user name which cannot be changed, the last updated time of the user identity information from Active Directory and the connection status of the JIMS server(s).

**NOTE:** If you have already configured a JIMS user account in CSO, the details of this connection is displayed in the **JIMS-to-CSO Configuration** panel.

3. The **Username** is auto-generated for each tenant. You will not be able to change it. Enter a password of your choice for your JIMS-to-CSO connection in the **Password** field.

**NOTE:** The password must contain a number, an upper-case letter, and a special character.

**NOTE:** The password you entered will appear encrypted. If you want to see the password that you entered as plain text, select **Show Password**.

4. Click **Save** to save your changes. The JIMS user credentials are saved.  
If you do not want to save your changes, click **Cancel**.
5. CSO and JIMS need to be connected in order for JIMS to push data to CSO. To set up this connection, you must configure the CSO client on JIMS, using the username and password that you created in the **JIMS-to-CSO Configuration** panel. For more information on configuring the CSO client on JIMS, see [Configuring the Connection to a CSO Client](#).
6. Configure an Active Directory (AD) as a data source in JIMS, see [Configuring the Connection to an Active Directory](#).

**NOTE:** After your JIMS user credentials are saved, the password field changes to the **Change Password** link.

If you want to change your password, click **Change Password**.

The **Change Password** page appears.

- Enter your new password in the **New Password** field and re-enter the same password in the **Confirm Password** field.
- Click **OK** to save the new password. The updated password is saved.

If you do not want to save your new password, click **Cancel** instead.

## RELATED DOCUMENTATION

## Configuring JIMS for an SRX Device

Configuring the connection between SRX Series devices to JIMS allows the JIMS server to send the IP address, username, and group relationship information to SRX Series devices through CSO. You can also configure a set of optional advanced settings for authentication timeout, domain filters, and choose to include or exclude user identity information in the communication between the JIMS server and the SRX Series device.

For every SRX Series device, you can configure the primary and secondary JIMS servers. The SRX Series device always queries the primary JIMS server. The secondary JIMS server is available as a fallback option with limited resources. The secondary JIMS server is used when a number of queries to the primary JIMS server fails. The SRX Series device constantly scrutinizes the failed primary JIMS server and reverts to the primary JIMS server, once it is up and running.

Before you begin, you need the following information:

- The IP address of the primary and secondary (optional) JIMS server.
- The Certificate Authority (CA) certificate for the primary and secondary (optional) JIMS server.
- The client ID to obtain an OAuth token from the JIMS server for user queries.
- The client secret to obtain an OAuth token from the JIMS server for user queries.

To configure a connection between an SRX Series device and JIMS:

1. Select **Administration > Identity Management**.

The **Identity Management** page appears.

2. Click **SRX-to-JIMS Configuration** or the greater-than (>) symbol beside it.

The **SRX-to-JIMS Configuration** panel expands.

**NOTE:** If you have already configured JIMS for an SRX Series device, the details of this configuration is displayed in the **SRX-to-JIMS Configuration** panel.

3. Complete the configuration according to the guidelines provided in [Table 358 on page 950](#).
4. Click **Save** to save the changes. JIMS is now configured for an SRX device.

If you want to discard your changes, click **Cancel** instead.

Table 358 on page 950 provides guidelines on using the fields on the **SRX-to-JIMS Configuration** panel.

**Table 358: Fields on the SRX-to-JIMS Configuration Panel**

Field	Description
<b>Identity</b>	
IP Address	<p>Enter a valid IPv4 or IPv6 address of the primary JIMS server.</p> <p>SRX Series devices always query the primary JIMS to obtain the user identities.</p>
Secondary Identity	<p>Enable this option to use the secondary JIMS server as a fallback when the primary JIMS server fails. By default, this option is disabled.</p>
Secondary IP Address	<p>Enter a valid IPv4 or IPv6 address of the secondary JIMS server.</p> <p>The secondary JIMS is available as a fall back option with limited resources. Use the secondary JIMS when the HTTP GET query or number of queries to the primary JIMS fails.</p>
<b>Client Credentials</b>	
Client ID	<p>Enter the client ID that the SRX Series device provides to JIMS server as part of its authentication. The SRX Series device must authenticate itself with the JIMS server to obtain an access token that allows the it to query the JIMS server for user identity information. The client ID must be consistent with the CSO client ID or username configured on the JIMS server.</p>
Client Secret	<p>Enter the client secret that the SRX Series device provides to the JIMS server as part of its authentication. The client secret must be consistent with the CSO client secret or password configured on the JIMS server.</p>
<b>Advanced Settings</b>	
Authentication Entry Timeout	<p>Enter the timeout interval (in minutes) after which, the idle entries in the JIMS authentication table expire. The timeout interval begins from when the user authentication entry is added to the authentication table. This value can be between 10 and 1440 minutes, where a value of 0 means no timeout. The default value is 69 minutes.</p>

Table 358: Fields on the SRX-to-JIMS Configuration Panel (*continued*)

Field	Description
Include IP Address(es)	<p>The SRX Series device sends a query to JIMS for the user identity information only for the IP addresses present in the selected address group; JIMS responds with the requested user identity information.</p> <p>Click <b>Add New Address</b> to create a new IP address group, see <a href="#">“Creating Addresses or Address Groups” on page 717</a>.</p>
Exclude IP Address(es)	<p>The SRX Series device does not query JIMS for the user identity information for the excluded IP addresses present in the selected address group.</p> <p>Click <b>Add New Address</b> to create a new IP address group, see <a href="#">“Creating Addresses or Address Groups” on page 717</a>.</p>
Filter Domain(s)	<p>The SRX Series device sends a query to JIMS for the user identity information within the specified domains. Enter a comma-separated list of up to 25 domain names. A domain name can be an alphanumeric string of up to 64 characters that can also contain dashes, underscores, and dots.</p> <p>Example: example.net</p>

## RELATED DOCUMENTATION

[Juniper Identity Management Service Overview | 943](#)
[About the Identity Management Page | 946](#)
[Configuring CSO and JIMS Connection | 947](#)

# 3

PART

## Designer Tools

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# Configuration Designer

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## Configuration Designer Overview

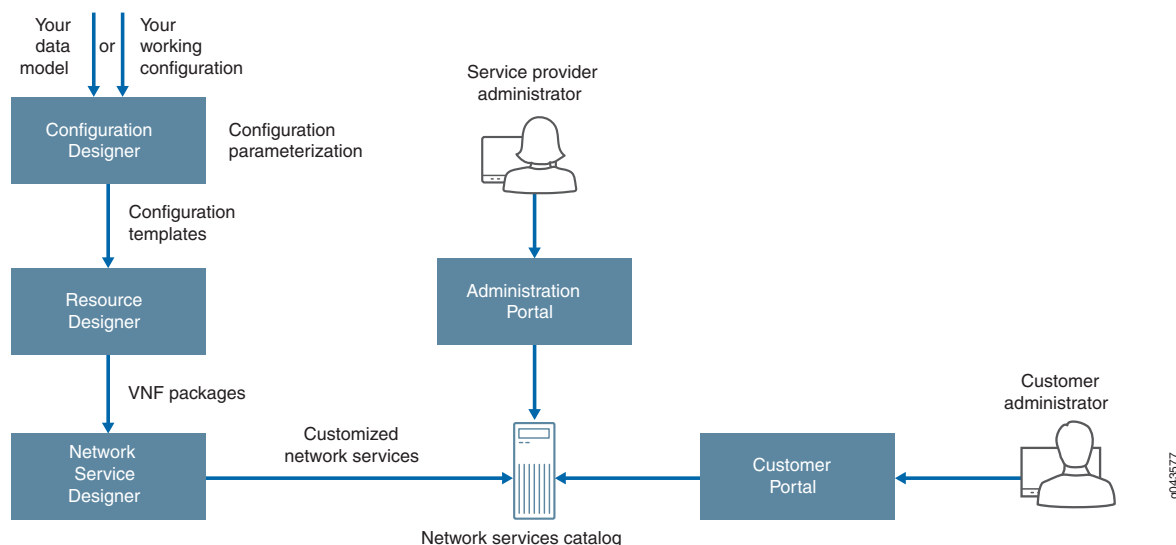
Configuration Designer, Resource Designer, and Network Service Designer are visual designer tools used by the Juniper Networks Contrail Service Orchestration (CSO) for smooth onboarding. The tools offer network designers a convenient way of bringing virtualized network functions (VNFs) from Juniper Networks and third-party companies into the network services catalog using a graphical user interface (GUI).

Configuration Designer provides an intuitive UI-based workflow for creating and managing configuration templates. These templates are rendered automatically in a GUI format that can be used as is by Resource Designer. Resource Designer uses these templates to create VNF packages that are then published to Network Service Designer.

Network Service Designer uses the VNF packages to design customized network services that are published to the network services catalog. The network services catalog contains a list of usable network services. Service provider administrators access the network services catalog to assign a set of network services to their customers using the Administration Portal. Finally, customer administrators access the network

services assigned to them using a Customer Portal to manage their sites and services. [Figure 20 on page 954](#) shows a Configuration Designer and its workflow.

**Figure 20: Configuration Designer Workflow**



Configuration Designer creates templates based on a simple concept of configuration parameterization. Parameterization facilitates the creation of versatile configuration templates that can be easily used for different configurations. It provides variables and parameters that you can substitute with actual values. For example, if you were to deploy an instance of a non-parameterized template—with fixed IP addresses specified for a network interface—in a second deployment you would have to delete the first instance or it would lead to an error. However, in a parameterized template you would simply specify the required values for the provided parameters.

A configuration template has prepopulated values for configuration settings associated with a virtualized network function (VNF). The configuration in the templates can be of the following types:

- Device-level base configurations, such as an interface configuration
- Service configurations, such as a firewall policy configuration
- Monitoring configurations, such as a CLI, SNMP, or other monitoring command configuration

In Configuration Designer, you can manually type a working configuration or copy and paste an existing golden configuration from your device. You can also use your own data model to configure your template. Once created, the templates are listed on a Design page, where you can review them at a glance. You can also modify the parameters and values of your templates as needed from the Design page.

The configuration templates can be used by:

- Network designers to create a day 0 configuration or default parameters in the Resource Designer. For example, they can enter interface information.

- Your customer administrators or end users (using the Customer Portal):
  - On Day 1 they can customize their services during VNF instantiation. For example, they can enter IP addresses for a given site.
  - On Day 2 they can update a configuration of existing instances. For example, they can configure their network to block social media.

## RELATED DOCUMENTATION

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[Accessing the Configuration Designer | 955](#)

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[Changing Your Password | 956](#)

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[Using the Configuration Designer | 956](#)

## Accessing the Configuration Designer

To access the Configuration Designer:

1. Review the OpenStack keystone username and password that you defined.
  - For a centralized deployment, you can view these settings on the Contrail configure and control node in the files `/etc/contrail/keystonerc` and `/etc/contrail/openstackrc`.
  - For a distributed deployment, you can view these settings on the central infrastructure node in the file `/etc/keystone/keystonerc`.
  - The default username is **cspadmin** and the default password is **passw0rd**.
2. Using a Web browser, access the URL for the Configuration Designer.

For example, if the IP address of the host on which the Configuration Designer resides is 192.0.2.1, the URL would be `https://192.0.2.1:83/cd-ui/index.html`.

3. Log in with the OpenStack Keystone username and password.

## RELATED DOCUMENTATION

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[Configuration Designer Overview | 953](#)

## Using the Configuration Designer

Use the Configuration Designer to create a configuration template or modify an existing one. Follow these steps to get started with the Configuration Designer:

- Learn about the Configuration Designer. See [“Configuration Designer Overview” on page 953](#).
- Log into the Configuration Designer. See [“Accessing the Configuration Designer” on page 955](#).

To create a configuration template:

1. Create a request for a configuration template. See [“Creating Requests for Configuration Templates” on page 959](#).
2. Design a configuration template. You can design a configuration template using one of these methods:
  - Using a data model. Choose this method when you already have a data model for your configuration template. See [“Designing Templates with a YANG Configuration” on page 960](#).
  - Using your working configuration. Choose this method when you have a Jinja template but want the Configuration Designer to generate a data model for your configuration template. See [“Designing Templates with a Configuration” on page 964](#).
3. Publish the configuration template to the Network Service Designer. See [“Publishing Configuration Templates” on page 968](#).

### RELATED DOCUMENTATION

[Configuration Designer Overview](#) | 953.

## Changing Your Password

Some of the Contrail Service Orchestration components—such as Administration Portal, Configuration Designer, Resource Designer, and Network Service Designer—have a common password. When you change the password from any of these GUIs, the new password is saved in Contrail and applies to all the GUIs.

To change your password:

1. Click the administrative username located at the right side of the top banner.  
A drop-down list appears.
2. Click **Change Password**.

The Change Password page appears.

- 3. Change your password following the guidelines provided in [Table 359 on page 957](#).
- 4. Click **OK**.

You are logged out of the system. To log in to the GUI again, you must use your new password. Other sessions logged in with the same username are unaffected until the next login.

**Table 359: Fields on the Changing Password Page**

Field	Description
Current Password	Enter your existing password.
New Password	<p>Enter your new password.</p> <p>The minimum character length for this field is 6 (the default) and the maximum is 21. The password can include alphanumeric and special characters, but not control characters. The password strength indicator displays the efficiency of the password that you entered.</p> <p><b>NOTE:</b> You cannot proceed to the next step if the password strength indicator shows that the password is weak.</p>
Confirm Password	<p>Reenter the password for confirmation.</p> <p>You can select the <b>Show Password</b> option to view the password.</p>

RELATED DOCUMENTATION

<a href="#">Administration Portal Overview   4</a>
<a href="#">Configuration Designer Overview   953</a>
<a href="#">Resource Designer Overview   973</a>
<a href="#">Network Service Designer Overview   997</a>

About the Requests Page for the Configuration Designer

To access this page, click **Home> Requests**.

You can use the Requests page to request a new configuration template. A configuration template has prepopulated values for configuration settings associated with a virtualized network function (VNF). By

using a configuration template for a network service, you can avoid having to manually configure settings for each service.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Create a request for a configuration template. See [“Creating Requests for Configuration Templates” on page 959](#).
- Design a new configuration template using a predefined working configuration. In this method, the Configuration Designer generates the data model. See [“Designing Templates with a Configuration” on page 964](#).
- Design a new configuration template using the YANG model. See [“Designing Templates with a YANG Configuration” on page 960](#).

### Field Descriptions

[Table 360 on page 958](#) provides guidelines on using the fields on the Requests page for the Configuration Designer.

**Table 360: Fields on the Requests Page for the Configuration Designer**

Field	Description
<b>Requests Page</b>	
New Template	<p>Click to request a new configuration template.</p> <p>The New Template page allows you to define the requirements for your configuration template.</p>
<b>Configuration Template Request</b>	
Begin with config	<p>Click to design a new configuration template using a predefined working configuration.</p> <p>Select this method if you have the Jinja2 configuration but need the Configuration Designer to generate a data model for your configuration template.</p>
Begin with YANG	<p>Click to design a configuration template using an existing data model.</p> <p>Select this method if you already have the Jinja2 (a template engine for Python) configuration and the data model for your configuration template.</p>
Delete	Click to delete a configuration template request.

RELATED DOCUMENTATION

<a href="#">Configuration Designer Overview</a>   <a href="#">953</a>
<a href="#">Using the Configuration Designer</a>   <a href="#">956</a>

## Creating Requests for Configuration Templates

You can create a configuration template by first making a request for it. A request allows you to define the requirements for the configuration template, including the template format, vendor, and the supported device family.

To create a request for a configuration template:

1. Click **Home > Requests > New Template**.
2. Complete the configuration according to the guidelines provided in [Table 361 on page 959](#).
3. Click **Create**.

A new template request is created.

Table 361: Fields on the New Template Page

Field	Description
Name	<p>Specify a name for your configuration template. Only a string of alphanumeric characters, dashes, and spaces are accepted.</p> <p>Example: ucpe-SRX DPI config</p>
Description	<p>Enter a description for your configuration template. Make this description as clear and useful as possible for all administrators.</p> <p>Example: NFX JCP configuration to restore default route from LAN to WAN. This configuration is pushed to JCP after the service chain is deleted.</p>
Output config format	<p>Select a format for your configuration template:</p> <ul style="list-style-type: none"><li>• CLI (Command-line interface)</li><li>• XML (Extensible Markup Language)</li><li>• Native—Default file format of the application that we use to create and save files. We use CLI plug-in and it is used for cms_plug-in.</li></ul>

Table 361: Fields on the New Template Page (continued)

Field	Description
Category	<p>Specify the category for the configuration template. Categories allow you to group your templates and filter and search them easily.</p> <ul style="list-style-type: none"> <li>• <b>VNF</b>—Select this option when you create a configuration template for the virtualized network function.</li> <li>• <b>Device Template</b>—Select this option when you create a device template for a network device, such as a customer premises equipment (CPE) device.</li> <li>• <b>Other</b>—Select this option when you create a configuration template for a network function other than VNF or device template.</li> </ul>
Vendor	<p>Specify the vendor that you want the configuration template to support.</p> <p>Example: Juniper Networks</p>
Device family	<p>Specify the device family that you want the configuration template to support.</p> <p>Example: juniper-srx</p>

## RELATED DOCUMENTATION

[Configuration Designer Overview | 953](#)

[Designing Templates with a YANG Configuration | 960](#)

[Designing Templates with a Configuration | 964](#)

## Designing Templates with a YANG Configuration

You can design a configuration template either by using your own YANG model or by using the YANG model generated by the Configuration Designer. The Configuration Designer provides a wizard that takes you through a step-by-step procedure to create a configuration template. You can design multiple templates by creating requests and launching respective wizards from them.

To design a template using your own data model, make sure to have your data model schema and Jinja (a template engine for Python) template content ready.

Before you begin, create a configuration template request. See [“Creating Requests for Configuration Templates” on page 959](#).



To design a configuration template with your own YANG model:

1. From the Configuration Template Request drop-down list, select **Begin with YANG**.

The Enter YANG Schema page appears.

2. Enter or copy and paste your YANG schema in the space provided for it. Click **Next**.

The Enter Jinja Template page is displayed.

3. Enter or copy and paste your Jinja template content in the space provided for it. Click **Next**.

**NOTE:** You can also download a sample template from this page.

**NOTE:** When you paste the Jinja template, the Configuration Designer detects the keywords **post\_config**, **pre\_config**, and **diff\_config** automatically. If the configuration template contains any one of these three keywords, the template will enable the **Diff Config** feature.

4. Click **Next**.

The Generate UI page appears and generates a UI page based on your YANG schema and displays a read-only view. The fields on this page map to the parameters in the configuration template. You can drag and drop the field labels to reorder the UI.

**NOTE:** If you edit an existing template and change its data model, then you can generate a new UI for it by clicking **Re-generate ui**. If you do not want a new UI, skip to the next step.

5. Click **Next**.

The Validate Template page appears.

6. Enter values that you want to validate. See [Table 362 on page 962](#) for sample fields and their descriptions. Click **Validate**.

A configuration template is generated using the values that you entered.

7. In the Validate Template page, make sure your data in the template is complete and correct.

8. Click **Yes, it looks good** to close the page. If any parameter value in the configuration template needs to be changed, click **No, it needs change** to return to the previous page.

9. Click **Next**.

The Review Template page is displayed. It contains three tabs—Jinja Template, Data Model, and View Def. You can click through the tabs to view and update your Jinja template, data model, and view definition.

10. Click **Done** to save your configuration template.

The Designs page is updated with the new configuration template and its status shows as **Validated**. You can monitor and manage the new configuration template from the Configuration Design page.

**NOTE:** You need to publish the configuration template for it to be available for the Resource Designer to create virtualized network function (VNF) packages. See [“Publishing Configuration Templates” on page 968](#).

**Table 362: Sample Fields on the Validate Template Page**

Field	Description
Name Servers	Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers.  Example: 10.0.2.15
NTP Servers	Specify the FQDNs or IP addresses of one or more NTP servers.  Example: ntp.example.net
Time Zone	Specify the time zone for your virtual machine.  Example: UTC
Enable Default Screens	For a centralized deployment, select <b>True</b> to enable the default screens security profile for the destination zone or <b>False</b> to disable default screening.  Example: False  <b>NOTE:</b> You cannot configure this setting for a distributed deployment.

Table 362: Sample Fields on the Validate Template Page (*continued*)

Field	Description
Enable Re-filter	<p>Select <b>True</b> to enable a stateless firewall filter that protects the Routing Engine from denial-of-service (DoS) attacks or <b>False</b> to allow DoS attacks.</p> <p>Example: True</p>
Loopback Addr	<p>Specify an IPv4 or IPv6 loopback address for the management interface of your virtual machine.</p> <p>Example: 192.0.2.25</p>
Hostname	<p>For a centralized deployment, specify the hostname of your virtual machine that contains the vSRX VNF. The hostname has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: vm-vsrx</p> <p><b>NOTE:</b> For a distributed deployment, the vSRX application resides on the NFX250 device, and you cannot configure this setting.</p>
Syslog Servers	<p>Specify the FQDNs or IP addresses of one or more system log servers.</p> <p>Example: 192.0.2.55</p>
Right Interface	<p>Specify the identifier of the interface receiving data transmitted by the host.</p> <p>Example: GigabitEthernet3</p>
Left Interface	<p>Specify the identifier of the interface that transmits data to the host.</p> <p>Example: GigabitEthernet2</p>
<b>Allowed Prefix List</b>	
Ping Prefix List	<p>If you set the Enable Re-filter field to True, specify the routes that the Junos Space Virtual Appliance uses for ping operations when it discovers the vSRX VNF.</p> <p>Example: 10.0.2.1/24</p>
SNMP Prefix list	<p>If you set the Enable Re-filter field to True, specify the routes that the Junos Space Virtual Appliance uses for SNMP operations when it discovers the vSRX VNF.</p> <p>Example: 10.0.2.0/24</p>

Table 362: Sample Fields on the Validate Template Page (*continued*)

Field	Description
Space Servers	<p>If you set the Enable Re-filter field to True, specify the IP addresses of the virtual machines that contain the Junos Space Virtual Appliances.</p> <p>Example: 10.0.2.50</p>

## RELATED DOCUMENTATION

[Configuration Designer Overview](#) | 953

[Designing Templates with a Configuration](#) | 964

## Designing Templates with a Configuration

You can design a configuration template either by using your own data model or by using the data model generated by the Configuration Designer. The Configuration Designer provides a configuration template wizard that takes you through a step-by-step procedure to create your configuration template. You can design multiple templates by creating requests and launching respective wizards from them.

To design a template using the data model generated by the Configuration Designer, you provide your Jinja configuration and the wizard automatically parses its parameters and generates the data model for your template. See <http://jinja.pocoo.org/docs/2.10/templates/> for documenting the configuration templates of the jinja2 Python module.

Before you begin, create a configuration template request. See “[Creating Requests for Configuration Templates](#)” on page 959.

To design a template with your configuration:

1. From the Configuration Template Request drop-down list, select **Begin with config**.

The Templatize Config page appears.

2. Enter or copy and paste your Jinja configuration in the space provided for it.

The wizard parses the parameters in your configuration and generates a variables tree in the Detected Variables panel.

**NOTE:** You can also download a sample template from this page.

**NOTE:** When you paste the Jinja template, the Configuration Designer detects the keywords **post\_config**, **pre\_config**, and **diff\_config**, automatically. If the configuration template contains any one of these three keywords, the template will enable the **Diff Config** feature.

3. Review your configuration and edit it as needed. The wizard accordingly updates the variables in the Detected Variables panel. Click **Next**.

The Customize Variables page appears.

4. Select any variable to update. You can update different attributes of your template, such as the Yang and data types. You can also add default values and descriptions. See [Table 363 on page 966](#) for sample fields and their descriptions.

5. After completing your configuration, click **Next**.

The Generate UI page appears and generates the data model according to your values and displays as read-only. You can drag and drop the field labels to reorder the UI.

**NOTE:** If you edit an existing template and change its data model, then you can generate a new UI for it by clicking **Re-generate ui**. If you do not want a new UI, skip to the next step.

6. Click **Next**.

The Validate Template page appears.

7. Enter values that you want to validate, and ensure that the configuration template is displayed with the correct values.

8. Click **Validate**.

The Rendered Config page appears and the configuration template is generated using the values that you entered.

9. Make sure your data in the configuration template is complete and correct.


10. Click **Yes, it looks good** to close the page. If any parameter value in the configuration template needs to be changed, click **No, it needs change** to return to the previous page.

11. Click **Next**.

The Review Template page is displayed. It contains three tabs—Jinja Template, Data Model, and View Def. You can click through the tabs to view and update your Jinja template, data model, and the view definition.

12. Click **Done** to save your configuration template.

The Designs page is updated with the new configuration template and its status shows as **Validated**. You can monitor and manage the new configuration template from the Configuration Design page.



**NOTE:** You must publish the configuration template for it to be available for the Resource Designer to create virtualized network function (VNF) packages. See [“Publishing Configuration Templates” on page 968](#).

Table 363: Sample Fields on the Customize Variables Page

Field	Description
Detected Variables	<p>Edit the variable name. A configuration template contains variables that get replaced with values when a template is rendered. The Configuration Designer automatically generates these variables from your Jinja configuration.</p> <p>You can edit the variable name.</p> <p>Example: left_interface</p>
Yang Type	<p>Select an appropriate Yang type from the drop-down list. A Yang module defines a data model through its data, and through the hierarchical organization and constraints on that data. It uses a hierarchical, tree-based structure with the following nodes:</p> <ul style="list-style-type: none"> <li>● <b>leaf node</b>—Contains a single value of a specific type</li> <li>● <b>leaf-list node</b>—Contains a sequence of leaf nodes</li> <li>● <b>container node</b>—Contains a grouping of related nodes containing only child nodes, which can be any of the six node types</li> <li>● <b>list node</b>—Contains a sequence of list entries, each of which is uniquely identified by one or more key leafs</li> <li>● <b>choice node</b>—Contains a set of alternatives, only one of which may exist at any one time</li> <li>● <b>case node</b>—Contains branches of the choice node</li> </ul>

Table 363: Sample Fields on the Customize Variables Page (*continued*)

Field	Description
Data Type	<p>Select an appropriate data type based on your variable. In Yang, each leaf and leaf-list node includes the type statement to identify the data type for valid data for that node. Yang defines a set of built-in types and also provides the typedef statement for defining a derived type from a base type, which can be either a built-in type or another derived type.</p> <ul style="list-style-type: none"> <li>• <b>String</b>—Human-readable string</li> <li>• <b>Boolean</b>—True or false</li> <li>• <b>Init8</b>—8-bit signed integer</li> <li>• <b>Init16</b>—16-bit signed integer</li> <li>• <b>Init32</b>—32-bit signed integer</li> <li>• <b>Init64</b>—64-bit signed integer</li> <li>• <b>Uint8</b>—8-bit unsigned integer</li> <li>• <b>Uint16</b>—16-bit unsigned integer</li> <li>• <b>Uint32</b>—32-bit unsigned integer</li> <li>• <b>Uint64</b>—64-bit unsigned integer</li> <li>• <b>Enumeration</b>—Enumerated strings with associated numeric values</li> <li>• <b>Inet: ip-address</b>—192.0.2.101</li> <li>• <b>Inet: ip-prefix</b>—192.0.2.0/24</li> <li>• <b>Empty</b>—A leaf that does not have any value</li> </ul>
Display Name	Specify the name of the variable as you want it to display.
Key	<p>Specify the key to be associated with the variable.</p> <p>Keys are identifiers used in defining list entries in the Yang data hierarchy. They help distinguish one list entry from another.</p>
Required	Specify if the variable is mandatory.
Default Value	Specify the default value for the variable.
Pattern	<p>Specify the regular expression (regex pattern) if the data type of the variable is string.</p> <p>Example: <code>^[a-z][A-Z]</code></p>

Table 363: Sample Fields on the Customize Variables Page (*continued*)

Field	Description
Information	<p>This field displays values only if the data type of the variable is enumeration. When you select the data type as enumeration, you need to specify the values for the enumeration list and these values are displayed in the <b>Information</b> column. You can also edit the enumeration list.</p> <p>Example: ["abc","def"]</p>
Description	<p>Enter a meaningful description for the variable.</p> <p>Example: Firewall policy information</p>

To create an actual configuration for a device, you must log in to Administration Portal or Customer Portal. You must enter the actual values for the configuration in the configuration template. The configuration template then renders the actual values. You can click on stage2 configuration to view the actual configuration.

To delete an actual configuration for a device, you must login to Administration Portal or Customer Portal and execute the delete command, remove command or an alternate command for the configuration. The command to delete a configuration depends on the existing configuration on the device.

## RELATED DOCUMENTATION

[Configuration Designer Overview](#) | 953

[Designing Templates with a YANG Configuration](#) | 960

## Publishing Configuration Templates

After you have designed a configuration template, you need to publish it. Only published configuration templates are available to the Resource Designer for creating virtualized network function (VNF) packages.

Use one of the following methods to design a configuration template:

- Using a data model. Choose this method when you already have a data model for your configuration template. See [“Designing Templates with a YANG Configuration” on page 960](#).
- Using your working configuration. Choose this method when you have a Jinja template but want the Configuration Designer to generate a data model for your configuration template. See [“Designing Templates with a Configuration” on page 964](#).



To publish a configuration template:

1. Select **Home> Designs**.

The Configuration Template Designs page appears. All the configuration templates are displayed in a table.

2. Select the configuration template (with the status as Validated) that you want to publish to the Resource Designer.

3. Select **Publish** from the Edit drop-down list.

Your configuration template is published and available to be used by the Resource Designer. Its status changes from **Validated** to **Published**.

## RELATED DOCUMENTATION

| [Configuration Designer Overview](#) | 953

## About the Designs Page for the Configuration Designer

To access this page, click **Home> Designs**.

Use the Designs page to manage configuration template designs that you have saved or published.

### Tasks You Can Perform

You can perform the following tasks from this page:

- View the configuration template designs. [Table 364 on page 970](#) describes the fields on the Configuration Template Designs page.
- Modify a configuration template design that you published or saved using the configuration. Click **Edit** from the drop-down list at the end of the appropriate row and make your updates. See [“Designing Templates with a Configuration” on page 964](#).
- Modify a configuration template design that you published or saved using the YANG model. Click **Edit** from the drop-down list at the end of the appropriate row and make your updates. See [“Designing Templates with a YANG Configuration” on page 960](#).
- Publish a configuration template. See [“Publishing Configuration Templates” on page 968](#).

- Clone a configuration template. See [“Cloning Configuration Templates” on page 971.](#)
- Delete a configuration template. See [“Deleting Configuration Template Designs” on page 972.](#)

## Field Descriptions

[Table 364 on page 970](#) provides guidelines on using the fields on the Designs page for the Configuration Designer.

**Table 364: Fields on the Configuration Template Designs Page**

Field	Description
Template	View the configuration template name. The name can be a string of alphanumeric characters, dashes, and spaces.  Example: srx-lan-to-wan-config
Family	View the device family supported by the configuration template.  Example: juniper-srx
Vendor	View the vendor that the configuration template supports.  Example: Juniper Networks
Output Format	View the format used by the configuration template. It can be one of the following: <ul style="list-style-type: none"> <li>• CLI (Command-line interface)</li> <li>• XML (Extensible Markup Language)</li> <li>• Native - Default file format of the application that we use to create and save files. We use CLI plug-in and it is used for cms_plug-in.</li> </ul>
Category	View the category for the configuration template. <ul style="list-style-type: none"> <li>• <b>VNF</b>—A configuration template for the virtualized network function.</li> <li>• <b>Device Template</b>—A device template for the network function and this cannot be published to the Resource Designer.</li> <li>• <b>Other</b>—A configuration template for the network function other than VNF or device template.</li> </ul>
Diff-Config	Use to compare configuration difference between the two configuration files. <ul style="list-style-type: none"> <li>• Yes—Diff.Config feature is enabled for the template.</li> <li>• No—Diff.Config feature is disabled for the template.</li> </ul>

Table 364: Fields on the Configuration Template Designs Page (*continued*)

Field	Description
Status	<p>View the configuration template status:</p> <ul style="list-style-type: none"> <li>• <b>In-Progress</b>—Configuration template request was created but the template hasn't been validated.</li> <li>• <b>Validated</b>—Configuration Designer validated the configuration template and it is ready to be published.</li> <li>• <b>Published</b>—Configuration Designer published the configuration template and it is available to the Resource Designer for use.</li> </ul>
Description	<p>View the configuration template description.</p> <p>Example: NFX Stage-1 configuration</p>

## RELATED DOCUMENTATION

[Configuration Designer Overview | 953](#)

[About the Requests Page for the Configuration Designer | 957](#)

## Cloning Configuration Templates

Cloning a template is useful when you want to create a configuration template that is similar to an existing one but with small differences. You can easily clone an existing template from the Designs page and customize it as needed.

To clone a configuration template design:

1. Select **Home>Designs**.

The Designs page appears.

2. Select the configuration template design that you want to clone, and click the clone icon at the top of the Designs page.

The Clone Template page appears.

3. Specify an appropriate name for your new configuration template. For example, uCPE-SRX NAT config.

4. Click **Save**.

A message is displayed indicating that the template was cloned successfully. The cloned configuration template appears on the Designs page.

If you want to edit the cloned configuration template, select the template and click **Edit** from the drop-down list at the end of the row.

#### RELATED DOCUMENTATION

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[About the Designs Page for the Configuration Designer | 969](#)

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[Designing Templates with a Configuration | 964](#)

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[Designing Templates with a YANG Configuration | 960](#)

## Deleting Configuration Template Designs

You can easily delete a configuration template design from the Designs page.

To delete a configuration template design:

1. Select **Home>Designs**.

The Designs page appears.

2. Select the configuration template design that you want to delete.

3. Click **Delete** from the drop-down list at the end of the row.

A page requesting confirmation for the deletion appears.

4. Click **Yes** to confirm that you want to delete the design.

The configuration template design is deleted.

#### RELATED DOCUMENTATION

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# Resource Designer

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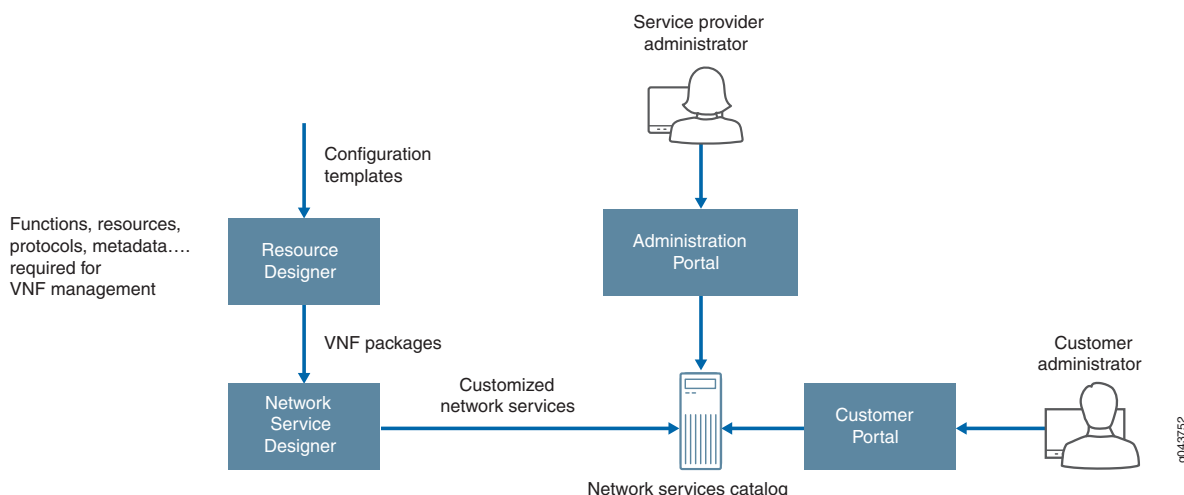
## Resource Designer Overview

Configuration Designer, Resource Designer, and Network Service Designer are visual designer tools used by the Juniper Networks Contrail Service Orchestration (CSO) for smooth onboarding. The designer tools offer network designers a convenient way of bringing virtualized network functions (VNFs) from Juniper Networks and third-party companies into the network services catalog using a graphical user interface (GUI).

Resource Designer provides an intuitive GUI-based workflow that guides administrators as they provide the required information to create a VNF package. Resource Designer also validates the created VNF package before it is published to Network Service Designer. Network Service Designer uses VNF packages to design customized network services that are published to the network services catalog, which contains a list of usable network services.

Service provider administrators access the network services catalog to assign a set of network services to their customers using the Administration Portal. Finally, customer administrators access the network services assigned to them using a Customer Portal to manage their sites and services. [Figure 21 on page 974](#) shows a Resource Designer workflow.

**Figure 21: Resource Designer Workflow**



As a system integrator or a service provider, you can use Resource Designer to create and onboard a VNF package that can be used for defining network services. A VNF package is a set of metadata or templates designed for a specific vendor's VNF. Each VNF has its own combination of resources and performance characteristics. Having access to different levels of VNF packages can help you to design specific service-level agreements (SLAs) for your services. You can assign resources to VNFs using your vendor's data sheets as a basis.

A typical VNF package might include:

- **VNF base configuration template**—A configuration template can be created in Configuration Designer:
  - To ensure correct startup and ongoing manageability of the VNF
  - For management IP, SNMP, and system log configuration of the VNF
- **VNF descriptor (VNFD)**—A deployment template that describes a VNF in terms of its deployment and operational behavior requirements. VNFD is mainly used during the instantiation of a VNF and for lifecycle management of a VNF instance. It includes the following properties:
  - **Connection points**—Represents the management interface, left interface, and right interface. Connections points are used to connect the virtual links.
  - **Virtual links**—Represents the management network link, left network link, and right network. Virtual links provide connectivity between VDUs.

- Virtual deployment units (VDUs) and a topology showing how the VDUs are connected—VDUs are basic part of VNFs. VDUs are used to host the network function.
- Allocated CPU and memory
- Required storage
- Names and types of VNF images
- Deployment flavors—A differentiated option such as Gold, Silver, or Bronze with an appropriate SLA metric.
- VNF auto-scale policies
- **VNF Manager plug-in**—A plug-in type and name. For example, a VNF Manager for VNF lifecycle management.
- **Supported function chains**—Sequences of network functions, such as firewall, NAT, or WAN optimization, that the VNF packages offers.

Some VNFs, like vSRX, support multiple functions and service chains. For example, vSRX can be deployed in the context of multiple functions such as firewalls, carrier-grade NAT, IDP, UTM, malware, and others.

## RELATED DOCUMENTATION

[Accessing the Resource Designer | 976](#)

[Changing Your Password | 956](#)

[Using the Resource Designer | 975](#)

## Using the Resource Designer

Use the Resource Designer to create a VNF package or modify an existing one. Follow these steps to get started with the Resource Designer:

- Learn about the Resource Designer. See [“Resource Designer Overview” on page 973](#).
- Log into the Resource Designer. See [“Accessing the Resource Designer” on page 976](#).

To create a VNF package:

1. Create a request for a VNF package. See [“Creating Requests for VNF Packages” on page 980](#).
2. Design a VNF package. See [“Designing VNF Packages” on page 981](#).
3. Publish the VNF package to the Network Service Designer. See [“Publishing VNF Packages” on page 991](#).

You can also perform the following tasks using the Resource Designer:

- Clone a VNF package. See [“Cloning VNF Packages” on page 993](#).
- Import a VNF package. See [“Importing VNF Packages” on page 994](#).
- Export a VNF package. See [“Exporting VNF Packages” on page 994](#).

## RELATED DOCUMENTATION

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[Accessing the Resource Designer | 976](#)

## Accessing the Resource Designer

To access the Resource Designer:

1. Review the keystone username and password that you defined for Contrail OpenStack.
  - For a centralized deployment, you can view these settings on the Contrail configure and control node in the files `/etc/contrail/keystonerc` and `/etc/contrail/openstackrc`.
  - For a distributed deployment, you can view these settings on the central infrastructure node in the file `/etc/keystone/keystonerc`.
  - The default username is **cspadmin** and the default password is **passw0rd**.
2. Using a Web browser, access the URL for the Resource Designer.

For example, if the IP address of the host on which Resource Designer resides is 192.0.2.1, the URL would be **https://192.0.2.1:83/rd-ui/index.html**.
3. Log in with the OpenStack Keystone username and password.

## RELATED DOCUMENTATION

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[Using the Resource Designer | 975](#)



# About the Requests Page for the Resource Designer

To access this page, click **Home > Requests**.

Use the Requests page to request a new VNF package. A VNF package is a package of device metadata or templates for a specific vendor VNF. You can also view the open VNF package requests with the request name, date, and time.

## Tasks You Can Perform

You can perform the following tasks from this page:

- Create a request to design a VNF package. See [“Creating Requests for VNF Packages” on page 980](#).
- Design a new VNF package. See [“Designing VNF Packages” on page 981](#).

## Field Descriptions

[Table 365 on page 977](#) provides guidelines on using the fields on the Requests page for the Resource Designer.

**Table 365: Fields on the Requests Page for the Resource Designer**

Field	Description
<b>Requests Page</b>	
New Request	Click to request a new VNF package.  The New Request page allows you to define the requirements for your VNF package.
<b>VNF Package Request</b>	
Begin	Hover over the bottom right of the package and click to design a VNF package.  The Basic VNF Information page appears. You can specify the basic information for the VNF package, supported VNF, and function chains.
Delete	Hover over the bottom right of the package and click to delete a VNF package request.  The VNF package request is deleted.

## RELATED DOCUMENTATION

## VNF Overview

A virtualized network function (VNF) is a software application used in a Network Functions Virtualization (NFV) implementation that has well defined interfaces, and provides one or more component networking functions in a defined way. For example, a security VNF provides Network Address Translation (NAT) and firewall component functions.

For Contrail Service Orchestration (CSO) in a centralized deployment model, you design network services for customers based on VNFs. Each VNF used in the network service is deployed in its own virtual machine (VM). The connections between VNFs depend on how VIMs define them over the NFV Infrastructure (NFVI).

For CSO in distributed deployment model, the Open vSwitch (OVS) bridges are used within the NFX hypervisor.

You can specify the following required resources for a VNF package when you create it in Resource Designer.

- Number of virtual CPUs
- Virtual memory (MB)
- Virtual disk capacity (MB)
- License cost

CSO supports a range of Juniper Networks and third-party VNFs. Vendors can provide multiple versions of a VNF that offer differentiated performance. You can see available VNFs and their specifications and resource requirements in the VNF catalog of the Network Service Designer tool. [Table 366 on page 979](#) lists the VNFs that are currently supported by CSO.

Table 366: VNFs Supported by CSO

Vendor Name	VNF Name	Network Functions Supported	Deployment Model Support	Element Management System Support
Juniper Networks	<ul style="list-style-type: none"> <li>• vSRX</li> <li>• vSRX managed by Junos Space</li> <li>• vSRX on uCPE</li> </ul>	<ul style="list-style-type: none"> <li>• Network Address Translation</li> <li>• Demonstration version of Deep Packet Inspection (DPI)</li> <li>• Firewall</li> <li>• Unified Threat Management (UTM)</li> </ul>	<ul style="list-style-type: none"> <li>• Centralized deployment</li> <li>• Distributed deployment</li> </ul>	EMS microservice
Linux	IP Table	<ul style="list-style-type: none"> <li>• NAT</li> <li>• Firewall</li> </ul>	Centralized deployment	EMS microservice
Linux	HAProxy	Load Balancer	Centralized deployment	EMS microservice
Cisco	Cisco1000v	Firewall	Centralized deployment	Junos Space Network Management Platform
Riverbed	<ul style="list-style-type: none"> <li>• Riverbed</li> <li>• Riverbed-NFX150</li> </ul>	WAN optimization	Distributed deployment  <b>NOTE:</b> Supported on NFX150 and NFX250 platforms only	EMS microservice
Fortinet	<ul style="list-style-type: none"> <li>• Fortinet-no-oam</li> <li>• Fortinet-oam</li> </ul>	Firewall without WAN optimization	<ul style="list-style-type: none"> <li>• SD-WAN deployment</li> <li>• Distributed deployment</li> </ul> <b>NOTE:</b> Supported on NFX150 and NFX250 platforms only	EMS microservice
Ubuntu	<ul style="list-style-type: none"> <li>• Ubuntu-fw</li> <li>• Ubuntu-fw-NFX150</li> </ul>	Firewall without WAN optimization	<ul style="list-style-type: none"> <li>• SD-WAN deployment</li> <li>• Distributed deployment</li> </ul> <b>NOTE:</b> Supported on NFX150 and NFX250 platforms only	EMS microservice

## RELATED DOCUMENTATION

# Creating Requests for VNF Packages

You can create a configuration template by making a request. A request allows you to define the basic requirements for the VNF package, including the vendor and the supported device family.

1. Click **Home > Requests > New Requests**.
2. Complete the configuration according to the guidelines provided in [Table 367 on page 980](#).
3. Click **Create**.

A new VNF package request is created. If you want to discard your changes, click **Cancel** instead.

**Table 367: Fields on the New Request Page**

Field	Description
Name	Specify a unique name for your VNF package using a string of alphanumeric characters, dashes, and spaces.  Example: vSRX
Description	Enter a description for your VNF package. Make this description as clear and useful as possible for all administrators.
Vendor	Select the vendor for the VNF package.  Example: Juniper Networks
Target family	This field is auto-populated with the device family supported by the vendor.  Example: juniper-nfx
VNF Package Capability Version	Select the version of VNF package. The available options are: <ul style="list-style-type: none"><li>• <b>1.0</b>—Does not support NFX150 device.</li><li>• <b>1.1</b>—Supports NFX150 device.</li></ul>
Vendor Logo	This field is auto-populated with the vendor logo for the selected vendor.  You can also click <b>Select files</b> to upload logos for any new vendor that you add to the vendor list through an API.

## RELATED DOCUMENTATION

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[About the Requests Page for the Resource Designer | 977](#)

[Designing VNF Packages | 981](#)

## Designing VNF Packages

### IN THIS SECTION

- [Creating Basic VNF Information | 981](#)
- [Adding Flavor Parameters | 984](#)
- [Adding Standard and Custom Functions | 986](#)
- [Designing a Supported Function Chain | 987](#)
- [Viewing the Summary of VNF Packages | 988](#)

You can design a VNF package using the Resource Designer. The Resource Designer provides a VNF package wizard that takes you through a step-by-step procedure to create your VNF package. You can design multiple VNF packages by creating requests and launching respective wizards from them.

### Before You Begin

Create a request to design a VNF package. See [“Creating Requests for VNF Packages” on page 980](#).

To design a VNF package, you need to perform the following:

### Creating Basic VNF Information

You can click through each tab on this page to specify basic VNF information, flavor parameters, standard functions, custom functions, and supported function chains for the VNF package.

To create basic VNF information:

1. Click **Home > Requests**. You see the Requests page and can view the number of open requests that you created to design a VNF package.
2. Select **Begin** from the appropriate open VNF request wizard.

You are directed to the **Configure** page. It contains three tabs—Enter Basic Information, Select Functions, and Design Function Chains. You can click through the tabs to specify basic VNF information, flavor parameters, standard functions, custom functions, and supported function chains that are required for the VNF package.

3. Complete the configuration according to the guidelines provided in [Table 368 on page 982](#).

**Table 368: Fields on the VNF Information Page**

Field	Description
VNFD Name	<p>Displays the VNF Package request name that you provided. A VNFD is a deployment template that describes the deployment and operational behavior of the VNF. Some of the VNFs are listed below:</p> <ul style="list-style-type: none"> <li>• <b>Juniper Networks vSRX</b>—Supports both centralized and distributed deployments.</li> <li>• <b>LxCIPtable</b>—A free, third-party VNF based on Linux IP tables; supports only centralized deployments.</li> <li>• <b>CSR-1000V</b>—Cisco Cloud Services Router 1000V Series; supports only for centralized deployments.</li> <li>• <b>HAProxy</b>—An open source, reliable solution that offers high availability and proxy service for TCP applications.</li> </ul>
VNF Package Capability Version	<p>Displays the VNF package capability version.</p> <p>Example: 1.1</p>
VNF Manager	<p>Select the VNF configuration manager. A VNF manager represents plug-in information, which includes plug-in type and name and is extracted from an existing VNF. The VNF manager manages the life cycle management of VNFs including third-party VNFs. Some of the VNF managers are listed below:</p> <ul style="list-style-type: none"> <li>• Viptables</li> <li>• viptables_v2</li> <li>• generic_v2</li> <li>• JunosSpace</li> <li>• riverbed_v2</li> <li>• Space_14_2</li> <li>• Space_DMS_CMS_2_0</li> </ul>
Deployment Type	<p>Select the deployment type.</p> <ul style="list-style-type: none"> <li>• <b>uCPE only</b>—Select this option for a distributed deployment.</li> <li>• <b>vCPE only</b>—Select this option for a centralized deployment.</li> </ul>

Table 368: Fields on the VNF Information Page (*continued*)

Field	Description
Basic Configuration	<p>Select the basic configuration template. A basic configuration template ensures correct startup and ongoing manageability, management IP address, SNMP, and system logs and is created by using the Configuration Designer.</p> <p>Example: vSRX Space firewall config</p>
BootStrap Configuration	<p>Select the bootstrap configuration as a reference to the configuration template for the bootstrap configuration to be used when the VNF is spawned. Bootstrap configuration template is created using the Configuration Designer.</p> <p>Example: default-domain</p>
Network Configuration	<p>Select the network configuration as a reference to the configuration template for the networking configuration to be staged on the VNF. Network configuration template is created using the Configuration Designer.</p> <p>Example: default-domain</p>
OAM Ports	Enter one or more OAM port names for the distributed deployment VNF package.
VNF Capability	<p>Select one or more capabilities supported for the software release of the VNF.</p> <ul style="list-style-type: none"> <li>• <b>SRIOV-DATA</b>—Supports SRIOV and its data interfaces</li> <li>• <b>SRIOV-MGMT</b>—Supports SRIOV and its management interfaces</li> <li>• <b>CDROM-Bootstrapping</b>—Supports bootstrap configuration through CDROM ISO</li> <li>• <b>UserData-Bootstrapping</b>—Supports bootstrap configuration using CloudInit</li> <li>• <b>MGMT-VLAN-Tagged-Traffic</b>—Supports VLAN tagged traffic and its management interfaces</li> <li>• <b>DATA-VLAN-Tagged-Traffic</b>—Supports VLAN tagged traffic and its data interfaces</li> <li>• <b>Transparent-mode</b>—Supports insertion in transparent mode</li> <li>• <b>L3-mode</b>—Supports Layer 3 mode</li> <li>• <b>Direct-OAM-Reachability</b>—Enables service chaining of a third-party VNF. This option is supported only for centralized deployments(vCPE-Only).</li> </ul>

Table 368: Fields on the VNF Information Page (*continued*)

Field	Description
Connection Points	<p>Specify the connection points for the VNF package. You can also specify whether to enable or disable the TCP offloads for the VNF connection points. This option is supported only for distributed deployments(uCPE-Only).</p> <ul style="list-style-type: none"> <li>• <b>internal</b>—For internal management network.</li> <li>• <b>oob</b>—For out-of-band (OOB) management network.</li> <li>• <b>mgmt-interface</b>—For Operation, Administration, and Maintenance (OAM) network.</li> <li>• <b>left-interface</b>—For incoming traffic to the VNF.</li> <li>• <b>right-interface</b>—For outgoing traffic from the VNF.</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• You can configure only left interface and right interface for centralized deployment model.</li> <li>• You can re-order the connection points as per the port index(0-4).</li> </ul>
Package Flavors	Click Add icon. The New Flavor Parameters window appears. Add the flavor parameters to the VNF package.

## Adding Flavor Parameters

You can create a package flavor (for example, Gold, Silver, or Bronze) and assign the flavor to the VNF. Flavor parameters are computational properties of virtual deployable units (VDUs) and each package flavor supports only one virtual deployable unit (VDU). You can specify different resources for each VDU such as number of CPUs, allocated memory size, and allocated disk size. You can also specify a VNF image for VDU for vCPE devices and specify the bootstrap script for uCPE devices.

To add flavor parameters:

1. From the Package Flavors field on the Basic VNF Information page, click **Add**.

The New Flavor Parameters wizard appears.

2. Complete the configuration according to the guidelines provided in [Table 369 on page 985](#).

3. Click **Save**. If you want to discard your changes, click **Cancel** instead.

A graphical representation of the wizard is displayed and shows the VNF flavor name and the required virtual resources.



4. Click the edit icon at the top of the wizard to modify the flavor parameters. If you want to close the wizard, click the **X** icon.
5. Click **Next**.

The Select Functions page appears with the standard and custom functions.

**Table 369: New Flavor Parameters**

Field	Description
Flavor Name	Specify the name of the package flavor for the VNF.  Example: Gold, Silver, or Bronze
Image Name	Select the VNF image file.  Click <b>Upload Image</b> to upload VNF images for the centralized deployment through Administration Portal. See <a href="#">"Uploading a Device Image" on page 197</a> .  Example: csr1000v-img
CPU	Specify the number of virtual CPUs required for the VNF using a numeric value without a fractional component.  Example: 4 CPU cores
Memory	Specify the virtual memory size required for the VNF in megabytes (MB) using a numeric value without a fractional component.  Example: 4096 MB
Disk	Specify the virtual disk capacity required for the VNF in gigabytes (GB) using a numeric value without a fractional component.  Example: 128 GB
Bootstrap Script	Bootstrap script is supported only for the uCPE deployment. You can add a bootstrap script to support a third-party VNF for the uCPE devices.  Click <b>Add</b> .  The Edit Bootstrap Script wizard appears.
<b>Edit Bootstrap Script</b>	Edit and save the script. If you want to discard your changes, click <b>Cancel</b> instead.

Table 369: New Flavor Parameters (*continued*)

Field	Description
Script Type	<p>Select the supported bootstrap script for the third-party VNF. Supported bootstrap script types are:</p> <ul style="list-style-type: none"> <li>• <b>bash</b></li> <li>• <b>sh</b></li> <li>• <b>python</b></li> <li>• <b>perl</b></li> </ul> <p>The default script type is bash.</p>

## Adding Standard and Custom Functions

To add standard and custom functions:

1. On the Select Functions page, from the Standard Functions wizard, select the function category from the Category drop-down list. To select all function categories, click **All**.
  - There are four function categories: Security, Switching, Networking, and Routing.
  - When you select a function category, a list of network functions that belong to the function category is displayed in the wizard. For example, NAT, Firewall, Anitspam, and Antivirus are displayed when you select **Security**.
2. Select the network function that you want to add to the VNF package individually. If you want to select all network functions, click **Select All**.
3. Click **Add Custom Function** to add a custom function if the predefined category does not have the network function the user wants to use.

The Edit Custom Function wizard appears.

- a. Specify the name of the custom function.
  - b. Select the function category.
  - c. Click **Save**. If you want to discard your changes, click **Cancel** instead.
4. Click **Next**.

The Design Function Chains page appears.

## Designing a Supported Function Chain

To design a supported function chain:

1. On the Design Function Chains page, a list of standard and custom functions are displayed in the Function Palette wizard at the bottom of the page.
2. Drag any standard or custom function from the Function Palette wizard at the bottom of the page and drop it on the Supported Function Chains workspace at the top of the page in the order that they should appear. If you drop two or more functions to the workspace, the functions will automatically connect with a connection arrow to form a service chain.
3. Click the edit icon on the network function to add a configuration template for the network function.  
The Config Template wizard appears.
4. From the Template Name drop-down list, select the network configuration template to be staged on the VNF. Some configuration templates are listed as follows:
  - **IPTable NAT config** —Configuration template designed for NAT.
  - **IPTable Firewall config** —Configuration template designed for firewall.
  - **FireFly UTM config**—Configuration template designed for firefly UTM.
5. Click **Save**. If you want to discard your changes, click **Cancel** instead.
6. Using the guidelines in [Table 370 on page 988](#), specify assurance parameters for the VNF on the left panel of the page. Assurance parameters are used to provide SLA performance and scale indicators from the data sheet for the VNF. Each VNF flavor can achieve the SLA performance and scale indicators. When you design a network service in Network Service Designer, these values are used to determine how well your design meets your target performance for the network service.
7. Click **Next**.  
The service chain is created and displayed in the same page. For example, Antispam-UTM-NAT-Antivirus.
8. If you use more than one network function in the VNF package, click **Service Chain** to create the next combination of services.
9. Repeat steps 4 through 6 to create the service chain.
10. Repeat steps 6 through 9 until you have covered all possible combinations of the network functions including each function on its own.
11. Click **Next**.

The Review VNF Package page appears.

**Table 370: Assurance Parameters of the Network Function**

Field	Description
Service Mode	<p>Select the mode of network service that can be configured for the VNF.</p> <ul style="list-style-type: none"> <li>• <b>Transparent</b>—Used for services that do not modify the packet. Also known as <i>bump-in-the-wire</i> or <i>Layer 2 mode</i>. Example: Firewall, IDP, and so on.</li> <li>• <b>In-Network</b>—Provides a gateway service where packets are routed between the service instance interfaces. Example: NAT, Layer 3 firewall, load balancer, HTTP proxy, and so on.</li> <li>• <b>In-Network-NaT</b>—Similar to in-network mode, but return traffic does not need to be routed to the source network. In-network-nat mode is particularly useful for NAT service.</li> </ul> <p>The default service mode is In-Network.</p>
Bandwidth	<p>Specify the data rate for the virtualized network function in megabytes per second (Mbps) or gigabytes per second (Gbps).</p> <p>Example: 185</p>
Latency	<p>Specify the time a packet takes to traverse the virtualized network function in milliseconds (ms).</p> <p>Example: 5.8</p>
Sessions	<p>Specify the maximum number of sessions concurrently supported for the VNF.</p> <p>Example: 25,000</p>
License cost	<p>Specify the license cost for the virtualized network function in USD.</p>

## Viewing the Summary of VNF Packages

To view the summary of a VNF package:

1. On the Review VNF package page, you can view the VNF basic information, number of standard and custom network functions available, number of standard and custom network functions selected, and the number of service chains created for the VNF package.
2. Click the edit icon on top corner of each wizard to edit the individual fields of VNF basic information, functions, and service chains.

3. Click **Done**.

A success message is displayed.

The VNF package is added in the Designs page and the status of the package changes to **Validated**.

RELATED DOCUMENTATION

<a href="#">Resource Designer Overview   973</a>
<a href="#">Creating Requests for VNF Packages   980</a>
<a href="#">Adding VNF Managers   989</a>
<a href="#">Publishing VNF Packages   991</a>

Adding VNF Managers

Resource Designer allows a service provider to add a new VNF manager, including third-party VNF manager plug-in information, from the Designs page.

To clone a VNF package design:

1. Click **Home > Requests**. You see the Requests page and can view the number of open requests that you created to design a VNF package.
2. Select **Begin** from the appropriate open VNF request wizard.  
The Basic VNF Information page appears.
3. Click **Add VNF Manager**.  
The New VNF Manager wizard appears.
4. Complete the configuration according to the guidelines provided in [Table 371 on page 989](#).
5. Click **Save**. If you want to discard your changes, click **Cancel** instead.

Table 371: Add VNF Manager

Field	Description
VNF Manager Name	Select the VNF configuration manager. A VNF manager represents plug-in information, which includes plug-in type and name.  Example: JunosSpace

Table 371: Add VNF Manager (*continued*)

Field	Description
Username	Specify the username that you configured for the VNF manager.
Password	<p>Specify the password that you configured for the VNF manager.</p> <p>You can choose a password that is at least eight characters long and contains characters from at least three of the following four character classes: uppercase letters, lowercase letters, numbers (0 through 9), and special characters.</p>
Plug In	<p>Select the plug-in type.</p> <ul style="list-style-type: none"> <li>• <b>Built-In</b>—Built-in plug-in name.</li> <li>• <b>External Plugin</b>—Python plug-in package name.</li> </ul>
Built-In	<p><b>PlugIn Name</b>—Specify the built-in plug-in name.</p> <p>Example: viptables</p>
External Plugin	<ul style="list-style-type: none"> <li>• <b>PlugIn Name</b>—Specify the python VNF manager plug-in name, which is used to provide additional features on top of the existing built-in VNF manager. The naming convention of the package name is &lt;Vendor&gt;&lt;VNFM Name&gt;&lt;Version&gt;, and this can be installed through the PIP tool.</li> <li>• <b>Display Name</b>—Specify the display name for the VNF manager.</li> <li>• <b>Description</b>—Enter a description for your VNF manager. Make this description as clear and useful as possible for all administrators.</li> <li>• <b>Vendor</b>—Specify the vendor name that you want the external plug-in to support.</li> <li>• <b>EMS Name</b>—Specify an EMS name for the EMS instance that manages the VNF instances instantiated from the VNF package. Each POP is associated with an EMS instance to manage instances instantiated in the POP. The same EMS instance is shared by multiple POPs or dedicated EMS instances for each POP, and the EMS name is used to find the right EMS instance to manage the VNF instances in a specific POP.</li> </ul> <p>Example: Junos Space 15.1 and Versa Director 1.1.</p>

## RELATED DOCUMENTATION

[About the Designs Page for the Resource Designer | 991](#)
[Designing VNF Packages | 981](#)

# Publishing VNF Packages

After you have designed a VNF package, you need to publish the designed VNF package to the Network Service Designer. Only published VNF packages are available from the Network Service Designer.

To publish a VNF package to the Network Service Designer:

1. Select **Home > Designs**.

The VNF Package Designs page appears. All of the VNF packages are displayed in a table.

2. Select the VNF package (with the status as Validated) that you want to publish to the Network Service Designer.

3. Select **Publish to NSD** from the drop-down list at the end of the row.

Your VNF package is published and available to be used by the Network Service Designer. The status of the package changes from **Validated** to **Published**.

## RELATED DOCUMENTATION

[Resource Designer Overview | 973](#)

[Creating Requests for VNF Packages | 980](#)

[About the Designs Page for the Resource Designer | 991](#)

# About the Designs Page for the Resource Designer

To access this page, click **Home > Designs**.

Use the Designs page to manage VNF packages that you have saved or published. You can also view the information about each VNF package.

## Tasks You Can Perform

You can perform the following tasks from this page:

- View the VNF package information. See [Table 372 on page 992](#) for field descriptions of the Designs page.
- Export a VNF package from the Resource Designer. See [“Exporting VNF Packages” on page 994](#).
- Import a VNF package to the Resource Designer. See [“Importing VNF Packages” on page 994](#).

- Clone a VNF Package. See [“Cloning VNF Packages” on page 993](#).
- Modify the VNF package that you saved or published using the **Edit** option from the drop-down list. See [“Designing VNF Packages” on page 981](#).
- Publish a VNF package. See [“Publishing VNF Packages” on page 991](#).
- Delete a VNF package. See [“Deleting VNF Packages” on page 995](#).

## Field Descriptions

[Table 372 on page 992](#) provides guidelines on using the fields on the Designs page for the Resource Designer.

**Table 372: Fields on the Designs Page for the Resource Designer**

Field	Description
VNF Name	View the VNF package name. The name can be a string of alphanumeric characters, dashes, and spaces.  Example: ucpe-vSRX
Vendor	View the vendor that the VNF package supports.  Example: Juniper Networks
Family	View the device family supported by the VNF package.  Example: juniper-srx
Date	View the data and time when the VNF design package was created.  Example: 01/24/2017 12:01
Status	View the VNF package status. <ul style="list-style-type: none"> <li>• <b>Started</b> —An empty VNF package was created and the components need to be added.</li> <li>• <b>In-Progress</b> — A VNF package was created but the package is not validated.</li> <li>• <b>Validated</b>— Resource Designer validated the VNF package and it is ready to be published.</li> <li>• <b>Published</b>—Resource Designer published the VNF package and it is available from the Network Service Designer.</li> </ul>

## RELATED DOCUMENTATION



## Cloning VNF Packages

You can clone a VNF package from the Designs page when you want to quickly create a copy of an existing VNF package and modify its parameters including the name of the VNF.

To clone a VNF package design:

1. Select **Home > Designs**.

The Designs page appears.

2. Select the VNF package design that you want to clone, and click the clone icon at the top of the Designs page.

The Clone VNF Package wizard appears.

3. Specify an appropriate name for your new VNF package.

4. Click **Save**.

A success message is displayed. The cloned VNF package appears on the Designs page.

If you want to edit the cloned VNF package, select the VNF package and click **Edit** from the drop-down list at the end of the row.

### RELATED DOCUMENTATION

[About the Designs Page for the Resource Designer | 991](#)

[Designing VNF Packages | 981](#)

## Importing VNF Packages

You can import a VNF package design to the Designs page from third-party applications and VNF packages from another Resource Designer. A VNF package design retains its state when it is imported.

To import a VNF package design:

1. Select **Home > Designs**.

The Designs page appears.

2. Click the Import VNF package icon at the top of the Designs page.

The Import VNF wizard appears.

3. Click **Select files** to select the VNF JSON data file.

**NOTE:** You need to retain the file format as .json to successfully import the VNF package design to the Resource Designer.

4. Click **Import**. If you want to discard the import process, click **Cancel** instead.

A success message is displayed indicating that the VNF is imported. The imported VNF package appears on the Designs page.

### RELATED DOCUMENTATION

[About the Designs Page for the Resource Designer | 991](#)

[Designing VNF Packages | 981](#)

## Exporting VNF Packages

You can export a VNF package design from the Designs page when you want to use this VNF package in another Resource Designer that is running in another customer's server. A VNF package design retains its state when it is exported.

To export a VNF package design:

1. Select **Home > Designs**.

The Designs page appears with a list of VNF packages.

2. Select the VNF package design that you want to export.

3. Select **Export** from the drop-down list at the end of the row.

The VNF package JSON file opens at the bottom of the page.

4. Save the file to your computer.

You can modify the parameters and rename the JSON filename if required.

## RELATED DOCUMENTATION

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[About the Designs Page for the Resource Designer | 991](#)

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[Designing VNF Packages | 981](#)

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[Importing VNF Packages | 994](#)

## Deleting VNF Packages

To delete a VNF package design:

1. Select **Home > Designs**.

The Designs page appears with a list of VNF packages.

2. Select the VNF package design that you want to delete.

3. Select **Delete** from the drop-down list at the end of the row.

A page requesting confirmation for the deletion appears.

4. Click **Yes** to confirm.

The VNF package design is deleted.

## RELATED DOCUMENTATION

[Resource Designer Overview | 973](#)

[About the Designs Page for the Resource Designer | 991](#)

# Network Service Designer introduction

## IN THIS CHAPTER

- [Network Service Designer Overview | 997](#)
- [Accessing Network Service Designer | 998](#)

## Network Service Designer Overview

Network Service Designer is a visual design tool to create and manage network services for the Juniper Networks Contrail Service Orchestration (CSO).

The Network Service Designer receives input from the Configuration Designer and Resource Designer. Configuration Designer is used to create and manage configuration templates. The templates are based on a simple concept of configuration parameterization. Parameterization facilitates the creation of versatile configuration templates that can be easily used for different configurations. The different types of configuration templates are device-level base configurations, service configurations, and monitoring configurations. Resource Designer uses these configuration templates to create VNF packages that are published to Network Service Designer. You combine various VNFs from multiple vendors to create a service chain and publish it to the network service catalog. The network service orchestrator instantiates the service chain to CSO.

With Network Service Designer you can:

- Create requests for new network services.
- Design customized network services for your customers.
- Design new standard network services that you can offer to all your customers.
- Update existing network services.
- Publish services to the network service catalog.
- Manage network services that you are designing or have published to the network catalog.
- Configure some basic parameters for the VNFs used in a network service and the virtual containers in which the VNFs reside.

## RELATED DOCUMENTATION

[Network Services and Service Chains Overview | 999](#)

[Accessing Network Service Designer | 998](#)

## Accessing Network Service Designer

To access the Network Service Designer:

1. Review the OpenStack Keystone username and password that you defined.
  - For a centralized deployment, you can view these settings on the Contrail configure and control node in the files `/etc/contrail/keystonerc` and `/etc/contrail/openstackrc`.
  - For a distributed deployment, you can view these settings on the central infrastructure node in the file `/etc/keystone/keystonerc`.
  - The default username is **cspadmin** and the default password is **passw0rd**.
2. Using a Web browser, access the URL for the Network Services Designer.

For example, if the IP address of the host on which the Network Service Designer resides is 192.0.2.1, then the URL would be **https://192.0.2.1:83/nsd-ui/index.html**.

3. Log in with the OpenStack Keystone username and password.

## RELATED DOCUMENTATION

[Network Service Designer Overview | 997](#)

# Creating Requests for Network Services

## IN THIS CHAPTER

- [Network Services and Service Chains Overview | 999](#)
- [Performance Overview | 1000](#)
- [About the Requests Page for the Network Service Designer | 1001](#)
- [Creating Requests for Network Services | 1003](#)
- [Creating a Functional Service Chain | 1005](#)
- [Configuring Performance Goals | 1006](#)
- [Viewing Requests for Network Services | 1008](#)

## Network Services and Service Chains Overview

The terms *network service* and *service chain* are sometimes used interchangeably, but they are not the same; you need to understand the difference between them:

- A *network service* is a final product offered to end users with a full description of its functionality and specified performance.

Administrators deploy network services between two locations in a virtual network, so that traffic traveling in a specific direction on that link is subject to action from that service. This term is defined in the ETSI Network Functions Virtualization (NFV) standard.

- A *service chain* refers to the structure of a network service, and consists of a set of linked network functions, which are provided by specific virtualized network functions (VNFs), with a defined direction for traffic flow and defined ingress and egress points. Although not defined in the ETSI NFV standard, this term is regularly used in NFV and software-defined networking (SDN).

You can create a service chain in the Network Service Designer by using:

- One VNF instance that provides one or more functions. See [Figure 22 on page 1000](#).

Using one VNF instance instead of multiple instances increases performance.

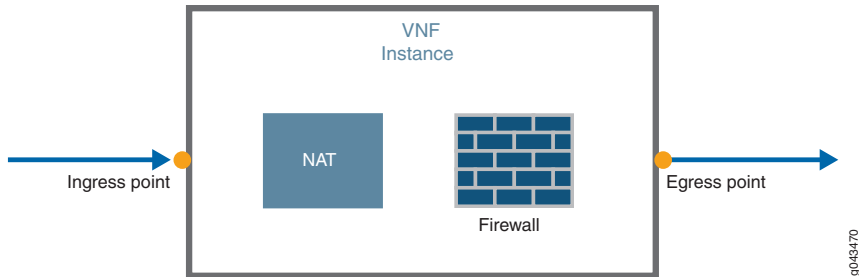
- Multiple instances of the same VNF, each providing certain functions. See [Figure 23 on page 1000](#).

Using multiple instances of the same VNF lowers performance, such as when you want to create differentiated services.

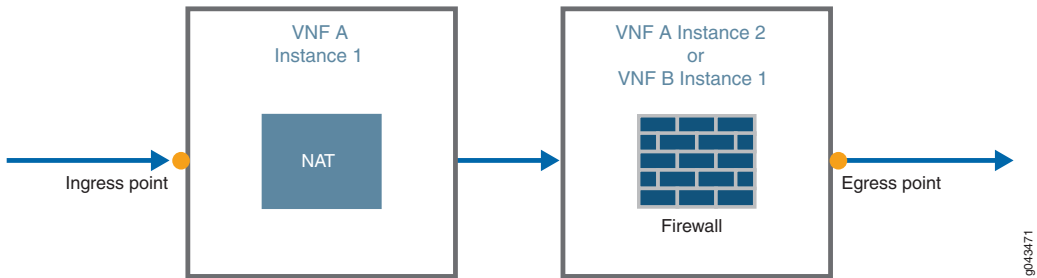
- Instances of different VNFs, each providing certain functions. See [Figure 23 on page 1000](#).

You might need to use different VNFs if one VNF cannot fulfill all network functions or if a particular VNF offers an advantage for a network function.

**Figure 22: Service Chain with One VNF Instance That Provides All Functions**



**Figure 23: Service Chain with Either Multiple Instances of the Same VNF or Multiple VNFs**



## RELATED DOCUMENTATION

[Performance Overview | 1000](#)

[Designing Network Services | 1012](#)

[Defining Ingress and Egress Points for a Service Chain | 1016](#)

## Performance Overview

The following parameters define the performance of a network service, a virtualized network function (VNF), and the component functions of a VNF:



- Sessions—Maximum number of sessions allowed for one instance of the service.
- Bandwidth (Mbps or Gbps)—Data rate for the function or service.
- Latency (ms or ns)—Time taken by a packet to traverse the function or service.
- Licence cost (USD)—Cost of the function or service.

Vendors provide specified values for these parameters for a VNF and for each allowed combination of components in the VNF (internal service chain). You can view the specified values in the Vendor catalog.

Network Service Designer evaluates the aggregate performance of the design against the goals in the request and displays the information in the Goals pane.

## RELATED DOCUMENTATION

[Configuring Performance Goals | 1006](#)

[Monitoring Performance Goals | 1017](#)

[VNF Overview | 978](#)

[Viewing Information About VNFs | 1011](#)

[Designing Network Services | 1012](#)

## About the Requests Page for the Network Service Designer

To access this page, click **Home> Requests**.

Use the Requests page to create and manage requests for new network services. You must create a request before you can design a network service.

A request contains information about the required service, such as:

- The customer's name.
- The requested functions in the network service. For example, NAT, UTM, and firewall.
- The performance goals for the service.

As soon as you start to design the network service, the request becomes a design, which you track on the Designs page. See [“About the Designs Page for the Network Service Designer” on page 1035](#).

Tasks You Can Perform

You can perform the following tasks from this page:

- Create requests for new network services. See [“Creating Requests for Network Services” on page 1003](#).
- Specify a sequence of network functions that you want in the network service. See [“Creating a Functional Service Chain” on page 1005](#).
- View open requests for network services. See [“Viewing Requests for Network Services” on page 1008](#).

Field Descriptions

[Table 373 on page 1002](#) provides guidelines on using the fields on the Requests page for the Network Service Designer.

Table 373: Fields on the Requests Page for the Network Service Designer

Field	Description
New Request	Click to request a new network service design. The New Request page allows you to define the requirements for your network service design.
Begin	Hover over a saved request and click <b>Begin</b> to design a network service. The Build page appears. You can specify the virtual network function, update the function configuration, and specify the performance goals.
Edit	Click to edit the network service design request details.
Delete	Click to delete a network service design request.

RELATED DOCUMENTATION

<a href="#">Network Service Designer Overview   997</a>
<a href="#">About the Designs Page for the Network Service Designer   1035</a>

# Creating Requests for Network Services

You must create a request before you can design a network service. When you create a request for a network service, you define the requirements for the service, including the required network functions and the performance goals.

To create a request for a network service:

1. Click **Home** in the toolbar and **Requests** in the left navigation bar.

2. Click **New Request**.

The Request Information page in which you specify information about the request appears.

3. Configure the request information according to the guidelines provided in [Table 374 on page 1003](#).

4. Click **Next**.

The Service Chain and Design Goals page appears, displaying the Goals pane, the Functional Service Design area, and the Function Palette.

5. Configure the goals and service chain according to the guidelines provided in [Table 374 on page 1003](#).

6. Click **Next**.

The Summary page appears that displays the details you entered for the request.

7. Review the details and make corrections if necessary, using the **Previous** and **Next** options to navigate through the pages.

8. After updating the information, click **Create**.

The request for the network service design appears on the Requests page.

**Table 374: Fields on the New Request Page**

Field	Description
<i>Request Information</i>	
Name	Specify the name for the request.  The Name field accepts up to 60 characters, including letters, numbers, and symbols.
Priority Request	(Optional) If the request is urgent, select the <b>Priority Request</b> check box.

Table 374: Fields on the New Request Page (*continued*)

Field	Description
Customer Name	<p>(Optional) Specify a customer name.</p> <p>The Customer Name field accepts up to 60 characters, including letters, numbers, and symbols.</p>
Description	<p>(Optional) Specify a description for the service.</p> <p>The Description field accepts up to 500 characters, including letters, numbers, and symbols.</p>
Requirements	<p>(Optional) Specify the requirements for the request.</p> <p>The Requirements field accepts up to 1000 characters, including letters, numbers, and symbols.</p>
Deployment Type	<p>(Optional) Select a Deployment Type from the drop-down list. The available options are:</p> <ul style="list-style-type: none"> <li>• vCPE-Only</li> <li>• uCPE-Only</li> </ul> <p>The default option is vCPE-Only.</p>
Attachments	<p>(Optional) Click <b>Select Files</b>, navigate to the file you want to attach, and click <b>Open</b>.</p> <p>The file is uploaded to the Attachments (Optional) field.</p>
<i>Service Chain and Design Goals</i>	
Function Palette	View the list of supported network functions in the Function Palette. You can drag the network function from the Function Palette and drop it to the Functional Service Design area.
Functional Service Design	Create a functional service chain by placing the required network functions in the required order. See <a href="#">“Creating a Functional Service Chain” on page 1005</a> .
Goals	Configure the performance goals for a network service. You can define goals for the number of sessions, bandwidth, latency, and license cost. See <a href="#">“Configuring Performance Goals” on page 1006</a> .
Summary	Review the details and make corrections if necessary, using the <b>Previous</b> and <b>Next</b> options to navigate through the pages.

## RELATED DOCUMENTATION

[Network Services and Service Chains Overview | 999](#)

[Performance Overview | 1000](#)

[Designing Network Services | 1012](#)

[Configuring Performance Goals | 1006](#)

[Creating a Functional Service Chain | 1005](#)

## Creating a Functional Service Chain

Network Service Designer automatically connects the network functions in the order that you place them in the design area. You can insert a function between two functions already on the design pane. If you make an error, you can use the delete icon or you can right-click a component in the design area and delete the component.

**NOTE:** The WAN links that are supported are WAN0, WAN1, and WAN2.

To create a functional service chain:

- For a centralized deployment model, drag and drop the network functions in the required order from the Function Palette to the Functional Service Design area.
- For a distributed deployment model, drag the network function from the Function Palette and drop it to the Functional Service Design area in the following order:
  - Between the ingress point and AppRouting function
  - Between the AppRouting function and WAN links
  - Between WAN Links and the egress point

## RELATED DOCUMENTATION

[Creating Requests for Network Services | 1003](#)

## Configuring Performance Goals

To configure the performance goals of a network service:

1. Click **Home > Requests > New Request** .

2. Enter the request information and click **Next**.

3. In the Goals pane, click **Add Goal**.

The New Goal window is displayed.

4. Configure the goals according to the guidelines provided in [Table 375 on page 1006](#).

**BEST PRACTICE:** Adding one or more goals to the request enables you to track performance of those parameters when you design a network service for the request. Although adding goals is not mandatory, we recommend that you do so.

5. Click **Save**.

**Table 375: Fields on the Performance Goal Page**

Field	Description
<i>Session</i>	
Goal Value	<p>Specify the target value for the goal. When you design a network service, the goal value is used by the Network Service Designer to evaluate how your design meets the goal. There is no upper limit. As a guideline, typical achievable values for a firewall are as follows:</p> <ul style="list-style-type: none"><li>• Session: 25,000–60,000 Min. of path</li><li>• Bandwidth: 185–240 Mbps</li><li>• Latency: 2–6 ms</li><li>• License Cost: 100 USD</li></ul>

Table 375: Fields on the Performance Goal Page (*continued*)

Field	Description
Acceptable Value	<p>Specify a value that is lower than the target and acceptable for the network service. When you design a network service, the acceptable value is used by the Network Service Designer to evaluate how your design meets the goal.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• Session: 20,000 Min. of path</li> <li>• Bandwidth: 150 Mbps</li> <li>• Latency: 5 ms</li> <li>• License Cost: 99 USD</li> </ul>
Must Value	<p>Specify the minimum value for the goal. The minimum value should be lower than the acceptable value. When you design a network service, the must value is used by the Network Service Designer to evaluate how your design meets the goal.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• Session: 15,000 Min. of path</li> <li>• Bandwidth: 100 Mbps</li> <li>• Latency: 4 ms</li> <li>• License Cost: 95 USD</li> </ul>
Based on	<p>View the method that is used by the Network Service Designer to evaluate how your design meets the goal. You cannot edit this field.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• Session: Min. of path If there are multiple VNFs in the service chain, then the VNF with the smallest bandwidth is chosen.</li> <li>• Bandwidth: Min. of path</li> <li>• Latency: Cumulative</li> <li>• License Cost: Cumulative</li> </ul>
Unit	<p>Specify the measurement unit of the goal.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• Bandwidth: Mbps, Gbps</li> <li>• Latency: ns, ms</li> <li>• License Cost: USD</li> </ul>

## RELATED DOCUMENTATION

[Performance Overview | 1000](#)[Monitoring Performance Goals | 1017](#)

## Viewing Requests for Network Services

You can view the requests for a network service in a hierarchical grid view and tree view. The grid view is the default option.

To view the requests for a network service in the tree view:

1. Select **Home> Requests**.

The Request page appears. All requests for a network service are displayed in the grid view.

2. Click **Show Details** (hierarchy icon at the top left of the page).

The requests for the network service are listed in the Home page.

3. Select a request to view the detailed information about the customer, supported function requirements, and design goals.

## RELATED DOCUMENTATION

[About the Requests Page for the Network Service Designer | 1001](#)



# Creating Network Services

## IN THIS CHAPTER

- About the Build Page for the Network Service Designer | 1009
- Viewing Information About VNFs | 1011
- Designing Network Services | 1012
- Connecting VNFs in a Service Chain | 1015
- Defining Ingress and Egress Points for a Service Chain | 1016
- Monitoring Performance Goals | 1017
- Configuring Network Services | 1018
- vSRX Configuration Settings | 1019
- LxCIPtable VNF Configuration Settings | 1028
- Cisco CSR-1000v VNF Configuration Settings | 1031
- Riverbed Steelhead VNF Configuration Settings | 1033
- Fortinet VNF Configuration Settings | 1033
- Ubuntu VNF Configuration Settings | 1034

## About the Build Page for the Network Service Designer

To access this page click **Home** > **Designs** > *Design Name* > **Edit**.

You can also view the Build page by following these steps:

1. Click **Home** in the toolbar and **Requests** in the left navigation bar.
2. Hover over an existing request.

A menu appears at the bottom right of the request that you are hovering over.

3. Click **Begin**.

The Build page appears.

Use the Build page to design, configure, save, and publish a network service. You can also view VNFs to use in your design and monitor how the design performs against your target goals.

## Tasks You Can Perform

You can perform the following tasks from this page:

- View performance specifications, required resources, and component network functions for each VNF. See [“Viewing Information About VNFs” on page 1011](#).
- Design a service chain for both distributed and centralized deployment models. See [“Designing Network Services” on page 1012](#).
- Define the ingress and egress point for a service chain. See [“Defining Ingress and Egress Points for a Service Chain” on page 1016](#).
- Connect VNFs in a service chain. See [“Connecting VNFs in a Service Chain” on page 1015](#).
- Configure the performance goals of a network service. See [“Configuring Performance Goals” on page 1006](#).
- Monitor the performance of a service. See [“Monitoring Performance Goals” on page 1017](#).

## Field Descriptions

[Table 376 on page 1010](#) provides guidelines on using the fields on the Build page for the Network Service Designer.

**Table 376: Fields on the Network Service Build Page**

Field	Description
Functional Service Design	View the functions in the network service.
Network Service Design	Drag and drop the VNFs from the VNF category, add ingress and egress points, and connect the VNFs.
Goals	Click to monitor the performance goals for the network service.
Info	Click to add the information about the Network Service Design that you want to track.
Docs	Click to upload documents about the Network Service Design, such as specifications, or requirement documents.
VNF Category	Choose the VNFs from the VNF category.
Functional Configuration	Click to configure the VNF settings.

Table 376: Fields on the Network Service Build Page (*continued*)

Field	Description
Save NSD	Click to save the network service design template.
Publish NSD	Click to publish the network service design template to the network service catalog.
Delete NSD	Click to delete multiple NSD templates together.

## RELATED DOCUMENTATION

[About the Designs Page for the Network Service Designer](#) | 1035

## Viewing Information About VNFs

You can view performance specifications, required resources, and component network functions for each VNF, which you created in the Resource Designer, in the VNF catalog. Reviewing this information can help you to determine which VNF to use when you are designing a network service.

To view information about a specific VNF:

1. Click the network function in the Vendor catalog.

The information window for the network function appears, displaying the following information in the Details tab:

- A graphical representation of the complete network function with ingress and egress points.
- A list of resources required for the network function.

2. Click **Functions**.

You see the category of the network function, such as security, and the component functions, such as NAT and firewall.

3. Click **Service Chains** to display:

- A list of the potential internal service chains (allowed combinations of component functions) for this network function.

Lines without arrows connecting component functions in an internal service chain indicate that the order of the functions does not matter.

- The performance specification for each internal service chain.
4. Click anywhere outside the window to close the VNF information window.

## RELATED DOCUMENTATION

[VNF Overview | 978](#)

[Performance Overview | 1000](#)

## Designing Network Services

### IN THIS SECTION

- [Designing a Network Service for a Centralized Deployment | 1012](#)
- [Designing a Network Service for a Distributed Deployment | 1014](#)

When you save a request it appears on the Requests page. You can then design a service chain to fulfill the request, using VNFs in the Vendor catalog to provide the requested network functions.

You can design the service chains for the following deployment models:

### Designing a Network Service for a Centralized Deployment

To design a service chain for a centralized deployment model:

1. Click **Home** in the toolbar and **Requests** in the left navigation bar.

The Requests page appears, displaying the open requests.

2. Click **Begin**.

The Build page displays the requested network functions and the goals.

3. Click the first function in the chain.

The VNF catalog at the bottom right of the page is refreshed to show the VNFs that provide this function.

4. Drag and drop a VNF from the catalog to the Network Service Design workspace.

The function appears inside the VNF image.

5. Add an ingress point to the first VNF in the chain.

The Performance Goals pane is refreshed to indicate how the network service design meets the defined goals.

6. Click the next function in the chain.

The VNF catalog is refreshed to show only the VNFs that provide this function. If a VNF in the Network Service Design workspace supports this function, a faded image of the function appears inside the VNF image.

7. Choose a VNF for this function:

- To implement this function with the same VNF, click the faded image in the VNF image.
- To implement this function with a different VNF, drag the VNF from the Vendor catalog to the Network Service Design workspace.

8. Repeat Step 6 and Step 7 until you have assigned a VNF to each required network function. If you make an error in the design area, you can right-click and delete the component.

9. If you have used multiple VNFs in your design, connect them by packet flow.

10. Add an egress point to the last VNF in the chain.

The Performance Goals pane is refreshed again to indicate how the network service design meets the customer goals.

11. Click **Save NSD** to save the design.

12. (Optional) Configure the Network Service.

13. Click **Publish NSD** to add the service to the catalog.

The Publish NSD page appears.

- a. Specify a name (that customers see) for this network service.

The field accepts up to 60 characters, including letters, numbers, and symbols.

- b. Specify a description of the service.

The field accepts up to 500 characters, including letters, numbers, and symbols.

- c. Select the type of service from the menu.
- d. Click **Publish**.

## Designing a Network Service for a Distributed Deployment

To design a service chain for a distributed deployment model:

1. Click **Home** in the toolbar and **Requests** in the left navigation bar.

The Requests page appears, displaying the open requests.

2. Click **Begin**.

The Build page displays the requested network functions and the goals.

3. Click the first function in the chain.

The Vendor catalog is refreshed to show only the VNFs that provide this function.

4. Drag the VNF from the Vendor catalog and drop the network functions at the appropriate points in the network chain to meet the requirements of your network.

The Performance Goals pane is refreshed to indicate how the network service design meets the customer goals.

**NOTE:** The ingress point, egress points, and gateway router are automatically updated for the distributed deployment model.

5. Click the next function in the chain.

The Vendor catalog updates to show only the VNFs that provide this function. If a VNF in the Network Service Design workspace supports this function, a faded image of the function appears inside the VNF image.

6. If you have used multiple VNFs in your design, then drag and drop the network functions at the appropriate points in the network chain.

The Performance Goals pane again updates to indicate how the network service design meets the customer goals.

7. Repeat Step 4 and Step 5 until you have assigned a VNF to the required network function. If you make an error, you can right-click a component in the network service design area and delete the component.

8. (Optional) Click **Function Configuration** and configure the network service.

9. Click **Save NSD** to save the design.

10. Click **Publish NSD** to add the service to the catalog.

The Publish NSD page appears.

a. Specify an official name (that customers see) for this network service.

The field accepts up to 60 characters, including letters, numbers, and symbols.

b. Specify a description of the service for customers to read.

The field accepts up to 500 characters, including letters, numbers, and symbols.

c. Select the type of service from the menu.

d. Click **Publish**.

## RELATED DOCUMENTATION

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[Network Services and Service Chains Overview | 999](#)

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[Performance Overview | 1000](#)

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[Defining Ingress and Egress Points for a Service Chain | 1016](#)

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[Connecting VNFs in a Service Chain | 1015](#)

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[Configuring Network Services | 1018](#)

## Connecting VNFs in a Service Chain

To connect VNFs in a service chain:

1. Click **Connect**, then click **ELAN**.

The dots that represent potential ingress and egress points on the VNFs enlarge.

2. Hover over the egress point of the first VNF until a green circle appears.

3. Click and hold the green circle, then drag the cursor to the green circle that appears around the ingress point for the next VNF, and release the mouse button.

A one-way arrow indicating the flow of traffic in the service chain appears.

4. Repeat Step 1 through Step 3 until you have connected all VNFs in the service chain.

#### RELATED DOCUMENTATION

[Network Services and Service Chains Overview | 999](#)

[Designing Network Services | 1012](#)

## Defining Ingress and Egress Points for a Service Chain

To define the ingress point and the egress point for a service chain that you are designing:

1. Click **Ingress**.

The dots that represent potential ingress and egress points on VNFs enlarge.

2. Click the dot that represents the ingress point for the service chain.

An arrow indicating the direction of traffic flow with the label I appears.

3. Click **Egress**.

4. Click the dot that represents the egress point for the service chain.

An arrow indicating the direction of traffic flow with the label E appears.

5. Click the egress point of the last VNF to define the egress point.

#### RELATED DOCUMENTATION

[Network Services and Service Chains Overview | 999](#)

[Designing Network Services | 1012](#)

[Monitoring Performance Goals | 1017](#)



## Monitoring Performance Goals

Network Service Designer provides comprehensive information about the performance of VNFs and their component network functions in the VNF catalog. Network Service Designer also tracks the aggregate performance of a network service that you are designing and saves the information to the network service catalog.

Minimizing the number of VNFs and VNF instances in a service chain optimizes the performance of a network service. For example, using one VNF instance for both NAT and firewall functions provides higher performance than using either separate instances of the same VNF or different VNFs to provide the functions.

You specify performance goals for the service when you create a request for a network service. When you are designing a service chain, you evaluate the performance of your design against the requested goals.

To monitor the performance of a service that you are designing:

1. Click the right arrow in the Goals pane to view the performance goals.
2. Add an ingress point to the first VNF in the service chain immediately after you assign that VNF to the first network function.
3. Monitor the values in the Goals pane as you design your service chain.

### RELATED DOCUMENTATION

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[Network Services and Service Chains Overview | 999](#)

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[Performance Overview | 1000](#)

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[Designing Network Services | 1012](#)

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[Defining Ingress and Egress Points for a Service Chain | 1016](#)

## Configuring Network Services

When you are designing a service chain or after you have designed a service chain, you can configure settings for the VNFs in the chain. The configuration settings you can configure are specified in Configuration Designer and the values for the settings are specified in Resource Designer. The settings that you configure are:

- The virtual container in which the VNF resides.
- The network functions, such as NAT or firewall.

The settings that you can configure depend on the actual VNF. Manual configurations are optional and override automatic configurations specified by the Contrail Service Orchestration (CSO) deployment script, other CSO components, or default settings that you configured with Resource Designer.

To configure the network service:

1. View the service chain design on the Build page.

If the design is not currently visible on the Build page:

- a. Click **Home** in the toolbar and **Designs** in the left navigation bar.

The list of saved and published designs appears.

- b. Click **Edit** for the network service you want to configure.

The Build page appears, displaying the service chain design.

2. Click **Function Configuration**.

The Service page appears, displaying the VNFs in the service chain and the Base Configure tab for the first VNF in the Functional Service Design workspace.

3. Specify the settings on the Base Configure tab.

This action configures the virtual machine in which the VNF resides.

### BEST PRACTICE:

- Complete all the settings in the Base Configure tab to optimize your deployment. End users can see these settings in Customer Portal or custom access software and should not override them.
- Configure few example settings for the service. These example settings must be generic and not network-specific. End users can configure service settings specific to their networks in Customer Portal.

4. (Optional) Specify settings on the other tabs for this VNF to customize a particular function such as NAT.

End users can customize their own services with these settings in Customer Portal. Settings that end users specify in Customer Portal override conflicting settings that you specify in Network Service Designer.

5. Click the next VNF icon in the Configuration page.
6. Repeat Step 3 and Step 4.
7. Repeat Steps 5 through 7 for each VNF in the chain.
8. Click **OK**.

The Service page closes.

RELATED DOCUMENTATION

<a href="#">vSRX Configuration Settings   1019</a>
<a href="#">LxCIPtable VNF Configuration Settings   1028</a>
<a href="#">Cisco CSR-1000v VNF Configuration Settings   1031</a>
<a href="#">Riverbed Steelhead VNF Configuration Settings   1033</a>

## vSRX Configuration Settings

**BEST PRACTICE:** Service providers configure base settings for a VNF. Customers should not change these values unless directed to do so by their service provider. Service providers may provide some generic examples of service configurations for their customers. Customers can configure services—for example, by creating policies—appropriate to their networks in Customer Portal.

Use the information in the following tables to provide values for the available settings:

- [Table 377 on page 1020](#) shows the settings you can configure for the virtual machine (VM) that contains the VNF.
- [Table 378 on page 1022](#) shows the firewall settings you can configure.

**NOTE:** Firewall is supported on both centralized deployment model and distributed deployment model.

- [Table 379 on page 1024](#) shows the Network Address Translation (NAT) settings you can configure.

**NOTE:** NAT is supported in distributed deployment model only.

- [Table 380 on page 1025](#) shows the unified threat management (UTM) settings you can configure.

**NOTE:** UTM is supported on both centralized deployment model and distributed deployment model.

**Table 377: Fields for the vSRX Base Settings**

Field	Description
Host Name	<p>For a cloud site, specify the hostname of the VM that contains the vSRX VNF. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: vm-vsrx</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
Loopback Address	<p>Specify an IPv4 loopback address for the management interface of the VM.</p> <p>Example: 192.0.2.25</p>
DNS Servers	<p>Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers.</p> <p>Example: 192.0.2.35</p>
NTP Servers	<p>Specify the FQDNs or IP addresses of one or more NTP servers.</p> <p>Example: 192.0.2.45</p>
Syslog Servers	<p>Specify the FQDNs or IP addresses of one or more system log servers.</p> <p>Example: 192.0.2.55</p>

Table 377: Fields for the vSRX Base Settings (*continued*)

Field	Description
Enable Re-filter	<p>Select <b>True</b> to enable a stateless firewall filter that protects the Routing Engine from denial-of-service (DoS) attacks or <b>False</b> to allow DoS attacks.</p> <p>Example: True</p>
Enable Default Screens	<p>For a cloud site, select <b>True</b> to enable the default screens security profile for the destination zone or <b>False</b> to disable default screening.</p> <p>Example: False</p> <p>You cannot configure this setting for an on-premise site.</p>
Time Zone	<p>Specify the time zone for the VM.</p> <p>Example: UTC</p>
Right Interface	<p>Specify the identifier of the VM interface that transmits data.</p> <p>Example: ge-0/0/1</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
Left Interface	<p>Specify the identifier of the VM interface that receives data.</p> <p>Example: ge-0/0/0</p> <p>For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.</p>
SNMP Prefix List	<p>If you set the Enable Re-filter field to <b>True</b>, specify the routes that the Junos Space Virtual Appliance uses for SNMP operations when it discovers the vSRX VNF.</p> <p>Example: 10.0.2.0/24</p>
Ping Prefix List	<p>If you set the Enable Re-filter field to <b>True</b>, specify the routes that the Junos Space Virtual Appliance uses for ping operations when it discovers the vSRX VNF.</p> <p>Example: 10.0.2.1/24</p>
Space Servers	<p>If you set the Enable Re-filter field to <b>True</b>, specify the IP addresses of the VMs that contain the Junos Space Virtual Appliances.</p> <p>Example: 10.0.2.50</p>

Table 378: Fields for the vSRX Firewall Settings

Field	Description
Policy Name	<p>Specify the name of the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: policy-1</p>
Source Zone	<p>Select the security zone from which packets originate.</p> <ul style="list-style-type: none"> <li>• <b>left</b>—Interface that transmits data to the host</li> <li>• <b>right</b>—Interface that receives data transmitted from the host</li> </ul> <p>Zone policies are applied to traffic traveling from one security zone (source zone) to another security zone (destination zone). This combination of a source zone and a destination zone is called a <i>context</i>.</p> <p>Example: left</p>
Destination Zone	<p>Select the security zone to which packets are delivered.</p> <ul style="list-style-type: none"> <li>• <b>left</b>—Interface that transmits data to the host</li> <li>• <b>right</b>—Interface that receives data transmitted from the host</li> </ul> <p>Zone policies are applied to traffic traveling from one security zone (source zone) to another security zone (destination zone). This combination of a source zone and a destination zone is called a <i>context</i>.</p> <p>Example: right</p>
Source Address	<p>Specify the source IP address prefixes that the network service uses as match criteria for incoming traffic.</p> <p>To add source addresses:</p> <ol style="list-style-type: none"> <li>1. Click the <b>Source Address</b> column. The source-address page appears.</li> <li>2. Select <b>any</b> to match any source IP address of packets or <b>ipp</b> to match a specific prefix in the source IP address for which the application enforces the policy.</li> <li>3. If you select <b>ipp</b>, specify a prefix.</li> <li>4. Click <b>OK</b>.</li> </ol> <p>Example: 10.0.2.30</p>

Table 378: Fields for the vSRX Firewall Settings (continued)

Field	Description
Destination Address	<p>Specify the destination IP address prefixes that the network service uses as match criteria for outgoing traffic.</p> <p>To add a destination address:</p> <ol style="list-style-type: none"><li>1. Click the <b>Destination Address</b> column. The destination-address page appears.</li><li>2. Select <b>any</b> to match any source IP address of packets or <b>ipp</b> to match a specific prefix in the source IP address for which the application enforces the policy.</li><li>3. If you select <b>ipp</b>, specify a prefix.</li><li>4. Click <b>OK</b>.</li></ol> <p>Example: 192.0.2.0/24</p>
Action	<p>Select <b>permit</b> to transmit packets that match the rule or <b>deny</b> to drop packets that match the rule.</p> <p>Example: permit</p>

Table 378: Fields for the vSRX Firewall Settings (*continued*)

Field	Description
Application	<p>Specify the applications to which the policy applies. The applications are based on protocols and ports.</p> <p>To specify applications:</p> <ol style="list-style-type: none"> <li>1. Click the <b>Application</b> column. The application page appears.</li> <li>2. In the allowed_apps field, select <b>any</b> to match any application or <b>app</b> to choose specific applications. If you select <b>app</b>, press and hold the Ctrl key and click the required applications from the drop-down list. <ul style="list-style-type: none"> <li>• junos-tcp-any</li> <li>• junos-udp-any</li> <li>• junos-ftp</li> <li>• junos-http</li> <li>• junos-https</li> <li>• junos-icmp-all</li> <li>• junos-icmp-ping</li> <li>• junos-telnet</li> <li>• junos-tftp</li> </ul> </li> <li>3. Click <b>OK</b>.</li> </ol> <p>Example:</p> <ul style="list-style-type: none"> <li>• junos-tcp-any</li> <li>• junos-udp-any</li> </ul>

Table 379: Fields for the vSRX NAT Settings

Field	Guidelines
NAT Source Name	<p>Specify the source IP address of packets that the policy rules match.</p> <p>Example: 10.0.2.2/24</p>
NAT Destination Name	<p>Specify the destination IP address of packets that the policy rules match.</p> <p>Example: 10.0.2.3/24</p>



Table 379: Fields for the vSRX NAT Settings (*continued*)

Field	Guidelines
NAT policy settings—For information about the following policy settings, see the firewall policy settings in Table 2.	
<ul style="list-style-type: none"> <li>• Policy Name</li> <li>• Source Zone</li> <li>• Destination Zone</li> <li>• Source Address</li> <li>• Destination Address</li> <li>• Action</li> <li>• Application</li> </ul>	

Table 380: Fields for the vSRX UTM Settings

Field	Description
<b>Antivirus</b>	<p>Select <b>True</b> to check for viruses in application layer traffic against a virus signature database. Select <b>False</b> to disable checking for viruses.</p> <p>Example: True</p>
<b>Antispam</b>	<p>Select <b>True</b> to block spam e-mails or <b>False</b> to allow spam e-mails.</p> <p>Example: True</p>
<b>Antispam Black List</b>	<p>Specify an address blocklist for local spam filtering.</p> <p>Blocklists contain e-mail addresses from which you do not want to receive messages.</p> <p><b>NOTE:</b> When both the allowlist and blocklist are in use, the allowlist is checked first. If there is no match, then the blocklist is checked.</p> <p>Example: john@example.net</p>
<b>Antispam White List</b>	<p>Specify an address allowlist for local spam filtering.</p> <p>Allowlists contain e-mail addresses from which you want to receive messages.</p> <p><b>NOTE:</b> When both the allowlist and blocklist are in use, the allowlist is checked first. If there is no match, then the blocklist is checked.</p> <p>Example: user@example.net</p>

Table 380: Fields for the vSRX UTM Settings (*continued*)

Field	Description
<b>Antispam Action</b>	<p>Select the antispam action that you want the device to take when it detects spam:</p> <ul style="list-style-type: none"> <li>• <b>block</b>—Blocks the message</li> <li>• <b>tag-subject</b>—Tags the subject field with a preprogrammed string</li> <li>• <b>tag-header</b>—Tags the message header with a preprogrammed string</li> </ul> <p>Example: block</p>
<b>Content Filter</b>	<p>Select <b>True</b> to block different types of traffic based on the MIME type, file extension, protocol command, and embedded object type or <b>False</b> to permit these types of traffic.</p> <p>Example: True</p>
<b>Content Filter Extensions</b>	<p>Specify one or more file extensions to block over HTTP, FTP, SMTP, IMAP, and POP3 connections.</p> <p>Example: exe, pdf, js</p>
<b>Content Filter Mime</b>	<p>Specify the MIME types to be blocked or permitted over HTTP, FTP, SMTP, IMAP, and POP3 connections.</p> <p>Example: application, exe</p>
<b>Content Filter Protocol Commands</b>	<p>Specify commands for HTTP, FTP, SMTP, IMAP, and POP3 protocols to block traffic based on these commands.</p> <p>Example: put, mput</p>
<b>Content Filter Content Type</b>	<p>Press and hold the Ctrl key and click one or more of the following types of content to specify filtering of traffic that is supported only for HTTP and is not covered by file extensions or MIME types:</p> <ul style="list-style-type: none"> <li>• Active X</li> <li>• Windows executable files (.exe)</li> <li>• HTTP cookie</li> <li>• Java applet</li> <li>• Zip files</li> </ul> <p>Example: activex, exe</p>

Table 380: Fields for the vSRX UTM Settings (*continued*)

Field	Description
<b>Content Filter Apply To</b>	<p>Press and hold the Ctrl key and click one or more of the following protocols in the drop-down list to specify filtering of traffic associated with these protocols:</p> <ul style="list-style-type: none"> <li>• HTTP</li> <li>• FTP</li> <li>• POP3</li> <li>• IMAP</li> <li>• SMTP</li> </ul> <p>Example: http, ftp</p>
<b>Web filter</b>	<p>Select <b>True</b> to prevent access to specific websites and embedded object types or <b>False</b> to permit access to all websites.</p> <p>Example: True</p>
<b>Web Filter Black List</b>	<p>Specify URLs to create a blocklist of websites to block.</p> <p><b>NOTE:</b> A Web filtering profile can contain one allowlist or one blocklist with multiple user-defined categories, each with a permit or block action.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• www.example1.com</li> <li>• www.example2.com</li> </ul>
<b>Web Filter White List</b>	<p>Specify URLs to create an allowlist of websites that users can always access.</p> <p>With local Web filtering, the firewall intercepts every HTTP request in a TCP connection and extracts the URL. The network service then looks up the URL to determine whether it is in the allowlist or blocklist based on its user-defined category.</p> <p><b>NOTE:</b> A Web filtering profile can contain one allowlist or one blocklist with multiple user-defined categories, each with a permit or block action.</p> <p>Example: www.example3.net</p>

Table 380: Fields for the vSRX UTM Settings (continued)

Field	Description
Policy settings—For information about the following policy settings, see the firewall policy settings in Table 2.	
<ul style="list-style-type: none"><li>• Source Zone</li><li>• Destination Zone</li><li>• Source Address</li><li>• Destination Address</li><li>• Action</li><li>• Application</li></ul>	

RELATED DOCUMENTATION

| [Configuring Network Services](#) | 1018

LxCIPtable VNF Configuration Settings

**BEST PRACTICE:** Service providers configure base settings for a VNF. Customers should not change these values unless directed to do so by their service provider. Service providers may provide some generic examples of service configurations for their customers. Customers can configure services—for example, by creating policies—appropriate to their networks in Customer Portal.

Use the information in the following tables to provide values for the available settings:

**NOTE:** The tables are applicable for centralized deployment model only.

- [Table 381 on page 1029](#) shows the base settings you can configure for the Linux container.
- [Table 382 on page 1029](#) shows the firewall settings you can configure.
- [Table 383 on page 1031](#) shows the Network Address Translation (NAT) settings you can configure.

Table 381: Fields for the LxCIP Base Settings

Field	Description
Loopback Address	Specify a loopback IP address.  Example: 192.0.2.10
Operation	Select <b>add</b> to apply the policies to a specific route or <b>del</b> to prevent use of the policies on specific routes.  Example: add
Route	Specify the IP prefix of the route to which the policies should apply.  Example: 192.0.2.20/24
Next Hop	Specify the IP address of a Contrail gateway network to which the VM connects.  Example: 192.0.2.20

Table 382: Fields for the LxCIP Firewall Policy Settings

Field	Description
<i>Firewall Policies</i>	
Prevent SSH Brute	Select <b>True</b> to prevent SSH brute attacks or <b>False</b> to allow SSH brute attacks.  Example: False
Prevent Ping Flood	Select <b>True</b> to prevent ping flood attacks or <b>False</b> to allow ping flood attacks.  Example: False
<i>Forwarding Rule Settings</i>	
Destination Address	Specify the destination IP address prefix that the network service uses as a match criterion for outgoing traffic.  Example: 192.0.2.25/24

Table 382: Fields for the LxCIP Firewall Policy Settings (*continued*)

Field	Description
Operation	<p>Select the operation, which applies to a chain of rules of the same type, from the drop-down list. The following options are available:</p> <ul style="list-style-type: none"> <li>• <b>append</b>—Append the rule to a rule chain.</li> <li>• <b>insert-before</b>—Insert the rule before a rule with the same name.</li> <li>• <b>delete</b>—Replace an existing rule with this name.</li> </ul> <p>Example: append</p>
Source Address	<p>Specify the source IP address prefix that the network service uses as a match criterion for outgoing traffic.</p> <p>Example: 192.0.2.20/24</p>
Name	<p>Specify the name for the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols.</p> <p>Example: vsrx-fw-policy</p>
Action	<p>Select the action for the rule, which applies to all traffic that matches the specified criteria.</p> <ul style="list-style-type: none"> <li>• <b>accept</b>—Transmit packets that match the policy parameters.</li> <li>• <b>drop</b>—Drop packets that match the policy parameters.</li> <li>• <b>reject</b>—Reject packets that match the policy parameters.</li> </ul> <p>Example: accept</p>
Service	<p>Specify the service that you want the rule to match.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• http</li> <li>• smtp</li> </ul>
Type	<p>Select the type of packet that the rule matches.</p> <ul style="list-style-type: none"> <li>• <b>input</b>—Packets that the network service receives that are addressed to this VM</li> <li>• <b>forward</b>—Packets that the network service receives that are addressed to other VMs</li> <li>• <b>output</b>—Packets that the network service transmits</li> </ul> <p>The application creates a chain of all rules with a particular type.</p> <p>Example: input</p>

Table 383: Fields for the LxCIP NAT Policy Settings

Field	Description
Left Interface	Specify the name of the interface on which the network service enforces NAT for incoming traffic.  Example: Eth1
Right Interface	Specify the name of the interface on which the network service enforces NAT for outgoing traffic.  Example: Eth2

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## Cisco CSR-1000v VNF Configuration Settings

**BEST PRACTICE:** Service providers configure base settings for a VNF. Customers should not change these values unless directed to do so by their service provider. Service providers may provide some generic examples of service configurations for their customers. Customers can configure services—for example, by creating policies—appropriate to their networks in Customer Portal.

Use the information in the following tables to provide values for the available settings:

**NOTE:** The tables are applicable for centralized deployment model only.

- [Table 384 on page 1032](#) shows the base settings you can configure for the virtual machine (VM) that contains the VNF.
- [Table 385 on page 1032](#) shows the firewall settings you can configure.

Table 384: Fields for the CSR-1000v Base Settings

Field	Description
Host Name	Specify the hostname of the VM.  Example: host1
Loopback Address	Specify the IPv4 loopback IP address.  Example: 10.0.2.50
Name Servers	Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers.  Example: 10.0.2.15
NTP Servers	Specify the FQDNs or IP addresses of one or more NTP servers.  Example: ntp.example.net

Table 385: Fields for the CSR-1000v Firewall Settings

Field	Description
Left Interface	Specify the identifier of the interface that transmits data to the host.  Example: GigabitEthernet2
Right Interface	Specify the identifier of the interface receiving data transmitted by the host.  Example: GigabitEthernet3
Left to Right Allowed Apps	Select the applications from the drop-down list for which the policy is enforced in outgoing packets. The following applications are available: <ul style="list-style-type: none"> <li>• http</li> <li>• https</li> <li>• telnet</li> <li>• ftp</li> <li>• tcp</li> <li>• udp</li> <li>• icmp</li> </ul> Example: http, https



Table 385: Fields for the CSR-1000v Firewall Settings (*continued*)

Field	Description
Right to Left Allowed Apps	<p>Select the application from the drop-down list for which the policy is enforced for incoming packets. The following applications are available:</p> <ul style="list-style-type: none"> <li>• http</li> <li>• https</li> <li>• telnet</li> <li>• ftp</li> <li>• tcp</li> <li>• udp</li> <li>• icmp</li> </ul> <p>Example: ftp, udp</p>

## RELATED DOCUMENTATION

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## Riverbed Steelhead VNF Configuration Settings

You configure the Riverbed Steelhead VNF through its own software. See the Riverbed Steelhead documentation for information about how to configure the VNF settings.

## RELATED DOCUMENTATION

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## Fortinet VNF Configuration Settings

You can configure the Fortinet VNF by logging in to the Fortinet UI. The URL for accessing the Fortinet UI is `https://loopback-IP-Address-of-spoke: 49155`, where the loopback IP address is the IP address that you provided to Contrail Service Orchestration (CSO) while configuring the spoke site.

For information about configuring the VNF, see the Fortinet documentation.

## RELATED DOCUMENTATION

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## Ubuntu VNF Configuration Settings

You can configure the Ubuntu VNF by logging in to the regional microservices virtual machine (VM) and establishing an outbound SSH connection to the loopback IP address of the spoke. The CLI command to access the Ubuntu VNF is as follows:

```
root@regionalmsvm:~#ssh -p 49153 admin@loopback-IP-Address
```

For information about configuring the VNF settings, see the Ubuntu documentation.

## RELATED DOCUMENTATION

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# Managing Network Services

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## About the Designs Page for the Network Service Designer

To access this page, click **Home> Designs**.

Use the Designs page to view and manage the network service design templates that you have saved or published.

### Tasks You Can Perform

You can perform the following tasks from this page:

- Publish a network service design template to the network service catalog. See [“Publishing Network Service Designs” on page 1037](#)
- Editing a network service design template. See [“Editing Network Service Designs” on page 1038](#)
- Delete one or more network service designs. See [“Deleting Network Service Designs” on page 1039](#)
- Copy one or more network service designs. See [“Copying Network Service Designs” on page 1037](#)
- View complete details of a network service design. See [“Viewing Network Service Designs” on page 1040](#)

## Field Descriptions

Table 386 on page 1036 provides guidelines on using the fields on the Designs page for the Network Service Designer.

**Table 386: Fields on the Designs Page for the Network Service Designer**

Field	Description
Priority	View the priority of the network service design.
Customer Name	View the customer name. The name can be a string of alphanumeric characters, dashes, and spaces.  Example: Juniper Networks
Network Design	View the network service design name. The name can be a string of alphanumeric characters, dashes, and spaces.  Example: nsd-firewall-nat-test
Functional Design	View the name of the functional design, which is obtained from the tenant requirement. The name can be a string of alphanumeric characters, dashes, and spaces.  Example: nsd-fd-test
Date	View the date and time when the network service design template was created.  Example: 02/06/2017 11:01
Status	View the network service design status: <ul style="list-style-type: none"> <li>• <b>Started</b>—Network Service Design template is created and the components need to be added.</li> <li>• <b>In-Progress</b>—Network Service Design template is created but the template has not been validated.</li> <li>• <b>Validated</b>—Network Service Design template is validated and it is ready to be published.</li> <li>• <b>Published</b>—Network Service Designer published the network service design template and it is available to the Customer Portal for use.</li> </ul>

## RELATED DOCUMENTATION

## Publishing Network Service Designs

After you have designed a network service design template, you need to publish the design to the network service catalog. Only published designs are available from the network service Catalog.

To publish a completed design to the network service catalog:

1. Select **Home> Designs**.

The Network Service Designs page appears. All the network service designs are displayed in a table.

2. Select the network service design that you want to publish.

The status of the template is **Validated**. For published designs, the status is **Published**.

3. Select **Publish** from the Edit drop-down list.

Your network service design is published and available to be used by the network service catalog. Its status changes from **Validated** to **Published**.

### RELATED DOCUMENTATION

## Copying Network Service Designs

You can create a new network service design template by copying an existing design template and editing it.

To copy one or more designs that you have saved or published:

1. Select **Home> Designs**.

The Network Service Designs page appears. All the network service designs are displayed in a table.

2. Select the network service design that you want to copy and click **Copy NSD**.

A page requesting confirmation for the copying appears.

3. Click **Yes** to confirm that you want to copy the designs.

The additional services appear in the table with the status as **Validated**.

## RELATED DOCUMENTATION

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## Editing Network Service Designs

To edit a network service design that you have saved or published:

1. View the network service design on the Build page.

If the design is not currently visible on the Build page:

- a. Click **Home** in the toolbar and **Designs** in the left navigation bar.

The list of saved and published designs appears.

- b. Click **Edit** for the network service you want to configure.

The Build page appears, displaying the network service design.

2. Click **Function Configuration** at the right of the Build page.

The Service page appears, displaying the VNFs in the service chain and the Base Configure tab for the first VNF in the Functional Service Design workspace.

3. Specify the settings on the Base Configure tab.

This action configures the VM in which the VNF resides.

**BEST PRACTICE:** Complete all the settings on the Base Configure tab to optimize the Contrail Service Orchestration (CSO). End users can see these settings in Customer Portal and should not override them.

4. (Optional) Specify settings on the other tabs for this VNF to customize a particular function such as Network Address Translation (NAT).

End users can customize their own services with these settings in Customer Portal. Settings that end users specify in Customer Portal override conflicting settings that you specify in Network Service Designer.

5. Click the next VNF icon in the Configuration page.
6. Repeat Step 3 and Step 4.
7. Repeat Steps 5 through 7 for each VNF in the chain.
8. Click **OK**.

The Service page closes.

## RELATED DOCUMENTATION

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## Deleting Network Service Designs

To delete a network service design:

1. Select **Home>Designs**.

The Designs page appears.

2. Select the network service design that you want to delete.

3. Click **Delete**.

A page requesting confirmation for the deletion appears.

4. Click **Yes** to confirm that you want to delete the design.

The network service design is deleted.

To delete multiple designs that you have saved or published:

1. From the list of designs, select the designs that you want to delete.
2. Click **Delete NSD**.

A page requesting confirmation for the deletion appears.

3. Click **Yes** to confirm that you want to delete the designs.

The designs are deleted and are then displayed on the Requests Page.

#### RELATED DOCUMENTATION

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## Viewing Network Service Designs

You can view the network service design in grid view and tree view. The default option is grid view.

To view the network service designs that you have saved or published:

1. Select **Home> Designs**.

The Network Service Designs page appears. All the network service designs are displayed in a table.

2. Click **Show Details**.

The network service designs are categorized according to their status and listed in the Home page.

3. Select a network service design template to view the detailed information about the design template, such as customer information, resource requirements, network design, and functional design.

You can edit, publish, or delete a network service design from this view.

#### RELATED DOCUMENTATION

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