Contrail Service Orchestration User Guide

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Contrail Service Orchestration User Guide
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Documentation and Release Notes

To obtain the most current version of all Juniper Networks® 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 xxxvi 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 xxxvi defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the **configure** command: user@host> **configure**
`Fixed-width text like this`	Represents output that appears on the terminal screen.	`user@host>` **show chassis alarms** `No alarms currently active`
Italic text like this	• Introduces or emphasizes important new terms. • Identifies guide names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS CLI User Guide* • RFC 1997, *BGP Communities Attribute*
Italic text like this	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# **set system domain-name** *domain-name*

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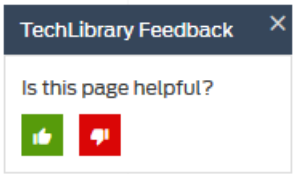
Table 2: Text and Syntax Conventions (continued)

Convention	Description	Examples
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	• To configure a stub area, include the **stub** statement at the **[edit protocols ospf area area-id]** hierarchy level. • The console port is labeled **CONSOLE**.
< > (angle brackets)	Encloses optional keywords or variables.	**stub <default-metric *metric*>;**
| (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.	**broadcast | multicast** **(*string1* | *string2* | *string3*)**
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	**rsvp { # Required for dynamic MPLS only**
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	**community name members [*community-ids*]**
Indention and braces ({ })	Identifies a level in the configuration hierarchy.	**[edit]** **routing-options {** **static {** **route default {** **nexthop *address*;** **retain;** **}** **}** **}**
; (semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	• In the Logical Interfaces box, select **All Interfaces**. • To cancel the configuration, click **Cancel**.
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

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:



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  - 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**. 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 J-Care or Partner Support Service 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/

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- Join and participate in the Juniper Networks Community Forum: https://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: https://www.juniper.net/cm/

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

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at https://www.juniper.net/cm/.
- 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://www.juniper.net/support/requesting-support.html.

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PART 1

Administration Portal

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- Managing Objects on page 13
- Using the Dashboard on page 17
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CHAPTER 1

Introduction

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- Extending the User Login Session on page 10
- Setting Up the Cloud CPE Centralized Deployment Model with Administration Portal on page 10
- Setting Up the Cloud CPE Distributed Deployment Model with Administration Portal on page 11

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.

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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 MSP 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 on page 164
- Device Images Overview on page 125

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 on page 10

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- Setting Up the Cloud CPE Distributed Deployment Model with Administration Portal on page 11
- Logging in to Administration Portal on page 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 on page 4
- Personalizing the Unified Administration and Customer Portal on page 217

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.

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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 on page 3
- Role-Based Access Control Overview on page 197

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.

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Related Documentation

- Administration Portal Overview on page 4
- Logging in to Administration Portal on page 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 7.

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	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. NOTE: 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 **Show Password** to view the password.

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Related Documentation

- Logging in to Administration Portal on page 5
- Changing the Administration Portal Password on page 6
- Resetting the Password on page 8
- Setting Password Duration on page 9

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 8.

5. Click **OK**.

Your password is reset.

Table 4: Fields on the Reset Password Page

Field	Description
Username	Enter your username.

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Table 4: Fields on the Reset Password Page (continued)

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. NOTE: 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 **Show Password** to view the password.

Related Documentation

- Logging in to Administration Portal on page 5
- Changing the Administration Portal Password on page 6
- Changing the Password on First Login on page 7
- Setting Password Duration on page 9

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 183.

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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 on page 5
- Changing the Administration Portal Password on page 6
- Changing the Password on First Login on page 7
- Resetting the Password on page 8

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 Administration Portal Password on page 6

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:

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1. Create the POPs and associated resources. See "Creating a Single POP" on page 53 and "Importing Data for Multiple POPs" on page 64.
   - 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 183 and "Importing Data for Multiple Tenants" on page 188.
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 580
4. Allocate network services to customers. See "Allocating a Service to Tenants" on page 139

Related Documentation

- Logging in to Administration Portal on page 5
- Administration Portal Overview on page 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 53 and "Importing Data for Multiple POPs" on page 64.
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 129.
3. Upload VNF images. See "Uploading a Device Image" on page 129.

4. Create customers. See "Adding a Single Tenant" on page 183 and "Importing Data for Multiple Tenants" on page 188.
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 139.

Related Documentation

- Logging in to Administration Portal on page 5
- Administration Portal Overview on page 4

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CHAPTER 2

Managing Objects

- Creating Objects on page 13
- Modifying an Object on page 13
- Deleting Objects on page 14
- Viewing Object Details on page 14
- Searching for Text in an Object Data Table on page 15
- Sorting Objects on page 15

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 on page 14

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 on page 14

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 on page 13

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.

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Related Documentation

- Deleting Objects on page 14

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 on page 13

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 on page 13

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CHAPTER 3

Using the Dashboard

- About the Administration Portal Dashboard on page 17

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.

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Table 5 on page 18 describes the dashboard widgets.

Table 5: Widgets on the Dashboard

Widget	Description
Alerts Donut Chart	View the total number of alerts grouped by severity level. Click each alert name to view the total number of tenant sites receiving alerts that are critical, major, or minor.
Top 5 POPs with Alerts	View the top five POPs receiving alerts. • **POP**—Name of the POP. • **Tenant**—Number of tenants in the POP. • **Location**—Location of the POP. • **Status**—Type of alerts received that are critical, major or minor.
Top 5 Sites with Alerts	View the top five tenant sites receiving alerts. • **Name**—Name of the tenant site. • **Location**—Location of the tenant site. • **Status**—Type of alerts received that are critical, major, or minor.
Top 5 Tenants with Alerts	View the top five tenants receiving alerts. • **Name**—Name of the tenant. • **Sites**—Number of sites in the tenant location. • **Status**—Type of alerts received that are critical, major, or minor.

Related Documentation

- Administration Portal Overview on page 4

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CHAPTER 4

Monitoring Alerts, Alarms, and Device Events

- About the Monitor Overview Page on page 19
- About the Generated Alerts Page on page 20
- About the SD-WAN Alert Definitions Page on page 21
- Creating SD-WAN Alert Definitions on page 22
- Editing and Deleting SD-WAN Alert Definitions on page 24
- About the Device Events Page on page 25

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 20 shows the descriptions of the fields on the Monitor Overview page.

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Table 6: Fields on the Monitor Overview Page

Field	Description
POPs	View the POP in which the site is located. Click the **POPs** drop-down list and select **POP Name**. Enter the name of the POP.
Sites	View the sites at which the service is deployed. Click the **Sites** drop-down list and enter the name of the site.
Connections	View the connections in the network. Click the **Connections** drop-down list and select **Show connections**.
Only the node with alerts	View the nodes with issues with the service. Click the drop-down list located next to the **Only the nodes with alerts** check box and select the type of alerts. • Critical—Issues that prevent the node from working and require action from the operator. The nodes with critical alerts are displayed in red. • 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. • 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. NOTE: The nodes without any alerts are displayed in blue.

Related Documentation

- About the SD-WAN Alert Definitions Page on page 21
- Creating SD-WAN Alert Definitions on page 22

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**.
- Select the generated alert and then right-click or click **More > Clear All Selections**.

Field Descriptions

Table 7 on page 21 provides guidelines on using the fields on the Generated Alerts page.

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Table 7: Fields on the Generated Alerts Page

Field	Description
Time	View the date and time when the alert was generated.
Alert Name	View the name of the alert.
Alert Description	View the description of the alert.
Alert Source	View the source.
Alert Type	View the type of alert.
Severity	View the severity of the alert.
Tenant	View the name of the tenant.
Site	View the tenant site
Object Type	View the object type
Alert ID	View the alert ID.

Related Documentation

- About the SD-WAN Alert Definitions Page on page 21
- Creating SD-WAN Alert Definitions on page 22
- Editing and Deleting SD-WAN Alert Definitions on page 24

About the SD-WAN Alert Definitions Page

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

You can use the SD-WAN Alert Definitions page to view and manage alert definitions for SD-WAN. 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.
- Create SD-WAN alert definitions. See "Creating SD-WAN Alert Definitions" on page 22.

- Edit or delete an existing SD-WAN alert definition. See "Editing and Deleting SD-WAN Alert Definitions" on page 24.
- Show or hide columns that contain information about SD-WAN alert definitions. See "Sorting Objects" on page 241.
- 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 22 describes the fields on the SD-WAN Alert Definitions page.

Table 8: Fields on the SD-WAN Alert Definitions Page

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.

Related Documentation

- Creating SD-WAN Alert Definitions on page 22.
- Editing and Deleting SD-WAN Alert Definitions on page 24.

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 > SD-WAN Alert Definitions** 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 9 on page 23.

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3. Click **OK** to create the alert definition.

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

Table 9 on page 23 describes the fields on the Create SD-WAN Alert Definition page.

Table 9: 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	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: • To match severity options, select **Match Severity Critical**, **Match Severity Not Critical**, **Match Severity Major**, **Match Severity Not Major**, **Match Severity Normal**, **Match Severity Not Normal**, or **Match Severity All**. The **Match Severity Critical** option is selected by default. • To match alert types, such as alerts related to the device host or the application services on the host, select **Match Alert Type Service** or **Match Alert Type Host**. • To match object types, such as a single uCPE device or a uCPE VNF, select **Match Object Type UCPE DEVICE** or **Match Object Type UCPE VNF** respectively.
Action	Select the action to be performed to resolve issues based on the severity of the alert. You can select one of the following actions: • **Alert Action Send to Rmq**—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. • **Alert Action Discard**—Discard the alert object. • **Alert Action Resolve Uuids**—Resolve UUIDs to a machine-readable format.

Context	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 **Alert Action Send to Rmq**.
	Example:
	`{`
	`“broker_ip”: “192.0.2.0”,`
	`“broker_port”: “5672”,`
	`“exchange_name”: “external_alert_exchange”,`
	`“exchange_type”: “topic”,`
	`“user”: “user-name”,`
	`“password”: “password”`
	`}`

Related Documentation

- About the SD-WAN Alert Definitions Page on page 21
- Editing and Deleting SD-WAN Alert Definitions on page 24

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 > SD-WAN Alert Definitions** 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 22.

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 > SD-WAN Alert Definitions** 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 SD-WAN Alert Definitions Page on page 21
- Creating SD-WAN Alert Definitions on page 22

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About the Device Events Page

To access this page, click **Monitor** > **Device Events**.

Use the Device Events page to view information about device events such as routine operations, failure and error conditions, and emergency or critical conditions.

You can view comprehensive details of device events in a tabular format that includes sortable columns and a line graph (also known as swim lanes). The data presented in the line graph is refreshed automatically based on the selected time range. The line graph shows light blue areas that represent all device events and dark blue areas represent blocked device events

Tasks You Can Perform

You can perform the following tasks from this page:

- Click **Custom** button to select the date and time range to generate the device event.
- Show or hide time range in the carousel by clicking **show** or **hide** buttons at the top of the page.

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 IPs in specific countries and landing on IPs in specific countries

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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 IPs with or without specific destination IPs

  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

Field Descriptions

Table 10 on page 26 provides guidelines on using the fields on the Device Events page.

Table 10: Fields on the Device Events Detailed View Page

Field	Description
Time	View the time when the log was received.
Event Name	View the event name of the log.
Tenant	View the name of the tenant.
Site	View the name of the tenant site.
Source Country	View the name of source country from where the event originated.
Source IP	View the source IP address from where the event occurred.
Destination Country	View the name of destination country from where the event occurred.
Destination IP	View the destination IP address of the event.
Source Port	View the source port of the device event.
Destination Port	View the destination port of the device event.
Description	View the description of the log.
Attack Name	View the attack name of the log. For example, Trojan, worm, virus, and so on.

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Table 10: Fields on the Device Events Detailed View Page (continued)

Field	Description
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.
Argument	View the type of traffic. For example, ftp and http.
Action	View the action taken for the event. For example, warning, allow, or 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 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.

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Table 10: Fields on the Device Events Detailed View Page (continued)

Field	Description
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	The name of the profile that triggered the event.
Event Count	View the number of events occurred.
Tenant	View the name of the tenant from which the event originated.

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CHAPTER 5

Monitoring Tenants SLA Performance

- Multidepartment CPE Device Support on page 29
- About the SLA Performance of All Tenants Page on page 30
- About the SLA Performance of a Single Tenant Page on page 32
- Monitoring Application-Level SLA Performance for real time-optimized SD-WAN on page 36
- Viewing the SLA Performance of a Site on page 37
- Viewing the SLA Performance of an Application or Application Group on page 41
- Understanding SLA Performance Score for Applications, Links, Sites, and Tenants on page 42

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.

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- 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 on page 283
- Viewing the SLA Performance of a Site on page 285

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 11 on page 31 describes the fields on the Tenants SLA Performance page.

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Table 11: 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	Specify the performance threshold, in percentage, based on which tenants can be classified as tenants with low, medium, or high SLA performance. To set the performance threshold, click **More** > **Performance Threshold**. From the **Performance Threshold** dialog box, move the slider button to set the low and high thresholds. 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.
Tenants with Low and Medium Performance	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. Click each tenant to view information about the SLA performance of the sites in the tenant. See "About the SLA Performance of a Single Tenant Page" on page 32.
Tenants with High Performance	View the tenants that have high SLA performance in the selected time range. Click each tenant to view information about the SLA performance of the sites in the tenant. See "About the SLA Performance of a Single Tenant Page" on page 32.

Table 12 on page 31 describes the fields in the card and grid views.

Table 12: 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 "Understanding SLA Performance Score for Applications, Links, Sites, and Tenants" on page 42.

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Table 12: Fields on the Tenants SLA Performance Page (continued)

Field	View	Description
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 on page 32
- Viewing the SLA Performance of a Site on page 37
- Viewing the SLA Performance of an Application or Application Group on page 41
- Creating SLA Profiles on page 169

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:

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- 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 13 on page 33 describes the fields on the SLA Performance of a Single Tenant page.

Table 13: 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	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. To set the performance threshold, click **More** > **Performance Threshold**. From the **Performance Threshold** dialog box, move the slider button to set the low and high thresholds. Site 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.

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Table 13: Fields on the SLA Performance of a Single Tenant Page (continued)

Field	Description
Sites with Low and Medium Performance	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. Click each site to view information about application-level SLA performance. See "Application and Link Level SLA Performance" on page 35.
Sites with High Performance	View the sites that have high SLA performance in the selected time range. Click each site to view information about the application-level SLA performance. See "Application and Link Level SLA Performance" on page 35.

Table 14 on page 34 describes the fields in the card and grid views.

Table 14: Fields on the SLA Performance of a Single Tenant Page in Card and Grid Views

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 "Understanding SLA Performance Score for Applications, Links, Sites, and Tenants" on page 42.
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.

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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 15 on page 35 describes the fields on the SLA Performance of a Single Tenant page.

Table 15: 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	Choose one of the following SLA parameters based on which you want to view the application SLA performance data: • Throughput • Latency metric • Packet loss • Jitter metric By default, Throughput is selected. The data for the selected parameter is displayed in the y-axis in the scatter plot view.
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 **SLA Profile** for **Group by**, select the SLA Profile for which you want to view the SLA performance information. This option is available only if you selected **SLA Profile** for **Group by**.
Traffic Type	If you selected **Traffic Type** for **Group by**, select the **Traffic Type** for which you want to view the SLA performance information. This option is available only if you selected **Traffic Type** for **Group by**.

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Table 15: Fields on the SLA Performance of a Single Tenant Page (continued)

Field	Description
Graph	Select whether you want to view the SLA performance information for applications in the **Scatter Plot** view or in **Tree Graph** view. By default, **Scatter Plot** is selected.
Link SLA Performance	
Traffic Type	Select the traffic type for which you want to view the link SLA performance. You can choose either **All Traffic Type** or one of the available traffic types.
Links	Select the links for which you want to view the SLA performance. You can choose either **All Links** or one of the available links.

Related Documentation

- About the SLA Performance of All Tenants Page on page 30
- Viewing the SLA Performance of a Site on page 37
- Viewing the SLA Performance of an Application or Application Group on page 41
- Creating SLA Profiles on page 169

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.

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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 42.

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 on page 36
2. Viewing SLA Performance of Sites on page 37

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**.

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The "Tenant SLA Performance" on page 30 page appears.

2. Customize the view to your specific requirements.

   For customization options, see Table 11 on page 31

   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 12 on page 31

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 32.

2. Customize the view as required. For more information about the customization options, see Table 13 on page 33

   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 14 on page 34.

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 15 on page 35.

Viewing the SLA Performance of a Site

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 on page 38
- Applications SLA Performance by Throughput on page 38
- SLA Performance for ALL on page 40

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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.

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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 41.

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 16 on page 39 describes the fields on the Applications SLA Performance by Throughput grid view.

Table 16: 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.

Table 16: Fields on the Applications SLA Performance by Throughput Grid View (continued)

Field	Description
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 41.

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.

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- (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 168 **page.**

Related Documentation

- About the SLA Performance of All Tenants Page on page 30
- About the SLA Performance of a Single Tenant Page on page 32
- Viewing the SLA Performance of an Application or Application Group on page 41

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 17 on page 41 describes the fields on the application or application group SLA Performance details page.

Table 17: 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.

Table 17: Fields on the Application or Application Group Details Page (continued)

Field	Description
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.
Global SLA Profile Performance	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. 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 **SLA Profile Performance** page appears. The SLA Profile Performance page displays the following fields: • SLA Profile—SLA profile associated with the application or application group • Target—Target throughput configured in the SLA profile • SLAs Not Met—Percentage of time SLA requirements were not met for the SLA profile • Sessions—Number of sessions consumed by the application or application group • Start Time—Time at which the WAN links associated with the application or application groups started to fail meeting the SLA requirements • End Time—Time at which SLA profile requirements started to be met again • Avg Val—Average throughput (in Mbps) when the SLA requirements started to fail • Duration—Total duration (in seconds) during which SLA requirements were not met • From—Source WAN link • To—Destination WAN link

Related Documentation

- About the SLA Performance of All Tenants Page on page 30
- About the SLA Performance of a Single Tenant Page on page 32
- Viewing the SLA Performance of a Site on page 37

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

This topic explains the following SLA performance scores:

- Application Score on page 42
- Site Score on page 43
- Tenant Score on page 43
- Link Score on page 43

Application Score

From Release 3.3 onward, 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

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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 42.

The site score for bandwidth-optimized networks is calculated as an average of "Link Score" on page 43.

Tenant Score

Tenant score is calculated as the average value of site scores. For information about site score calculation, see "Site Score" on page 43.

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.

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CHAPTER 6

Monitoring Jobs

- About the Jobs Page on page 45
- Viewing Job Details on page 47
- Editing and Deleting Scheduled Jobs on page 47
- Retrying a Failed Job on Devices on page 48

About the Jobs Page

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

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 47.
- Retry a job. See "Retrying a Failed Job on Devices" on page 48.
- Edit and delete schedule jobs. See "Editing and Deleting Scheduled Jobs" on page 47.

Field Descriptions

Table 18 on page 45 provides guidelines on using the fields on the Jobs page.

Table 18: 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

Table 18: Fields on the Jobs Page (continued)

Field	Description
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 **site.ucpe-32** and **customer.sdwan** are associated with this job.
Job Type	View the job type. Example: tssm import pop
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 19 on page 46 provides guidelines on using the fields on the Scheduled Jobs page.

Table 19: 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

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Table 19: Fields on the Scheduled Jobs Page (continued)

Field	Description
Next Run Time	View the time when the job is scheduled to run next.

Related Documentation

- Editing and Deleting Scheduled Jobs on page 47
- Retrying a Failed Job on Devices on page 48

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 303 for a description of the fields on these pages.

Related Documentation

- About the Jobs Page on page 45

Editing and Deleting Scheduled Jobs

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

- Editing Scheduled Jobs on page 47
- Deleting Scheduled Jobs on page 48

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 on page 45
- Viewing Job Details on page 47

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 and it is available only for All Tenants scope.**

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.

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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 on page 45
- Editing and Deleting Scheduled Jobs on page 47

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CHAPTER 7

Managing POPs

- About the POPs Page on page 51
- Creating a Single POP on page 53
- Importing Data for Multiple POPs on page 64
- Viewing the History of POP Data Imports on page 69
- Viewing the History of POP Data Deletions on page 71
- Managing a Single POP on page 72
- About the VIMs Page on page 73
- Creating a Cloud VIM on page 75
- About the EMS Page on page 79
- Creating an EMS on page 80
- Changing the Junos Space Virtual Appliance Password on page 81
- About the Routers Page on page 82
- Creating Devices on page 83
- Configuring Devices on page 85
- View the History of Device Data Deletions on page 88

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 20 on page 52.
- Create a POP. See "Creating a Single POP" on page 53.
- Import data for multiple POPs. See "Importing Data for Multiple POPs" on page 64.

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- View the history of POP data imports. See "Viewing the History of POP Data Imports" on page 69.
- View the history of POP data deletions. See "Viewing the History of POP Data Deletions" on page 71.
- View details about a POP. Hover over the name of a POP or click **More > Quick View**. See "Viewing Object Details" on page 14.
- Show or hide columns about the POPs. See "Sorting Objects" on page 15.
- Search an object about the POPs. See "Searching for Text in an Object Data Table" on page 15.
- Delete a POP. See "Deleting Objects" on page 14.

Field Descriptions

Table 20 on page 52 describes the widgets on the POPs page.

Table 20: Widgets on the POPs Page

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

Table 21 on page 52 shows the fields on the POPs page.

Table 21: 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.

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Table 21: Fields on the POPs Page (continued)

Field	Description
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. • 0—Either a distributed deployment or a centralized deployment for which you have not yet configured a VIM. 1—Centralized deployment 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 on page 53
- About the VIMs Page on page 73
- About the EMS Page on page 79
- About the Routers Page on page 82

Creating a Single POP

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 on page 54
- Adding a Device on page 55
- Adding a VIM on page 58
- Adding an EMS on page 62
- Reviewing and Saving the POP Configuration Settings on page 63

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 22 on page 54.

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

   The Add Device table appears.

Table 22: Fields on the Add POP page

Field	Description
Region	Regions are used to group services for various business reasons such as location, proximity, service distribution and load. • For a centralized deployment, select the region that you want to use to manage services in the POP; the default is regional. NOTE: The regions are configured during CSO installation. • For a distributed deployment, the default region is selected and cannot be modified. Example: regional NOTE: The administrator must not delete the region name.
POP Name	Enter the name of the POP. You can use an unlimited number of alphanumeric characters, including special characters. Example: north-east.

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Table 22: Fields on the Add POP page (continued)

Field	Description
Street Address	Enter the street address. You can use an unlimited number of alphanumeric characters, including special characters. Example: 1133 Innovation Way
City	Enter the name of the city. You can use an unlimited number of alphanumeric characters, including special characters. Example: Sunnyvale
State/Province	Enter the name of the state. You can use an unlimited number of alphanumeric characters, including special characters. Example: California
ZIP/Postal Code	Enter the zip code or postal code for the country. You can use an unlimited number of alphanumeric characters, including special characters. Example: 94089
Country	Select the name of the country. Example: USA

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 22 on page 54.

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 23 on page 56.

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 63.

Table 23: Fields on the Add Device Page

Field	Description
Name	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. • An MX Series router used as an SDN gateway in a centralized deployment. • An MX Series router used as a provider edge (PE) router in a distributed deployment. • An SRX Services Gateway router or a vSRX instance used as a CPE device in a distributed deployment. You can use letters, numbers, spaces, periods, dashes, underscores, commas, @, #, $, %, &, and *. Maximum length is 255 characters. Example: MX-router-10
Family	Select the product family for the device. Example: MX

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Table 23: Fields on the Add Device Page (continued)

Field	Description
Device Template	Select the name of the device template for the device: • Juniper-MX-MIS—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. • SDN-GW-MX—Default template for MX Series router. Select this option for MX routers in centralized and distributed deployments unless Juniper Networks advises use of the *Juniper-MX-MIS* device template. • SRX_Basic_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. • SRX_deployment_option_1—Device template for an SRX Services Gateway or a vSRX used as a CPE device in a distributed deployment. • NFX_deployment_option_1—Device template for an NFX device in distributed deployment. This template supports port-forwarding with Contrail Service Orchestration initiated connection. • SRX_Managed_Internet_CPE—Device template to manage an SRX Services Gateway devices for a managed internet service. • NFX_Managed_Internet_CPE—Device template to manage an NFX device for a managed internet service. • NFX_deployment_option_4—Device template for an NFX device in distributed deployment. This template supports outbound SSH, which is the device initiated connection, with port-forwarding capability. • vSRX-VNF-NFX—Device template for a vSRX VNF application on an NFX platform for a distributed deployment.
Type of Device	Select the type of device: • 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. • 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.
PNE package	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: • SRX—Use with SRX Series device template. • Juniper-MX—Use with the SDN-GW-MX device template. • 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 Juniper-MX-MIS device template. You must specify the PNE package only for data center gateway device. Do not use the SRX Series package for the MX router.

Table 23: Fields on the Add Device Page (continued)

Field	Description
Management Type	Specify the management type for the PE device. The following options are available: • Managed—Select Managed if you use Contrail Service Orchestration to manage the device. • Unmanaged—Select Unmanaged if you use another application to manage the device. Example: Unmanaged
Device IP	Enter the IPv4 address of the management interface for the device. Example: 192.0.2.15
Internet Gateway (optional)	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. Example: 192.0.2.20
User Name	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.
Password	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.

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 22 on page 54.

3. Click **Next**.

   The Device section appears.

4. Click **Next**.

   The VIM page appears.

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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 24 on page 59.

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 63.

Table 24: Fields on the Add Cloud VIM Page

Field	Guidelines
Name	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, @, #, $, %, &, and *. Maximum length is 255 characters. Example: vcpe-vim
Type	View the VIM type. The default VIM type is cloud. Example: Cloud
Connection Information	
IP address	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. Example: 10.102.28.36

Table 24: Fields on the Add Cloud VIM Page (continued)

Field	Guidelines
Auth URL	Enter the authentication URL for the OpenStack Keystone. Example: http://ip:5000/v3
User Name	Enter the OpenStack Keystone username that you configured. Example: admin
Password	Enter the OpenStack Keystone password that you configured. Example: contrail123
Domain	Enter the name of the OpenStack domain that you configured. Example: default
Tenant	Enter the name of the OpenStack tenant that you configured. Example: admin
Network Information *Resource Pools*	
Resource Pool Name	Enter a resource pool for each VIM. You can use an unlimited number of alphanumeric characters, including special characters. Example: north-east.
Compute Zone	Enter the availability zone in Contrail OpenStack in which the virtual machines for network services reside. The default availability zone is nova. You can run the **nova availability-zone-list** command on the Contrail OpenStack to find the list of available zones. Example: nova
Does Management Network Exists?	Select whether to use an existing virtual network in Contrail OpenStack or to create a new one. • yes—Import the named virtual network from Contrail OpenStack. • no—Create a virtual network in Contrail OpenStack with the specified name.
Management Network Name	Enter the name of the existing management network in Contrail or the new management network that you want to create in Contrail. Example: mgmt-net
Management Network Information	

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Table 24: Fields on the Add Cloud VIM Page (continued)

Field	Guidelines
Route Target	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. Example: 64512:10000.
Subnet	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. Example: 192.0.2.0/24.
Internet Network Information	
Network Name	Enter the name of the Internet network. Example: int-net
Does Exist	Specify whether to use an existing virtual network in Contrail OpenStack or to create a new one. • True—Import the named virtual network from Contrail OpenStack. • False—Create a virtual network in Contrail OpenStack with the specified name.
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.
Service Profile Information	
Profile Name	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. Example: vim-service-profile
Tenant Name	Enter the name of the infra tenant for whom you want to assign the service profile. Example: test-tenant
Domain Name	Enter the Infra domain name. Example: Default

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Table 24: Fields on the Add Cloud VIM Page (continued)

Field	Guidelines
User Name	Enter the username of the tenant. Example: admin
Password	Enter the password for the tenant user. Example: password123
Default Service Profile	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. Example: default-service-profile

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 22 on page 54.

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 25 on page 63.

8. Click **Save**.

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

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Table 25: Fields on the Add EMS Page

Field	Guidelines
Name	Name of the EMS. This field is auto-populated with the name that you specified when you deployed the Junos Space Virtual Appliance. Example: Junos Space
IP	Enter the IPv4 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	Enter the vendor name for the EMS. Example: Juniper Networks
Version	Enter the version number of the EMS. The default version is 15.1. Example: 15.1
Authentication URL	Enter the authentication URL for the EMS application.
User Name	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. Example: super
Password	Enter the administrator password that you configured. The default password is juniper123. Example: juniper123

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 22 on page 54.

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

- About the POPs Page on page 51
- About the EMS Page on page 79
- About the VIMs Page on page 73
- About the Routers Page on page 82

Importing Data for Multiple POPs

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 on page 64
- Uploading a POP Data File on page 68

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.

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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 26 on page 65.

6. Save the customized file.

Table 26: Fields on the POPs Page

Field	Description
POP Information	
dc_name	Specify the name of the region for this POP. Example: regional NOTE: 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
VIM Information NOTE: You must add a VIM for a centralized deployment. Do not add a VIM for a distributed deployment.	

Table 26: Fields on the POPs Page (continued)

Field	Description
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
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
Resource Pool	
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 **nova availability-zone-list** command on the Contrail OpenStack to find the list of available zones. Example: nova
Management Network	

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Table 26: 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. • true—Import named virtual network object from VIM. • false—Create a virtual network in VIM with the specified name.
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
EMS Information	
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
password	Specify the administrator password that you configured. The default password is juniper123. 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. Example: juniper123
vendor	Specify the vendor for the EMS. Example: Juniper Networks

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Table 26: Fields on the POPs Page (continued)

Field	Description
version	Specify the version number of the EMS. Example: 15.1
Device Information	
name	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. Example: PNE-MX10
device_ip	Specify the management IP address of the device. Example: 192.0.2.15.
pne_package	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: • SDN-GW-MX—Default for MX Series router. Select this option for most installations. • Juniper-MX-MIS—Customized device profile with MX configuration that prevents the creation of black holes when an administrative user activates a service at a site. You must specify the PNE package only for a data center gateway device. Do not use the SRX Series package for the PE router or the SDN gateway.
assigned_device_profile	Select the name of the configuration image for the SDN gateway or the PE router. • SDN-GW-MX—Default for MX Series router. Select this option for most centralized deployments and for all distributed deployments. • 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. • SRX_Basic_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.
username	Specify the username of the device administrator for logging into the device. Example: root
password	Specify the password for logging into the device. Example: pwd123

Uploading a POP Data File

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

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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

- Creating a Single POP on page 53
- Viewing the History of POP Data Imports on page 69
- Viewing the History of POP Data Deletions on page 71

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 64.

To view the history of imported POP data:

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

   The Import History page is displayed. Table 27 on page 70 describes the fields on the Import History page.

2. Click a task name.

   The Import POPs Tasks page appears. Table 28 on page 70 describes the fields on the Import Task page.

3. Click the Task ID.

   The Job Status page appears. Table 29 on page 70 describes the fields on the Job Status page.

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

Table 27: 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
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 28: 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 29: 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

- Importing Data for Multiple POPs on page 64
- Viewing the History of POP Data Deletions on page 71

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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 30 on page 71 describes the fields on the Delete History page.

2. Click a task name.

   The Delete POPs Tasks page appears. Table 31 on page 71 describes the fields on the Delete Task page.

3. Click the Task ID.

   The Job Status page appears. Table 32 on page 72 describes the fields on the Job Status page.

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

Table 30: 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 31: Fields on the Delete POPs Tasks Page

Field	Description
Success	View the number of times the delete operations has been successful for a POP.

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Table 31: Fields on the Delete POPs Tasks Page (continued)

Field	Description
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 32: 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 on page 64
- Viewing the History of POP Data Imports on page 69

Managing a Single POP

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

- About the VIMs Page on page 73
- About the EMS Page on page 79
- About the Routers Page on page 82

Related Documentation

- About the POPs Page on page 51
- Creating a Single POP on page 53

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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 33 on page 73.
- Create a Cloud VIM. See "Creating a Cloud VIM" on page 75.
- 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 14.
- Show or hide columns about the VIMs. See "Sorting Objects" on page 15.
- Search an object about the VIMs. See "Searching for Text in an Object Data Table" on page 15.

Field Descriptions

- Table 33 on page 73 describes the widgets on the VIMs page.
- Table 34 on page 73 shows the fields on the VIMs page.

Table 33: 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 34: Fields on the VIMs Page

Field	Description
Name	View the name of the VIM in the POP.

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Table 34: Fields on the VIMs Page (continued)

Field	Description
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 on page 51
- About the VIMs Page on page 73
- About the Routers Page on page 82
- Creating a Single POP on page 53

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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 35 on page 76.

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 35 on page 76.

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

Table 35: 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
Connection Information	
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
Tenant	Specify the name of the Contrail OpenStack tenant that you configured for the Contrail Cloud Platform. Example: admin
Network Information *Resource Pools*	

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Table 35: Fields on the Add Cloud VIM Page (continued)

Field	Guidelines
Resource Pool	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 nova availability-zone-list command on the Contrail controller node to view a list of available zones.
Resource Pool Name	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. Example: north-east.
Compute Zone	Specify the availability zone in Contrail OpenStack in which the virtual machines for network services reside. The default availability zone is nova. You can run the **nova availability-zone-list** command on the Contrail OpenStack to find the list of available zones. Example: nova
Does Management Network Exists?	Specify whether to use an existing virtual network in Contrail OpenStack or to create a new one. • yes—Import the named virtual network from Contrail OpenStack. • no—Create a virtual network in Contrail OpenStack with the specified name.
Management Network Name	Specify the name of the existing network in Contrail or of the new network that you want to create in Contrail. Example: mgmt-net
Management Network Information	
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.
Internet Network Information	
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.

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Table 35: Fields on the Add Cloud VIM Page (continued)

Field	Guidelines
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.
Service Profile Information	
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
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 on page 82
- Configuring Devices on page 85
- Creating an EMS on page 80

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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 80.
- Change the Junos Space Password. See "Changing the Junos Space Virtual Appliance Password" on page 81.
- 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 14.
- Show or hide columns about an EMS. See "Sorting Objects" on page 15.
- Search an object about an EMS. See "Searching for Text in an Object Data Table" on page 15.

Field Descriptions

Table 36 on page 79 shows the fields on the EMS page.

Table 36: 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

Related Documentation

- About the POPs Page on page 51
- Creating a Single POP on page 53

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- About the VIMs Page on page 73
- About the Routers Page on page 82

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 37 on page 80.
4. Click **Save**. If you want to discard your changes, click **Cancel** instead.

Table 37: Fields on the Add EMS Page

Field	Guidelines
Name	Name of the EMS. This field is auto-populated with the name that you specified when you deployed the Junos Space Virtual Appliance. 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: 192.0.2.3.
Vendor	Specify the vendor for the EMS. Example: Juniper Networks
Version	Specify the version number of the EMS. The default version is 15.1. Example: 15.1
Authentication URL	Specify the authentication URL for the EMS application.

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Table 37: 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

- About the Routers Page on page 82
- Creating a Cloud VIM on page 75

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 38 on page 81.
6. Click **Save**. If you want to discard your changes, click **Cancel** instead.

Table 38: Change Password Fields

Field	Description
Username	Specify the administrator username that you configured. Example: super

Table 38: Change Password Fields (continued)

Field	Description
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

- About the EMS Page on page 79
- Creating an EMS on page 80

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 "Creating Devices" on page 83.
- Configure a device. See "Configuring Devices" on page 85.
- 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 14.
- Show or hide columns about the routers. See "Sorting Objects" on page 15.
- Search an object about the router. See "Searching for Text in an Object Data Table" on page 15.
- Delete a device. See "Deleting Objects" on page 14.

Field Descriptions

Table 39 on page 82 describes the fields on the Routers page.

Table 39: Fields on the Routers Page

Field	Description
Name	View the name of the device configured in the POP. Example: blue_device

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Table 39: Fields on the Routers Page (continued)

Field	Description
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

- About the POPs Page on page 51
- About the VIMs Page on page 73
- About the EMS Page on page 79
- Creating a Single POP on page 53

Creating 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 create 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 40 on page 84.

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

Table 40: Fields on the Add Device Page

Field	Description
Name	Specify the name of the device, which can be: • An MX Series router used as an SDN gateway in a centralized deployment. • An MX Series router used as a provider edge (PE) router in a distributed deployment. • An SRX Series Services Gateway used as an IPsec concentrator in a distributed deployment. You can use any number of alphanumeric characters, including special characters. Example: MX-router-10
Family	Select the product series for the device. Example: MX
Device Template	Select the name of the device template for the device: • Juniper-MX-MIS—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. • SDN-GW-MX—Default template for MX Series router. Select this option for MX Series routers in centralized and distributed deployments. • SRX_Basic_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. • SRX_Managed_Internet_CPE—Device template to manage an SRX Services Gateway devices for a managed internet service. • SRX_SDWAN_SUPPORT—Device template for an SRX Series Services Gateway with SDWAN deployment.
Type of Device	Select the type of device: • PNE—Use this option to add an MX Series router as an SDN gateway in a centralized deployment. • 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.
PNE package	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: • Juniper-MX—Use with the SDN-GW-MX device profile. • 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 Juniper-MX-MIS device profile.
Management Type	If you specified that the device is a PE router, IPsec concentrator, or both, specify whether Contrail Service Orchestration manages the device: • Managed—Select this option if you use Contrail Service Orchestration to manage the device. • 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.

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Table 40: Fields on the Add Device Page (continued)

Field	Description
Device IP	Specify the IPv4 address of the management interface for the device. Example: 192.0.2.15
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
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 on page 82
- Configuring Devices on page 85

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 41 on page 86.
6. Click **Ok**. If you want to discard your changes, click **Cancel** instead.

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Table 41: Fields on the PNE Configure Page

Field	Description
Interface Configuration	
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
BGP Configuration	
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
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.
Management VRF Configuration	
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.

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Table 41: Fields on the PNE Configure Page (continued)

Field	Description
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.
Internet VRF Configuration	
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

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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 on page 82
- Creating Devices on page 83

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 42 on page 89 describes the fields on the Delete History page.

2. Click a task name.

   The Delete Device Tasks page appears. Table 43 on page 89 describes the fields on the Delete Task page.

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3. Click the Task ID.

   The Job Status page appears. Table 44 on page 89 describes the fields on the Job Status page.

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

Table 42: 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 43: 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 44: 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.

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Table 44: 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

- Creating Devices on page 83
- Configuring Devices on page 85

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CHAPTER 8

Managing Devices

- About the Tenant Devices Page on page 91
- About the Cloud Hub Devices Page on page 94
- Managing a Tenant Device on page 96
- Managing a Cloud Hub Device on page 97
- Device Redundancy Support Overview on page 98
- Viewing the History of Tenant Device Activation Logs on page 100
- Viewing the History of Cloud Hub Device Activation Logs on page 102
- Adding a Cloud Hub Device on page 103
- Rebooting a CPE Device on page 105

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 45 on page 92.
- View the history of activation data. See *Viewing the History of Activation Data Uploads*.
- View the history of deactivation requests. See *Viewing the History of Deactivation Requests*.
- Reboot a CPE device. See "Rebooting a CPE Device" on page 105.
- 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.

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- 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 14.
- Deleting a CPE. See "Deleting Objects" on page 14.
- Show or hide columns about the CPE. See "Sorting Objects" on page 15.
- Search an object about the CPE device. See "Searching for Text in an Object Data Table" on page 15.

Field Descriptions

- Table 45 on page 92 describes widgets on the Tenant Devices page.
- Table 46 on page 92 describes the fields on the Tenant Devices page.

Table 45: Widgets on the Tenant Devices Page

Widget	Description
Cloud CPEs by Status	View the management status of the CPE devices deployed in the cloud. • Pending Activation—Number of CPE devices that are yet to connect to the regional server. • Activation Failed—Number of CPE devices that could not connect to the regional server. • Expected—Number of CPE devices that have yet to connect to the regional server. • Active—Number of CPE devices that have downloaded images, but are not yet configured. • Provisioned—Number of CPE devices on which IPsec tunnels are fully operational. • Provision Failed—Number of CPE devices failed if the vSRX was not instantiated properly.

Table 46: Fields on the Tenant Devices Page

Field	Description
Device Name	View the name of the device. Example: sunny-NFX-250
Tenant	View the name of the tenant. Example: tenant-blue
Site Name	View the name of the tenant site. Example: site-blue-white
Location	View the name of the location. Example: San Jose, CA

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Table 46: Fields on the Tenant Devices Page (continued)

Field	Description
Status Message	View the latest status message. Example: IPsec provision success
WAN Links	View the number of WAN links. Example: 2
POP Name	View the name of the POP. Example: pop_blue
Management Status	View the management status of the CPE devices deployed in the cloud. • Expected—Regional server has activation details for the CPE device, but CPE device has not yet established a connection with the server. • Active—CPE device has downloaded images, but is not yet configured. • Provisioned—IPsec tunnel on NFX250 device is operational. • Provision Failed—CPE device failed when the vSRX was not instantiated properly.
Model	View the name of the device model. Example: NFX
Active Services	View the number of services that are activated for the device. Example: 3
Image Name	View the name of the device image file. Example: install_nfx_fmpm_agent_1_0.sh
OS Version	View the Junos OS Release version. Example: 15.1X49-D40
Serial Number	View the serial number of the device. Example: DD0416AA0117

Related Documentation

- *Viewing the History of Activation Data Uploads*
- *Viewing the History of Deactivation Requests*

About the Cloud Hub Devices Page

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

You can 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 either an MX Series router or an SRX Series services gateway as a cloud hub (SD-WAN) device in a hub-and-spoke 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.

NOTE:

- An MX Series router can be added as an SD-WAN cloud-hub device in brown-field deployment only.
- An MX Series router can be used as an SD-WAN hub in single-hub and multihoming deployment.
- An MX Series router is supported as an SD-WAN hub only in a hub-and-spoke topology.
- An MX Series router is not supported as an on-premise SD-WAN hub.
- When you use an MX Series router as SD-WAN hub, you must configure the NAT pools through the stage-2 configuration template.

The workflow for configuring a device as SD-WAN hub is as follows:

1. Create a point of presence (POP). See "Creating a Single POP" on page 53.
2. Add a cloud hub device for the POP. See "Adding a Cloud Hub Device" on page 103.
3. Add a cloud site for the cloud hub device. See "Creating Cloud Hub Sites for SD-WAN Deployment" on page 554.

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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 103.
- 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 14.
- Deleting a cloud hub device. See "Deleting Objects" on page 14.
- Show or hide columns that contain details about the cloud hub device. See "Sorting Objects" on page 15.
- Search an object about the cloud hub device. See "Searching for Text in an Object Data Table" on page 15.

Field Descriptions

- Table 47 on page 95 describes the fields on the Cloud Hub Devices page.

Table 47: 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
Status Message	Displays the latest status message. Example: IPsec provision success
WAN Links	Displays the number of WAN links for a device. Example: 2

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Table 47: Fields on the Cloud Hub Devices Page (continued)

Field	Description
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. • **Expected**—The regional server has activation details for the CPE device, but the CPE device has not yet established a connection with the server. Click **Activate** to activate the cloud hub device. If the activation process is successful, then the management status changes to **Provisioned**. • **Active**—Cloud hub device is yet to be configured. • **Provisioned**—Cloud hub device is ready to be used. • **Provision** Failed—Cloud hub device is not yet ready to be used.
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 on page 91

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***.

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.
- Details of the device, such as serial number, management IP address, OS version, device template, tenant name, site name, and site location.

Related Documentation

- About the Tenant Devices Page on page 91

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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 on page 94

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:

- AppQOE (latency-optimized SLA)
- CPE in Full-mesh Topology
- LTE WAN backup link
- Service chain support
- Hub in Hub-Spoke Topology

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:

- NFX_SDWAN_Dual_CPE—Supports dual CPE NFX Series devices on an SD-WAN site.
- SRX_SDWAN_Dual_CPE—Supports dual CPE SRX Series devices on 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

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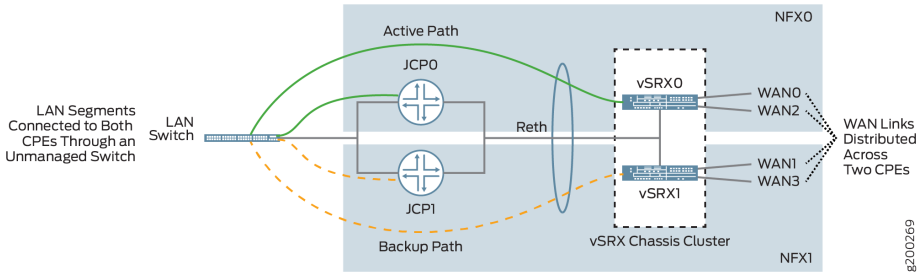
secondary device. The workflow to add and configure a site with dual CPE devices is similar to the single CPE device. For more information about creating and configuring a site with dual CPE devices, see "Creating On-Premise Spoke Sites for SD-WAN Deployment" on page 549 and "Configuring a Single Site" on page 567.

Dual CPE Devices Logical Topology for NFX Network Services Platform

Figure 1 on page 99 shows the logical topology of the NFX Series dual CPE devices.

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



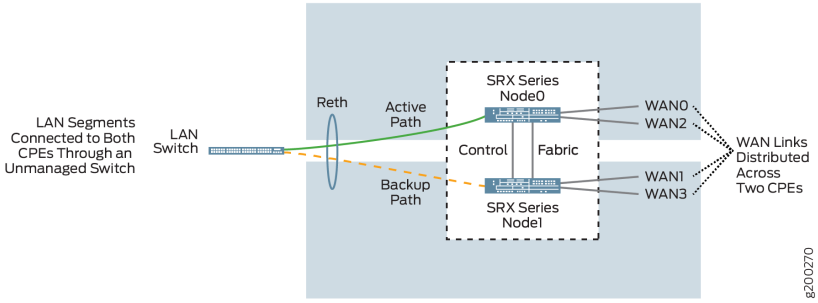
You can form a cluster using two NFX Series devices. The front panel ports of the NFX Series devices are used to interconnect two NFX Series devices and to carry the control and fabric interconnect traffic between the two NFX250 devices.

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 99 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.

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On the WAN, the active/active mechanism is used and all four WAN links are active and distributed across two NFX Series device.

Related Documentation

- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549
- Configuring a Single Site on page 567
- Activating Dual CPE Devices (Device Redundancy) on page 576

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 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 48 on page 100 describes the fields on the Activation Logs page.

3. Click a task name.

   The ZTP Logs page appears. Table 49 on page 101 describes the fields on the ZTP Logs page.

4. Click the Task Name.

   The Job Status page appears. Table 50 on page 101 describes the fields on the Job Status page.

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

Table 48: 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

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Table 48: 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 49: 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 50: 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 on page 91

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 51 on page 102 describes the fields on the ZTP History page.

3. Click a task name.

   The ZTP Logs page appears. Table 52 on page 103 describes the fields on the ZTP Logs page.

4. Click the Task Name.

   The Job Status page appears. Table 53 on page 103 describes the fields on the Job Status page.

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

Table 51: 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.
Log	View the import logs. Click a log to access more detailed information about the imported log.

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Table 52: 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 53: 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 on page 94

Adding a Cloud Hub Device

You can add either an MX Series router or an SRX Series services gateway as a cloud hub device. The device templates that are currently supported for cloud hub devices are:

- MX_Advanced_SDWAN_HUB_option_1
- SRX_Advanced_SDWAN_HUB_option_1

Before You Begin

Create all the resources required for the network point of presence (POP). See "Creating a Single POP" on page 53.

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 Hub Device page appears.

3. Complete the configuration according to the guidelines provided in Table 54 on page 104.

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

   If you click **Ok**, then the information about the new hub device appears on the Cloud Hub Devices page.

Table 54: Fields on the Add Hub Device Page

Field	Description
Name	Enter the name of the hub device. You can use any number of alphanumeric characters, including special characters. The maximum length is 256 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
Device Template	Select the device template that supports SD-WAN deployment with hub-and-spoke topology. Example: MX_Advanced_SDWAN_HUB_option_1
Connectivity Based on the site requirement, the following fields are populated:	
GRE Interfaces	Enter one or more interface names for the generic routing encapsulation (GRE) tunnel. Example: gr-0/0/1
VT Interfaces	Enter one or more interface names for the virtual tunnel (VT). Example: vt-0/0/1
MS Interfaces	Enter one or more interface names for the multiservices (MS) tunnel. Example: ms-0/0/1
OAM Traffic Information	(Optional) Select this option if the management connectivity is initiated by Contrail Service Orchestration (CSO).
VLAN ID	Enter the Operation, Administration, and Maintenance (OAM) VLAN ID for the in-band management of the site. Example: 53

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Table 54: Fields on the Add Hub Device Page (continued)

Field	Description
IP Prefix	Enter one or more prefixes for the site's management network. You can specify IPv4 or IPv6 addresses. Example: 172.16.1.1
Gateway IP	Enter the IP address of the default route for the management network. You can specify an IPv4 or IPv6 address. Example: 172.16.0.0

WAN_0
 	
WAN_1
 	
WAN_2
 	
WAN_3
	Select a WAN link to enable it. After selecting the link, specify the following information:
	
	• WAN Interface—Displays the interface name configured in the device template. You cannot modify this field.
	• Link Type—Select the link type (MPLS or Internet) configured in the device template.
	• Address Assignment—Select the method for IP address assignment. The options available are:
	  ◦ DHCP—Select DHCP to assign IP address by using a DHCP server.
	  ◦ STATIC—Select STATIC to assign a static IP address.
	• Traffic Type—Select the traffic type. The options available are:
	  ◦ DATA_ONLY—Select this option if you want to use the WAN link to transmit only data traffic.
	  ◦ OAM_AND_DATA—Select this option if you want to use the WAN link to transmit both data traffic and management traffic.
	
	  NOTE: You must select at least one WAN link with the **OAM_AND_DATA** traffic type.
	
	• 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.

Devices	
Serial Number	Enter the serial number of the hub device. Example: XXXXXXXXXXXX
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, you activate it. During activation, the device is discovered and the required details are stored in CSO.

Related Documentation

- About the Cloud Hub Devices Page on page 94

Rebooting a CPE Device

You need to reboot a CPE device if the device is down, or if all troubleshooting options fail. A CPE device might be a tenant device or a cloud hub device.

To reboot a tenant device:

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

2. Select the tenant 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.

To reboot a cloud hub device:

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

2. Select the cloud hub 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 cloud hub 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.**

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Related Documentation

- About the Cloud Hub Devices Page on page 94
- About the Tenant Devices Page on page 91

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CHAPTER 9

Managing Device Templates

- About the Device Template Page on page 109
- Cloning a Device Template on page 114
- Importing a Device Template on page 115
- Configuring a Device Template on page 116
- Modifying a Device Template Description on page 123
- Deleting a Device Template on page 124

About the Device Template Page

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

A device template contains configuration and provisioning instructions for a physical device that you manage through Contrail Service Orchestration (CSO), such as a CPE device or a router. The CSO installation includes several device templates for CPE devices and other physical devices. The device templates for non-CPE devices are fixed and you cannot customize them. You assign a device template to this type of device in CSO when you add it to a point of presence (POP). The CPE device templates are specific to the type of device and topology of the solution. You must assign a device template to each CPE device at each site in a distributed deployment. The CPE device templates contain three types of information:

- Template settings information prepares the device for remote activation, connects the device to the peer MX Series router, and establishes an IPsec tunnel with the router.
- Stage-2 configuration template information specifies the additional settings that you or your customer can configure for the device. For example, you can enable configuration of a 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 provides the actual values for the stage-2 configuration templates. In general, your customers perform this configuration through Customer Portal.

In some cases, however, you might want all CPE devices to use the same values, and you have the option to provide those values through the device template. You can use the default CSO CPE device templates if they are suitable for the topology of your solution.

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You can also customize the default device templates or create your own device templates and upload them to CSO.

The device templates support the following deployment models:

- MPLS WAN with Internet backup—Device templates NFX_deployment_option_1 and SRX_deployment_option_1 support this deployment model.
- Secure WAN over Internet—Device template NFX_deployment_option_4 supports this deployment model.
- CPE for a Managed Internet Service—Device templates NFX_Managed_Internet_CPE and SRX_Managed_Internet_CPE support this deployment model.

Tasks You Can Perform

You can perform the following tasks from this page:

- Clone a device template. See "Cloning a Device Template" on page 114.
- Import a device template from a file. See "Importing a Device Template" on page 115.
- Configure a device template. See "Configuring a Device Template" on page 116.
- Modify a device template description. See "Modifying a Device Template Description" on page 123.
- Delete a device template. See "Deleting a Device Template" on page 124.
- View details about a device template. See "Viewing Object Details" on page 14.
- Show or hide columns about the templates. See "Sorting Objects" on page 15.
- Search an object about the templates. See "Searching for Text in an Object Data Table" on page 15.

Field Descriptions

Table 55 on page 111 describes the fields on the Device Templates page.

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Table 55: Fields on the Device Templates Page

Field	Description
Template Name	View the name of the device template. • Juniper-MX-MIS—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. • SDN-GW-MX—Default template for MX Series router. Select this option for MX Series routers in centralized and distributed deployments. • SRX_Basic_SDWAN_HUB—Device template for an SRX Series 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. • SRX_deployment_option_1—Device template for an SRX Series Services Gateway or a vSRX used as a CPE device in a distributed deployment. • SRX_Managed_Internet_CPE—Device template to manage SRX Series Services Gateway devices for a managed internet service. • NFX_deployment_option_1—Device template for an NFX250 device in a distributed deployment. This template supports port-forwarding with a CSO-initiated connection. • NFX_deployment_option_4—Device template for an NFX250 device in a distributed deployment. This template supports outbound SSH, which is the device-initiated connection, with port-forwarding capability. • NFX_Managed_Internet_CPE—Device template to manage an NFX250 device for a managed Internet service. • SRX_Advanced_SDWAN_CPE_option_1—Device template for an SRX Series Services Gateway spoke in an SD-WAN deployment with hub-spoke topology. • SRX_Advanced_SDWAN_HUB_option_1—Device template for an SRX Series Services gateway hub in an SD-WAN deployment with hub-spoke topology. • VRR_Advanced_SDWAN_option_1—Device template for an SD-WAN deployment with hub-spoke topology. • NFX_Advanced_SDWAN_CPE_option_1—Device template for an NFX250 device that you use for an SD-WAN deployment with SP-managed hub-spoke topology. • NFX_SDWAN_SUPPORT—Device template for an NFX250 device that you use for an SD-WAN deployment. • SRX_SDWAN_SUPPORT—Device template for an SRX Series Services Gateway with an SD-WAN deployment. • MX_Advanced_SDWAN_HUB_option_1—Device template for MX Series router in an SD-WAN deployment with hub-spoke topology. • NFX_SDWAN_Dual_CPE—Device template for an NFX250 device in an SD-WAN deployment with a redundant NFX CPE device. • SRX_SDWAN_Dual_CPE—Device template for an SRX Series Services Gateway in an SD-WAN deployment with a redundant SRX CPE device. • NFX_AWS_Cloud_Connect—Device template for an NFX250 device that is deployed on-premise for an AWS VPC. • vSRX_AWS_SDWAN_Endpoint_option_1—Device template for a vSRX spoke in SD-WAN deployment for AWS in hub.
Description	View the description of the device template. Example: NFX250 device deployed as a CPE device with SD-WAN capability.

Table 55: Fields on the Device Templates Page (continued)

Field	Description
Assigned to	View the number of tenant sites using the device template. Example: 2 Tenants (2 Sites)
Workflows	View the number of workflows used in the device template. Example: 7
Target Family	View the name of the device family for which the device template is created. Example: juniper-srx
Last Updated	View the date and time when the device template was last updated. Example: 05/23/2017 06:22

The list of device templates and their default configurations are listed in Table 56 on page 112, Table 57 on page 113, and Table 58 on page 113.

Table 56: Device Templates Supported on NFX250 Device

Device Template Name	NFX_deployment_option_1	NFX_Managed_Internet_CPE	NFX_deployment_option_4	NFX_Advanced_SDWAN_CPE_option_1
AUTO_DEPLOY_STAGE2_CONFIG	Disabled	Disabled	Disabled	Disabled
ZTP_ENABLED	—	—	—	—
PRE-STAGED-CPE	—	—	—	—
ACTIVATION_CODE_ENABLED	Enabled	Enabled	Enabled	Enabled
OOB_OAM_Port	—	—	—	—
S2_MODEL_HUGEPAGE_COUNT	21	21	21	13
S1_MODEL_HUGEPAGE_COUNT	9	9	9	5
USE_SINGLE_SSH_TO_NFX	Enabled	Enabled	Enabled	Disabled
ENC_ROOT_PASSWORD	Specified	Specified	Specified	Specified
WAN Port Names	WAN_0 ge-0/0/10 WAN_1 ge-0/0/11	WAN_0 ge-0/0/10	WAN_0 ge-0/0/10	WAN_0 ge-0/0/10 WAN_1 ge-0/0/11 WAN_2 xe-0/0/12 WAN_3 xe-0/0/13

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Table 57: Device Templates Supported on SRX Series Services Gateways

Device Template Name	SRX_Managed_Internet_CPE	SRX_deployment_option_1	SRX_Advanced_SDWAN_CPE_option_1	SRX_Advanced_SDWAN_HUB_option_1
AUTO_DEPLOY_STAGE2_CONFIG	Disabled	Disabled	Disabled	Disabled
ZTP_ENABLED	Enabled	Enabled	Disabled	Disabled
PRE-STAGED-CPE	Enabled	—	—	—
ACTIVATION_CODE_ENABLED	Disabled	Disabled	Disabled	Disabled
OOB_OAM_Port	fxp0	fxp0	fxp0	fxp0
USE_SINGLE_SSH_TO_NFX	—	—	—	—
S2_MODEL_HUGEPAGE_COUNT	—	—	—	—
S1_MODEL_HUGEPAGE_COUNT	—	—	—	—
ENC_ROOT_PASSWORD	—	—	—	—
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

Table 58: Device Templates Supported on MX Series Router

Device Template Name	MX_Advanced_SDWAN_HUB_option_1
ACTIVATION_CODE_ENABLED	Disabled
AUTO_DEPLOY_STAGE2_CONFIG	Disabled
OOB_OAM_Port	fxp0
ZTP_ENABLED	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

Related Documentation

- Creating a Single POP on page 53

- Creating Devices on page 83

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_Advanced_SDWAN_CPE_option_1_Custom.

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_Advanced_SDWAN_CPE_option_1_Custom.

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.

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Related Documentation

- Importing a Device Template on page 115

Importing a Device Template

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 on page 115
- Importing a Device Template File on page 115

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 on page 53

Configuring a Device Template

Device templates contain global parameters and workflows. Global parameters are a set of variables that can be customized easily.

- Configuring Template Settings in a Device Template on page 116
- Updating Stage-2 Configuration Template in a Device Template on page 119
- Configuring Stage-2 Initial Configuration on page 122

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 a device template for which you want to configure the settings and then select **Edit Device Template > Template Settings**.

   The Template Settings page appears.

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3. Complete the configuration settings according to the guidelines provided in Table 59 on page 117.

4. Click **Save**.

Table 59: 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
ZTP_ENABLED	Specify whether to enable ZTP for the device. NOTE: This option is supported on SRX Series Services Gateways only. Example: Enabled
PRE_STAGED_CPE	Specify whether the CPE device is pre-staged with WAN configuration. NOTE: This option is supported on SRX Series Services Gateways only. Example: Enabled
ACTIVATION_CODE_ENABLED	Specify whether the customer must use an activation code to activate the CPE device. Example: Enabled
OOB_OAM_Port	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. NOTE: This option is supported on SRX Series Services Gateways only. Example: fxp0
S2_MODEL_HUGEPAGE_COUNT	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. Example: 21
USE_SINGLE_SSH_TO_NFX	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. Example: Enabled

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Table 59: 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-encrypted 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.
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.

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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 60 on page 119 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 61 on page 120.

4. Click **Save**.

   The new stage-2 configuration template is included in the device template.

Table 60: Fields on the Stage-2 Configuration Templates Page

Name	Description
Name	View the name of the stage-2 configuration template. Example: LAN side config
Family	View the name of the device family. Example: juniper-srx

Table 60: Fields on the Stage-2 Configuration Templates Page (continued)

Name	Description
Component Name	View the name of the component through which the settings are configured. The components that are currently supported are: • JUNOS—Supported on SRX Series Services Gateway. • Juniper Device Manager (JDM)—Supported on NFX250 device. JDM is a Linux container that manages software components. • 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. • 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. Example: JUNOS
Hide	Displays whether the template is hidden on Customer Portal. • true—Template is not visible on Customer Portal. • false—Template is visible on Customer Portal. Example: false

Table 61: Fields on the Add New Template Page

Name	Description
Template	Select the configuration template from the drop-down list. The configuration templates are designed in the Configuration Designer tool. Example: srx-basic-sdwan-cpe-config
Display Name	Specify the name of the template that you want to display on the configuration interface. Example: SDWAN Config
Component Name	Specify the component name through which the settings are configured. The components that are currently supported are: • JUNOS—Supported on SRX Series Services Gateway. • Juniper Device Manager (JDM)— Supported on NFX250 device. JDM is a Linux container that manages software components. • 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. • 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. Example: JUNOS

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Table 61: Fields on the Add New Template Page (continued)

Name	Description
Hide	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. • hide—White dot on right with blue background. • show—White dot on left with gray background. Example: hide
Copy From Template	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. Example: srx-mis-lan-to-wan-config

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.

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Configuring Stage-2 Initial Configuration

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 config 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

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 62 on page 122, Table 63 on page 123, and Table 64 on page 123.

4. Click **Ok**.

Table 62: 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
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

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Table 63: 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 64: 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

See Also

- About the Device Template Page on page 109

Related Documentation

- Modifying a Device Template Description on page 123

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 on page 109

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 on page 109

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CHAPTER 10

Managing Software Images

- Device Images Overview on page 125
- About the Device Images Page on page 126
- Deploying Device Images to Devices on page 127
- Uploading a Device Image on page 129
- Deleting Device Images on page 131

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 on page 126

About the Device Images Page

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

You can use the Device Images page to view uploaded device images for physical and virtual devices and upload device images from your local file system. You can deploy device images on a single device or simultaneously on multiple devices of the same family. See "Device Images Overview" on page 125.

Tasks You Can Perform

You can perform the following tasks from this page:

- Upload device images. See "Uploading a Device Image" on page 129.
- Deploy device images. See "Deploying Device Images to Devices" on page 127.
- 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 14.
- Show or hide columns that contain information about the device image. See "Sorting Objects" on page 15.
- Search an object for a device image. See "Searching for Text in an Object Data Table" on page 15.
- View the history of image upgrade. Click **Image Upgrade History > Upgrade History** at the top right corner of a page. See Table 66 on page 127.

Field Descriptions

Table 65 on page 126 shows the fields on the Device Images page.

Table 65: Fields on the 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

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Table 65: Fields on the Images Page (continued)

Field	Description
Size	View the size of the device image. Example: 14 KB

Table 66 on page 127 shows fields on the Upgrade History page.

Table 66: Fields on the Upgrade History Page

Field	Description
In progress	View the number of image upgrade tasks that are in progress.
Success	View the number of image upgrade tasks that are successful.
Failure	View the number of image upgrade 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 upgrade images.

Related Documentation

- Uploading a Device Image on page 129
- Deploying Device Images to Devices on page 127

Deploying Device Images to Devices

Use the Device Images page to view a list of physical and virtual devices that are relevant to the selected image. You can deploy an image on a single device or multiple devices on a per-site basis or across all sites of a tenant. A device can be a CPE device or a virtual network function (VNF). You can also schedule the deployment of images.

To deploy a device image to the device:

1. Select **Resource > Images**.

   The Images page appears.

2. Select the device image to be deployed on the device and then 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 67 on page 128 for the details of the device.

NOTE: **The Deploy button is enabled only for the device images.**

3. Select one or more devices on which the device image needs to be deployed and schedule a date and time for image deployment.

Table 67: Fields on the Deploy Image: Select Devices Page

Field	Description
Device Name	View the name of the device configured in the point of presence (POP) or site. Example: sunny-NFX-250
Tenant	View the name of the tenant. Example: tenant-blue
Site Name	View the name of the tenant site. Example: site-blue-white
Location	View the name of the location. Example: San Jose, CA
WAN Links	View the number of WAN links. Example: 3
POP Name	View the name of the POP. Example: pop_blue
Management Status	View the management status of the devices deployed in the cloud. • EXPECTED—Regional server has activation details for the device, but the device has not yet established a connection with the server. • ACTIVE—Device has downloaded images, but is not yet configured. • PROVISIONED—IPsec tunnel on the NFX250, SRX, or vSRX device is operational. • PROVISION_FAILED—Device failed if the vSRX was not instantiated properly.
Model	View the name of the device model. Example: NFX250
Active Services	View the number of services that are activated for the device. Example: 3

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Table 67: Fields on the Deploy Image: Select Devices Page (continued)

Field	Description
Choose Deployment Type	
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.

Related Documentation

- About the Device Images Page on page 126

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 68 on page 130.

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 68: Fields on the Upload Device Image Page

Field	Description
Name	Specify the filename for the device image that you are uploading. Example: juniper_nfx_250_v1_img.tgz You must use the following filename format for device images of VNFs as listed below: • Riverbed—**riverbed-img** • vSRX—**vsrx-vmdisk-15.1.qcow2** • NFX—**juniper_nfx_1.5_img.tgz**
Image Type	Specify the type of device image. • **Device Image**—Software image for the physical device (CPE). • **VNF Image**—Software image for the virtual device (VNF). • **VNF Script**—Provision script for the VNF image. • **EMS Plugin Package**—EMS plugin package to support a new device family. • **Device Extension Package**—Extension software package that can be installed on the device. • **Boot Config Image**—Boot configuration ISO image that can be used to boot up the VNF or virtual device. • **Telemetry Agent Package**—Installable package containing telemetry agent to run on a device. For example, NFX. Yes • **VNFM Plugin Package**—Installable package containing VNF Manager (VNFM) plugin specific to a certain set of VNFs.
Description	Enter a description of the device image.
File Location	Click **Browse** 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

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Table 68: Fields on the Upload Device Image Page (continued)

Field	Description
Build Number	Specify the build name of the device image. Example: X53-D102.2

Related Documentation

- Device Images Overview on page 125
- About the Device Images Page on page 126

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 on page 126

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CHAPTER 11

Configuring Network Services

- Network Services Overview on page 133
- About the Network Services Page on page 134
- About the Service Overview Page on page 136
- About the Service Instances Page on page 137
- Configuring VNF Properties on page 139
- Allocating a Service to Tenants on page 139
- Removing a Service from Tenants on page 140
- Viewing a Service Configuration on page 140
- vSRX VNF Configuration Settings on page 141
- LxCIPtable VNF Configuration Settings on page 148
- Cisco CSR-1000v VNF Configuration Settings on page 151
- Riverbed Steelhead VNF Configuration Settings on page 152
- Managing a Single Service on page 153

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.

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Related Documentation

- About the Network Services Page on page 134

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 133.

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 69 on page 134.
- Assign a service to one or more tenants. See "Allocating a Service to Tenants" on page 139.
- Remove a service from one or more tenants. See "Removing a Service from Tenants" on page 140.
- 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 137.

Field Descriptions

Table 69 on page 134 shows the descriptions of the widgets that appear at the top of the Services page.

Table 69: Widgets on the Services Page

Widget	Description
Top Network Services Used	View the numbers of instances of the three services that are most used by tenants in the network. This view might help you to identify trends for network services, especially when you introduce a new service.
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 70 on page 135 shows the descriptions of the fields on the Network Services page.

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Table 70: Fields on the Services Page

Field	Description
Name	View the name of the network service. Click the name to view full information about a service.
Tenants	View the number of tenants and the names of the tenants that have access to this netowkr service. • View the name of the first tenant that used the network service (left of the table cell). • View the additional number of tenants using this network service (right of the table cell). • Hover over the additional number of tenants to view a complete list of all the tenants using this network service.
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 71 on page 135 shows the descriptions of the fields on the Detail for *Service-Name* page.

Table 71: Fields on the Service Detail Page

Field	Description
General Information	
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 on page 133
- About the Service Overview Page on page 136
- About the Service Instances Page on page 137
- Allocating a Service to Tenants on page 139
- Removing a Service from Tenants on page 140

- Viewing Object Details on page 14

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 72 on page 136.
- View resources required for the service and its performance specification. See *Service Requirements* and *Service Performance* in Table 72 on page 136.
- View the service chain, with its constituent VNFs. See *Service Configuration* in Table 72 on page 136.

Field Descriptions

Table 72 on page 136 provides guidelines on using the fields on the Service Overview page.

Table 72: Fields on the Service Overview Page

Field	Description
General Information	
Description	View a summary about the service's capabilities. The network service designer provides this summary.
State	View the state of the network service: • Discontinued—Service is no longer available for customers. • Published—Service designer has published service to network catalog, and it is available for customers.
Tenants	View the number of tenants using this service.
Service Requirements	
CPU	View the number of CPUs that the service needs (cores).
Memory	View the amount of RAM that the service needs in gigabytes (GB).
Service Performance	

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Table 72: Fields on the Service Overview Page (continued)

Field	Description
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.
Service Configuration (graphic of the service chain)	
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	Click to view settings for the VNF. See "vSRX VNF Configuration Settings" on page 141. The service designer can configure the VNF settings in Network Service Designer and the administrative user can configure the VNF settings in Customer Portal. 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.

Related Documentation

- About the Network Services Page on page 134
- vSRX VNF Configuration Settings on page 141
- LxCIPtable VNF Configuration Settings on page 148
- Cisco CSR-1000v VNF Configuration Settings on page 151

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 74 on page 138.
- 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 139.

Field Descriptions

Table 73 on page 138 shows the descriptions of the fields on the Service Instances page.

Table 73: 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: • Created—Administrative user for the tenant has enabled this service instance, which is active. • Blank—Administrative user for the tenant has disabled this service instance.
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 74 on page 138 shows the descriptions of the fields on the Detail for *Service-Instance-Name* page.

Table 74: Fields on the Service Instance Details Page

Field	Description
General	
Description	View information about this service instance. This information is generated from data in Customer Portal.

Related Documentation

- Network Services Overview on page 133
- About the Network Services Page on page 134

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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

- About the Service Instances Page on page 137

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 on page 134
- Removing a Service from Tenants on page 140

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 on page 134
- Allocating a Service to Tenants on page 139

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.

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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 on page 141
- LxCIPtable VNF Configuration Settings on page 148
- Cisco CSR-1000v VNF Configuration Settings on page 151

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 75 on page 142 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 76 on page 143 shows the firewall settings you can configure.
- Table 77 on page 145 shows the network address translation (NAT) settings you can configure.
- Table 78 on page 146 shows the unified threat management (UTM) settings you can configure.

Table 75: Fields for the vSRX Base Settings

Field	Description
Host Name	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. Example: vm-vsrx For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
Loopback Address	Specify an IPv4 loopback address for the management interface of the VM. Example: 192.0.2.25
DNS Servers	Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers. Example: 192.0.2.35
NTP Servers	Specify the FQDNs or IP addresses of one or more NTP servers. Example: 192.0.2.45
Syslog Servers	Specify the FQDNs or IP addresses of one or more system log servers. Example: 192.0.2.55
Enable Re-filter	Select **True** to enable a stateless firewall filter that protects the Routing Engine from denial-of-service (DoS) attacks or **False** to allow DoS attacks. Example: True
Enable Default Screens	For a cloud site, select **True** to enable the default screens security profile for the destination zone or **False** to disable default screening. Example: False You cannot configure this setting for an on-premise site.

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Table 75: Fields for the vSRX Base Settings (continued)

Field	Description
Time Zone	Specify the time zone for the VM. Example: UTC
Right Interface	Specify the identifier of the VM interface that transmits data. Example: ge-0/0/1 For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
Left Interface	Specify the identifier of the VM interface that receives data. Example: ge-0/0/0 For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
SNMP Prefix List	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. Example: 10.0.2.0/24
Ping Prefix List	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. Example: 10.0.2.1/24
Space Servers	If you set the Enable Re-filter field to **True**, specify the IP addresses of the VMs that contain the Junos Space Virtual Appliances. Example: 10.0.2.50

Table 76: Fields for the vSRX Firewall Settings

Field	Description
Policy Name	Specify the name of the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols. Example: policy-1
Source Zone	Select the security zone from which packets originate. • **left**—Interface that transmits data to the host • **right**— Interface that receives data transmitted from the host 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 *context*. Example: left

Table 76: Fields for the vSRX Firewall Settings (continued)

Field	Description
Destination Zone	Select the security zone to which packets are delivered. • **left**—Interface that transmits data to the host • **right**—Interface that receives data transmitted from the host 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 *context*. Example: right
Source Address	Specify the source IP address prefixes that the network service uses as match criteria for incoming traffic. To add source addresses: 1. Click the **Source Address** column. The source-address page appears. 2. Select **any** to match any source IP address of packets or **ipp** to match a specific prefix in the source IP address for which the application enforces the policy. 3. If you select **ipp**, specify a prefix. 4. Click **OK**. Example: 10.0.2.30
Destination Address	Specify the destination IP address prefixes that the network service uses as match criteria for outgoing traffic. To add a destination address: 1. Click the **Destination Address** column. The destination-address page appears. 2. Select **any** to match any source IP address of packets or **ipp** to match a specific prefix in the source IP address for which the application enforces the policy. 3. If you select **ipp**, specify a prefix. 4. Click **OK**. Example: 192.0.2.0/24
Action	Select **permit** to transmit packets that match the rule or **deny** to drop packets that match the rule. Example: permit

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Table 76: Fields for the vSRX Firewall Settings (continued)

Field	Description
Application	Specify the applications to which the policy applies. The applications are based on protocols and ports. To specify applications: 1. Click the **Application** column. The application page appears. 2. In the allowed_apps field, select **any** to match any application or **app** to choose specific applications. If you select **app**, press and hold the Ctrl key and click the required applications from the drop-down list. • junos-tcp-any • junos-udp-any • junos-ftp • junos-http • junos-https • junos-icmp-all • junos-icmp-ping • junos-telnet • junos-tftp 3. Click **OK**. Example: • junos-tcp-any • junos-udp-any

Table 77: Fields for the vSRX NAT Settings

Field	Guidelines
NAT Source Name	Specify the source IP address of packets that the policy rules match. Example: 10.0.2.2/24
NAT Destination Name	Specify the destination IP address of packets that the policy rules match. Example: 10.0.2.3/24
NAT policy settings—For information about the following policy settings, see the firewall policy settings in Table 2. • Policy Name • Source Zone • Destination Zone • Source Address • Destination Address • Action • Application	

Table 78: Fields for the vSRX UTM Settings

Field	Description
Antivirus	Select **True** to check for viruses in application layer traffic against a virus signature database. Select **False** to disable checking for viruses. Example: True
Antispam	Select **True** to block spam e-mails or **False** to allow spam e-mails. Example: True
Antispam Black List	Specify an address blacklist for local spam filtering. Blacklists contain e-mail addresses from which you do not want to receive messages. NOTE: When both the whitelist and blacklist are in use, the whitelist is checked first. If there is no match, then the blacklist is checked. Example: john@example.net
Antispam White List	Specify an address whitelist for local spam filtering. Whitelists contain e-mail addresses from which you want to receive messages. NOTE: When both the whitelist and blacklist are in use, the whitelist is checked first. If there is no match, then the blacklist is checked. Example: user@example.net
Antispam Action	Select the antispam action that you want the device to take when it detects spam: • **block**—Blocks the message • **tag-subject**—Tags the subject field with a preprogrammed string • **tag-header**—Tags the message header with a preprogrammed string Example: block
Content Filter	Select **True** to block different types of traffic based on the MIME type, file extension, protocol command, and embedded object type or **False** to permit these types of traffic. Example: True
Content Filter Extensions	Specify one or more file extensions to block over HTTP, FTP, SMTP, IMAP, and POP3 connections. Example: exe, pdf, js
Content Filter Mime	Specify the MIME types to be blocked or permitted over HTTP, FTP, SMTP, IMAP, and POP3 connections. Example: application, exe
Content Filter Protocol Commands	Specify commands for HTTP, FTP, SMTP, IMAP, and POP3 protocols to block traffic based on these commands. Example: put, mput

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Table 78: Fields for the vSRX UTM Settings (continued)

Field	Description
Content Filter Content Type	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: • Active X • Windows executable files (.exe) • HTTP cookie • Java applet • Zip files Example: activex, exe
Content Filter Apply To	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: • HTTP • FTP • POP3 • IMAP • SMTP Example: http, ftp
Web filter	Select **True** to prevent access to specific websites and embedded object types or **False** to permit access to all websites. Example: True
Web Filter Black List	Specify URLs to create a blacklist of websites to block. NOTE: A Web filtering profile can contain one whitelist or one blacklist with multiple user-defined categories, each with a permit or block action. Example: • www.example1.com • www.example2.com
Web Filter White List	Specify URLs to create a whitelist of websites that users can always access. 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 whitelist or blacklist based on its user-defined category. NOTE: A Web filtering profile can contain one whitelist or one blacklist with multiple user-defined categories, each with a permit or block action. Example: www.example3.net

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Table 78: 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. • Source Zone • Destination Zone • Source Address • Destination Address • Action • Application	

Related Documentation

- About the Network Services Page on page 134
- About the Service Overview Page on page 136
- Viewing a Service Configuration on page 140
- LxCIPtable VNF Configuration Settings on page 148
- Cisco CSR-1000v VNF Configuration Settings on page 151

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 79 on page 148 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 80 on page 149 shows the firewall settings you can configure.
- Table 81 on page 150 shows the Network Address Translation (NAT) settings you can configure.

Table 79: Fields for the LxCIP Base Settings

Field	Description
Loopback Address	Specify a loopback IP address. Example: 192.0.2.10

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Table 79: Fields for the LxCIP Base Settings (continued)

Field	Description
Operation	Select **add** to apply the policies to a specific route or **del** 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 80: Fields for the LxCIP Firewall Policy Settings

Field	Description
Firewall Policies	
Prevent SSH Brute	Select **True** to prevent SSH brute attacks or **False** to allow SSH brute attacks. Example: False
Prevent Ping Flood	Select **True** to prevent ping flood attacks or **False** to allow ping flood attacks. Example: False
Forwarding Rule Settings	
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
Operation	Select the operation, which applies to a chain of rules of the same type, from the drop-down list. The following options are available: • **append**—Append the rule to a rule chain. • **insert-before**—Insert the rule before a rule with the same name. • **delete**—Replace an existing rule with this name. Example: append
Source Address	Specify the source IP address prefix that the network service uses as a match criterion for outgoing traffic. Example: 192.0.2.20/24
Name	Specify the name for the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols. Example: vsrx-fw-policy

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Table 80: Fields for the LxCIP Firewall Policy Settings (continued)

Field	Description
Action	Select the action for the rule, which applies to all traffic that matches the specified criteria. • **accept**—Transmit packets that match the policy parameters. • **drop**—Drop packets that match the policy parameters. • **reject**—Reject packets that match the policy parameters. Example: accept
Service	Specify the service that you want the rule to match. Example: • http • smtp
Type	Select the type of packet that the rule matches. • **input**—Packets that the network service receives that are addressed to this VM • **forward**—Packets that the network service receives that are addressed to other VMs • **output**—Packets that the network service transmits The application creates a chain of all rules with a particular type. Example: input

Table 81: 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 on page 134
- About the Service Overview Page on page 136
- Viewing a Service Configuration on page 140
- vSRX VNF Configuration Settings on page 141
- Cisco CSR-1000v VNF Configuration Settings on page 151

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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 82 on page 151 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 83 on page 151 shows the firewall settings you can configure.

Table 82: 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 83: 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

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Table 83: Fields for the CSR-1000v Firewall Settings (continued)

Field	Description
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: • http • https • telnet • ftp • tcp • udp • icmp Example: http, https
Right to Left Allowed Apps	Select the application from the drop-down list for which the policy is enforced for incoming packets. The following applications are available: • http • https • telnet • ftp • tcp • udp • icmp Example: ftp, udp

Related Documentation

- About the Network Services Page on page 134
- About the Service Overview Page on page 136
- Viewing a Service Configuration on page 140
- vSRX VNF Configuration Settings on page 141
- Cisco CSR-1000v VNF Configuration Settings on page 151

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 on page 140

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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 136
- About the Service Instances Page on page 137

Related Documentation

- About the Network Services Page on page 134
- Viewing a Service Configuration on page 140

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CHAPTER 12

Configuring Application SLA Profiles

- Application Quality of Experience (AppQoE) Overview on page 155
- About the Application Traffic Type Profiles Page on page 157
- Creating Traffic Type Profiles on page 160
- Editing and Deleting Traffic Type Profiles on page 163
- SLA Profiles and SD-WAN Policies Overview on page 164
- Local Breakout Overview on page 167
- About the Application SLA Profiles Page on page 168
- Creating SLA Profiles on page 169
- Editing and Deleting SLA Profiles on page 171

Application Quality of Experience (AppQoE) Overview

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. In Release 3.3, 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.

In Release 3.3 and later, 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.

- Limitations on page 156
- Workflow on page 156

Limitations

The AppQoE support in Release 3.3 is subject to the following limitations and restrictions:

- Only book-ended solutions, which have SRX devices or vSRX instances that run the same version of Junos OS with the same configuration on both ends, are supported.
- Multihoming is not supported.
- Dual CPE devices are not supported.

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 157, enable the required profiles, "modify the default profiles" on page 163, or "create new profiles" on page 160.
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 183.
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 169.

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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 441 and "Deploying Policies" on page 532.
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 36.

About the Application Traffic Type Profiles Page

To access this page from the Administration portal, select **Configuration** > **Application Traffic Type Profiles**. To access this page from the Customer portal, select **Configuration** > **SD-WAN** > **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 on page 157
- Tasks You Can Perform on page 159
- Field Descriptions on page 159

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 84: 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	

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Table 84: 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 160.
- Edit or delete a traffic type profile. See "Editing and Deleting Traffic Type Profiles" on page 163.
- Show or hide columns that contain information about traffic type profiles. See "Sorting Objects" on page 15.
- 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 85 on page 159 shows the descriptions of the fields on the Application Traffic Type Profiles page.

Table 85: Fields on the Application Traffic Type Profiles Page

Field	Description
Name	Displays the traffic type profile name.
Priority	Displays the traffic type profile priority.
Status	Displays whether the traffic type profile is enabled or disabled.

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Table 85: Fields on the Application Traffic Type Profiles Page (continued)

Field	Description
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: • Data Size (in bytes) • Probe Interval (in seconds) • Probe Count • Burst Size
Created by	Shows the user that created the SLA profile.

Related Documentation

- Creating Traffic Type Profiles on page 160
- Editing and Deleting Traffic Type Profiles on page 163

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 157 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 86 on page 161.

4. Click **OK** to save the traffic type profile configuration. If you want to discard your changes, click **Cancel** instead.

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If you click **OK**, the traffic type profiles that you configured appear on the **Application Traffic Type Profiles** page.

Table 86: Fields on the Create Traffic Type Profiles page

Field	Description
General	
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	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. NOTE: You cannot create two traffic type profiles with S-High or High priority. 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. 1. **S-High**, which denotes strict high or the highest priority. 2. **M-High**, which denotes medium high. 3. **High** 4. **M-Low**, which denotes medium low. 5. **Low**
Status	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. NOTE: If there are more than six traffic type profiles enabled when you deploy a policy, the policy deployment fails.
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 86: Fields on the Create Traffic Type Profiles page (continued)

Field	Description
DSCP Value	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: NOTE: You can assign a DSCP value to only one traffic type profile. • ef • af11 • af21 • af22 • af23 • af31 • af32 • af33 • af41 • af42 • af43 • be • cs1 • cs2 • cs3 • cs4 • cs5 • nc2/cs7
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.
Buffer	
Allocation	Move the slider button to choose the bandwidth buffer that you want to allocate to the traffic type profile. NOTE: The total buffer allocation of all the traffic type profiles that are in enabled state must not exceed 100%.

Related Documentation

- About the Application Traffic Type Profiles Page on page 157

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- Editing and Deleting Traffic Type Profiles on page 163

Editing and Deleting Traffic Type Profiles

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 on page 163
- Deleting Traffic Type Profiles on page 163

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 86 on page 161.

4. 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.

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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 on page 169
- Editing and Deleting SLA Profiles on page 171

SLA Profiles and SD-WAN Policies Overview

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 87 on page 164 lists the categories of configurable constraints that are defined in an SLA profile.

Table 87: SLA Profile Categories

Category	Description
Path preference and priority	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 that are used for local breakout, you must select a path preference. For SLA profiles that are not associated with local breakout, you must select a path preference or configure at least one SLA parameter. MPLS is more latency-sensitive than Internet. 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.

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Table 87: SLA Profile Categories (continued)

SLA parameters	For SLA profiles that are not used for local breakout, you can also define one or more than one of the following SLA parameters: • Throughput—Amount of data (in Mbps) that is sent upstream and received downstream by the site during the selected time period • Latency—Amount of time (in ms) that a packet of data takes to travel from one designated point to another • Packet loss—Percentage of data packets dropped by the network to manage congestion • Jitter—Difference between the maximum and minimum round-trip times (in ms) of a packet of data 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.
Class of service	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.
Rate limiters	Rate limiters are defined for traffic shaping and efficient bandwidth utilization. You can define the following rate limiters: • Maximum upstream and downstream rates—The maximum upstream and downstream rate for all applications associated with the SLA profile. • 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.

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

SLA profiles are used by SD-WAN policy intents 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. 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.

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- SLA profile—An SLA profile that has the required constraints you want to apply to 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. The full mesh topology supports only static policies. Also, only static policies can be applied on links that have local breakout enabled.
- **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 on page 168
- Local Breakout Overview on page 167

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Local Breakout Overview

The local breakout feature enables Contrail Service Orchestration (CSO) to route Internet traffic directly from a site in a software-defined WAN (SD-WAN) implementation. In the full mesh topology, local breakout is supported on the branch sites. In the hub-and-spoke topology, local breakout is supported on the on-premise hub site and the spoke site. If local breakout is not enabled on the spoke site, then Internet traffic is routed from the hub site if local breakout is enabled on the hub site. Local breakout is not supported on cloud hub sites.

When creating sites, you need to enable local breakout and configure the WAN links that are used for local breakout traffic on the site. You also need to specify whether the WAN links are used exclusively for local breakout traffic or for both local breakout and non-Internet traffic. If a specific WAN link is used exclusively for local breakout, then overlay tunnels for that WAN link are not created. Enabling a WAN link to be used exclusively for local breakout traffic reduces the number of overlay tunnels created between spoke and hub sites, thereby conserving bandwidth.

You can create a source Network Address Translation (NAT) rule while enabling local breakout on a spoke site. The source NAT rule is interface-based and is implicitly defined and applied to the site. This automatically created source NAT rule is not visible on the **NAT Policies** page. The automatically created source NAT rule has the least priority among rules and can be overridden by a user-created NAT policy. The automatically created source NAT rule can be enabled and disabled only from the **Configuring a Site** page. For an on-premise hub site, the option for automatic creation of source NAT rule is not available on the **Configuring a Site** page, and you need to create a source NAT rule.

You can enable SLA profiles to be associated with local breakout and map the SLA profile to static SD-WAN policies. For SLA profiles that are used for local breakout, you must select a path preference. Static SD-WAN policies are used to route the traffic of the applications defined in the static policies by using the preferred path in the attached SLA profile.

Applications are classified into the following categories:

- Cacheable applications—Cacheable applications are applications 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. Only cacheable applications and application groups are supported during the creation of local breakout-specific static SD-WAN policies.
- Non-cacheable applications—Non-cacheable applications 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. Non-cacheable applications cannot be used for local breakout-specific static SD-WAN policies.

Related Documentation

- SLA Profiles and SD-WAN Policies Overview on page 437
- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549

- Configuring a Single Site on page 567
- Creating SLA Profiles on page 447

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 169.
- Edit or delete an SLA profile. See "Editing and Deleting SLA Profiles" on page 171.
- Show or hide columns that contain information about SLA profiles. See "Sorting Objects" on page 15.
- 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 88 on page 168 shows the descriptions of the fields on the Application SLA Profiles page.

Table 88: 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	Shows whether failover is enabled for the SLA profile.
Local Breakout	Displays whether local breakout is enabled on the SLA profile.
Throughput Target	Displays the target throughput for the SLA profile.
Latency Target	Displays the target latency for the SLA profile.

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Table 88: Fields on the Application SLA Profiles Page (continued)

Field	Description
Packet Loss Target	Displays the target packet loss for the SLA profile.
Jitter Target	Displays the target jitter 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

- SLA Profiles and SD-WAN Policies Overview on page 164
- Local Breakout Overview on page 167
- Creating SLA Profiles on page 169
- Editing and Deleting SLA Profiles on page 171

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 89 on page 169.

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 89: Fields on the Create SLA Profile page

Field	Guidelines
General	
Name	Enter a name for the SLA profile. Can be a unique string of not more than 15 characters that contains alphanumeric characters and hyphen (-).

Table 89: Fields on the Create SLA Profile page (continued)

Field	Guidelines
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 **Enabled** state.
Local Breakout	Enable local breakout for the SLA profile. Local breakout is the ability of the site to route Internet traffic directly from the site.
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. For SLA profiles that are used for local breakout, you must select a path preference. For SLA profiles that are not used for local breakout, you must select a path preference or configure at least one SLA parameter.
Failover	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. NOTE: The Failover option is supported only for bandwidth-optimized SD-WAN networks.
Path Failover Criteria	Choose one of the following options: • **Does not meet one or more SLA parameters**—This triggers the path failover if any of the SLA parameters is violated. • **Does not meet all SLA parameters**—This triggers the path failover only when all the SLA parameters are violated.
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.
Advanced Configuration—SLA Sampling	
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.

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Table 89: Fields on the Create SLA Profile page (continued)

Field	Guidelines
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.
Advanced Configuration-Rate Limiting	
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 **High**. Other available values are **Medium High**, **Medium Low**, and **Low**.

Related Documentation

- SLA Profiles and SD-WAN Policies Overview on page 164
- About the Application SLA Profiles Page on page 168
- Editing and Deleting SLA Profiles on page 171

Editing and Deleting SLA Profiles

You can use the Applications SLA Profiles page to edit and delete SLA profiles.

- Editing an SLA Profile on page 171
- Deleting SLA Profiles on page 172

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 169. 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 169.

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

- SLA Profiles and SD-WAN Policies Overview on page 164
- About the Application SLA Profiles Page on page 168
- Creating SLA Profiles on page 169

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CHAPTER 13

Configuring Application Signatures

- Application Signatures Overview on page 173
- About the Application Signatures Page on page 174
- Creating Application Signature Groups on page 175
- Editing, Cloning, and Deleting Application Signature Groups on page 176

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

- About the Application Signatures Page on page 174
- Creating Application Signature Groups on page 175
- Editing, Cloning, and Deleting Application Signature Groups on page 176

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 175.
- Modify, clone, or delete an application signature group. See "Editing, Cloning, and Deleting Application Signature Groups" on page 176.
- 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 14.
- Show or hide columns in the **Application Signatures**. See "Sorting Objects" on page 15.
- Search for a specific application signature or application signature group. See "Searching for Text in an Object Data Table" on page 15.
- 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 90 on page 174 provides guidelines on using the fields on the **Application Signatures** page.

Table 90: 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 **Category** can be Messaging, Web, Infrastructure, Remote-Access, Multimedia, and so on.

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Table 90: Fields on the Application Signatures Page (continued)

Field	Description
Subcategory	UTM subcategory of the application signature. For example, the value of **Subcategory** 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 **Risk** 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 on page 173
- Creating Application Signature Groups on page 175
- Editing, Cloning, and Deleting Application Signature Groups on page 176

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 91 on page 175.
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 91 on page 175 provides guidelines on using the fields on the **Create Application Signature Group** page.

Table 91: 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.

Table 91: Fields on the Create Application Signature Group Page (continued)

Field	Description
Group Members	Click the add icon (+) to add signatures to your application group. On the **Add Application Signatures** page, select the check boxes next to the signatures you want to add to the group.

Related Documentation

- Application Signatures Overview on page 173
- About the Application Signatures Page on page 174
- Editing, Cloning, and Deleting Application Signature Groups on page 176

Editing, Cloning, and Deleting Application Signature Groups

You can edit, clone, and delete application signature groups from the **Application Signatures** page.

- Editing Application Signature Groups on page 176
- Cloning Application Signature Groups on page 176
- Deleting Application Signature Groups on page 177

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 175.

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.

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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

- Application Signatures Overview on page 173
- About the Application Signatures Page on page 174
- Creating Application Signature Groups on page 175

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CHAPTER 14

Managing Tenants

- Tenant Overview on page 179
- Full Mesh Topology Overview on page 179
- About the Tenants Page on page 181
- Adding a Single Tenant on page 183
- Editing Tenant Information on page 187
- Importing Data for Multiple Tenants on page 188
- Allocating Network Services to a Tenant on page 192
- Viewing the History of Imported Tenant Data on page 193
- Viewing the History of Deleted Tenant Data on page 194

Tenant Overview

A tenant in a Cloud CPE solution 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 customers in the Administration Portal to represent the staff in the customer's organization and the geographical locations in the customer's network. You also use Administration Portal to allocate network service profiles to customers.

Related Documentation

- Administration Portal Overview on page 4
- About the Tenants Page on page 181
- Editing Tenant Information on page 187
- Adding a Single Tenant on page 183
- Importing Data for Multiple Tenants on page 188

Full Mesh Topology Overview

Cloud CPE Solution 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 topology is selected when the tenant is created and cannot be modified later. A tenant supports only one full mesh network because all sites

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of the tenant are connected to one another. Sites in a full mesh topology can be of hub or spoke type. 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 the same type. For instance, WAN interfaces of type MPLS can connect to WAN interfaces of type MPLS only, and WAN interfaces of type Internet can connect to WAN interfaces of type Internet only. Consider that a tenant has two sites with one WAN interface each. If the interface type on one site is MPLS and the interface type on the other site is Internet, then the two sites cannot be connected to each other through the full mesh topology.

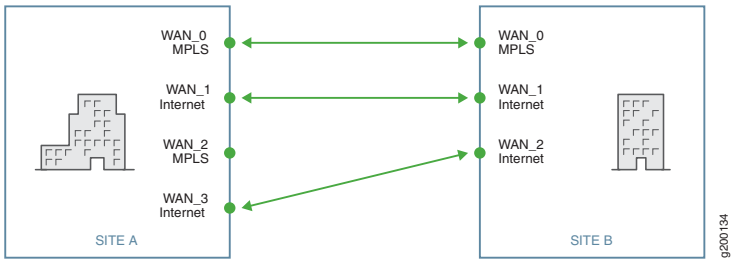
The following requirements must be satisfied for connections between WAN interfaces:

- 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.
- For connections between MPLS WAN interfaces, the MPLS subscription for all sites must be from the same service provider. Also, the MPLS WAN interfaces must have IP reachability.

The full mesh topology supports static SD-WAN policies and static advanced policy-based routing (APBR). Full mesh topology also supports LAN segmentation, departments, and multiple VPNs.

Cloud CPE Solution 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 3 on page 180). 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 3: 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 by default, only two WAN interfaces that are not enabled exclusively for local breakout traffic are chosen for connecting to the full mesh network. For instance, consider a site has four WAN interfaces. If WAN_1 on the site is enabled exclusively for

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local breakout traffic, then only WAN_0 and WAN_2 are 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 on page 164
- About the Tenants Page on page 181
- Local Breakout Overview on page 537

About the Tenants Page

To access this page, click **Tenants**.

You can use the Tenants page to create a tenant, import tenants and other objects associated with tenants, such as administrative users and sites, and view the history of imported tenant data and deleted tenant data. See "Tenant Overview" on page 179.

Before You Begin

Create all the resources required for the network point of presence (POP).

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 92 on page 182.
- View details about a tenant. Click the details icon for the tenant. See "Viewing Object Details" on page 14.
- Add a single tenant. See "Adding a Single Tenant" on page 183.
- Edit tenant information. See "Editing Tenant Information" on page 187.
- Import multiple tenants. See "Importing Data for Multiple Tenants" on page 188.
- Assign Network Services. See "Allocating Network Services to a Tenant" on page 192.
- View tenant import history. See "Viewing the History of Imported Tenant Data" on page 193.
- View tenant delete history. See "Viewing the History of Deleted Tenant Data" on page 194.

Field Descriptions

Table 92 on page 182 shows the description of the widget that appears at the top of the Tenants page.

Table 92: Widget on the Tenants Page

Widget	Description
Tenants by Topology	View the numbers of tenants and their types.
Tenants with Alerts	View the tenants with alerts defined on them.

Table 93 on page 182 provides guidelines on using the fields on the Tenants page.

Table 93: Fields on the Tenants Page

Field	Description
Name	View the name of the tenant. Click the name to view full information about a tenant.
Type	View the type of tenant. The tenant type limits the number of service instances for a tenant. The following options are available: • Small • Medium • Large • Default
Topology	View the topology of the tenant. Example: • Standalone • Hub and Spoke
Plan	View the deployment scenario of the tenant. Example: • HYBRID WAN • SD WAN
Sites	View the total number of sites that are available for the tenant.
Assigned Services	View the number of services that are assigned to the tenant.
Activated Service Instances	View the number of services that have been deployed by the administrator on a connection in the network.
Administrator	View the administrative user for the tenant.
Last Login	View the date and time when the tenant was last logged in.

Related Documentation

- Allocating a Service to Tenants on page 139
- Importing Data for Multiple Tenants on page 188

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Adding a Single Tenant

You can use the Add Tenant page to add tenant data and other objects associated with a tenant, such as administrative user, network details, deployment scenario, service profiles, and custom properties. A single tenant supports centralized deployment, distributed deployment, and hybrid (both centralized and distributed) deployment scenarios.

Begin by creating all the resources required for the network point of presence (POP).

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.

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 94 on page 183.

3. Click **OK**. 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 94: Fields on the Add Tenant Page

Field	Description
Tenant Info	

Table 94: Fields on the Add Tenant Page (continued)

Field	Description
Name	Enter the name of the tenant. You can use an unlimited number of alphanumeric characters, including special characters. Example: test-tenant
Plan	Select the deployment scenario. • **Hybrid WAN**—Supports both distributed and centralized deployments. NOTE: Intent policies are not applicable for hybrid WAN deployments. • **SD WAN**—Provides a flexible and automated way to route traffic through the cloud. SD-WAN supports both Hub-and-spoke and full mesh topologies and uses CPE devices located at on-premise sites to connect to the LAN segments. The CSO software uses SD-WAN policies and service-level agreement measurements to differentiate and route traffic for different applications. From Release 3.3 onward, you can also enable "Application Quality of Experience (AppQoE)" on page 155 if you set the SD-WAN mode to real-time optimized.
Type	Select the tenant type for a hybrid WAN deployment plan. The following options are available: • Small—1 vCPU, 20-GB disk space, and 2048-MB RAM • Medium—2 vCPUs, 40-GB disk space, and 4096-MB RAM • Large—4 vCPUs, 80-GB disk space, and 8192-MB RAM • X Large—8 vCPUs, 160-GB disk space, and 16384-MB RAM
SD-WAN Mode	Select the SD-WAN mode: • **Bandwidth-optimized SD-WAN**—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. • **Real time-optimized SD-WAN**—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. Click the **Compare** link in the UI to view more information about these modes.
Admin user	
First Name	Enter the first name of the administrative user.
Last Name	Enter the last name of the administrative user.
Username (Email)	Enter the email ID of the administrative user. The email ID is also the username for the administrative user. This field is automatically populated after you enter the tenant name. Example: test-tenant_admin@test-tenant.com
Password Policy	
User Password Expires	Select one of the following options: • **Never**—If you select this option, the password never expires. • **After specified number of days**—If you select this option, you must specify a duration in the **Password Expiration Days** field.

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Table 94: Fields on the Add Tenant Page (continued)

Field	Description
Password Expiration Days	Specify the duration (in days) after which the password expires and must be changed. The range is from 1 through 365. The default value is 180 days.
Topology Info	
Full Mesh	Select the full mesh topology type. All sites in the tenant are connected to one another in a full mesh topology.
Hub and Spoke	Select the hub and spoke topology type. All hub sites in the tenant are connected to one another and all spoke sites are connected to at least one hub site in a hub and spoke topology. A spoke site can also be connected to multiple hub sites if multihoming is enabled on the spoke site.
Tenant Properties	
SSL Settings NOTE: This setting is applicable only to the SD-WAN deployment scenario.	
Default SSL Forward Proxy Profile	Click the toggle button to enable a default SSL proxy profile for the tenant. If you enable this option, the following items are created when a tenant is added: • A default root certificate with the certificate content specified (in the **Root Certificate** field) • A default SSL proxy profile • A default SSL proxy profile intent that references the default profile This option is disabled by default. NOTE: You use this option to create a tenant-wide default profile; enabling or disabling this option does *not* mean that SSL is enabled or disabled. If you enable this option, you must add a root certificate.

Table 94: Fields on the Add Tenant Page (continued)

Field	Description
Root Certificate	You can add a root certificate (X.509 ASCII format) by importing the certificate content from a file or by pasting the certificate content: • To import the certificate content directly from a file: 1. Click **Browse**. The **File Upload** dialog box appears. 2. Select a file and click **Open**. The content of the certificate file is displayed in the **Root Certificate** field. • Copy the certificate content from a file and paste it in the text box. After the tenant is successfully added, a default root certificate, a default SSL proxy profile, and a default SSL proxy profile intent are created. NOTE: • The root certificate must contain both the certificate content and the private key. • For full-fledged certificate operations, such as certificates that need a passphrase, or that have RSA private keys, you must use the Certificates page (**Administration > Certificates**) to import the certificates and install on one or more sites.
Network Segmentation	
Network Segmentation	Enable network segmentation on the tenant.
Service Profiles	
VIM Name	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. Example: test-vim
Service Profile Name	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. Example: service-profile-for-test-vim
Custom 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.
Name	Specify any information about the site that you want to pass to a third-party router. Example: Location
Value	Specify a value for the information about the site that you want to pass to a third-party device. Example: Boston

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Related Documentation

- Tenant Overview on page 179
- Editing Tenant Information on page 187

Editing Tenant Information

From Release 3.3 onward, 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.

4. 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	Select the virtualized infrastructure manager (VIM) for the tenant. A tenant can be associated with multiple VIMs. Example: test-vim
Service Profile Name	Select the service profile that specifies the authentication information for the tenant. You configure the service profile when you create the VIM. Example: service-profile-for-test-vim

5. 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	Specify the type of information that you want to pass to a third-party router. Example: Location

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Value	Specify the information that you want to pass to a third-party device. Example: Boston

6. After you make the changes, click **Next** to view the changes in the Summary section.

   The Summary section appears.

7. Review the changes and click **OK** to save the changes. To discard the changes, click **Cancel**.

Related Documentation

- Tenant Overview on page 179
- Adding a Single Tenant on page 183

Importing Data for Multiple Tenants

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 on page 188
- Importing Tenant Data on page 191

Creating a Tenant Data File

To create a tenant data file:

1. Click **Tenants > Import Tenants > Import**.

   The Import Tenants page appears.

2. Click **Download Sample JSON** to download a JSON template.

   The tenant template file is downloaded to your system.

3. In 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 95 on page 189 as a reference.

7. Save the customized tenant data file.

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Table 95: 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
tenant_type	Specify the type of tenant. The following options are available. • Small • Medium • Large • X Large • Default Example: Default
admin_user_name	Specify a unique name for the tenant administrator. Example: admin-tenant-a
admin_user_password	Specify a password for the tenant administrator. Example: pwd123
managed_wan_topology	
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
site	
site_name	Specify a unique alphanumeric name for the site. You can use an unlimited number of alphanumeric characters, including symbols. Example: site1
site_description	Specify the description for the site. You can use an unlimited number of alphanumeric characters, including symbols. Example: vcpe payload
street	Specify the street name of the site. Example: site1-street
city	Specify the city name of the site. Example: site1-city

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Table 95: Tenant Configuration Fields (continued)

Field	Description
state	Specify the name of the state where the site is located. Example: site1-state
zip_code	Specify the zip code of the site location. Example: 99990
country	Specify the name of the country where the site is located. Example: site1-country
router_info (cloud_site_info)	
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
pop_info (cloud_site_info)	
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

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Table 95: 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
pop_info (data_center_site_info)	
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. Click **Tenants > All Tenants > Import Tenants**.

   The Import Tenants page is displayed.

2. Click **Browse** and navigate to the directory where the tenant 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 on page 193

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 689 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.

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Related Documentation

- About the Tenants Page on page 181

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 96 on page 193 describes the fields on the Import History page.

2. Click the task name.

   The Import Tenants Task page appears. Table 97 on page 194 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 98 on page 194 describes the fields on the Job Status page for imported tenant data.

Table 96: 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.

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Table 97: 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 98: 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 on page 188

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 99 on page 195 describes the fields on the Delete History page.

2. Click the task name.

   The Delete Tenants Tasks page appears. Table 100 on page 195 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.

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Table 101 on page 195 describes the fields on the Job Status page for deleted tenant data.

Table 99: 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 100: 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 101: 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.
Actual Start Time	View the start date and time of the task.

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Table 101: Fields on the Job Status Page for Deleted Tenant Data (continued)

Field	Description
End Time	View the end date and time of the task.

Related Documentation

- Importing Data for Multiple Tenants on page 188
- Viewing the History of Imported Tenant Data on page 193

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CHAPTER 15

Configuring MSP Users

- Role-Based Access Control Overview on page 197
- About the Service Provider Users Page on page 198
- Adding Service Provider Users on page 199
- Editing and Deleting Service Provider Users on page 200

Role-Based Access Control Overview

Contrail Service Orchestration supports the authentication and authorization of users. Both MSP and tenant users access the pages within the unified Administration and Customer Portal based on their role and access permissions.

Table 102 on page 197 shows MSP and Tenant roles and their access privileges.

Table 102: Roles and Access Privileges

Role	Access Privileges
MSP Administrator	Users with the MSP Administrator 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 MSP Administrator or MSP Operator roles, onboard tenants, and add the first tenant administrator during the onboarding process. They can also add tenant administrators or operators by switching the scope to a specific tenant.
MSP Operator	Users with the MSP Operator role have read-only access to the Administration Portal UI and APIs.
Tenant Administrator	Users with the Tenant Administrator 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	Users with the Tenant Operator role have read-only access to the Customer Portal UI and APIs.

Related Documentation

- Authentication Methods Overview on page 203

About the Service Provider Users Page

To access this page, click **Administration** > **Users**.

Use this page to add, edit, and delete users for a service provider. You can also assign roles to service provider users. To know more about MSP users' roles and access permissions, see "Role-Based Access Control Overview" on page 197.

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 local users
- **Authentication with SSO Server**—The **Add User** page does not display the password field because you can only assign a role only to an external user.
- **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

The MSP administrator can perform the following tasks from this page:

- Add a service provider user. See "Adding Service Provider Users" on page 199.
- Edit and delete a service provider user. See "Editing and Deleting Service Provider Users" on page 200.

Field Descriptions

Table 103 on page 198 provides guidelines on using the fields on the Users page.

Table 103: Fields on the Users Page

Field	Description
Username	Username of the service provider user. Example: *xyz@example.com*
First Name	First name of the service provider user.
Last Name	Last name of the service provider user.
Role	Role assigned to the service provider user. Example: MSP Admin
Last Login	Date and time when the user was last logged into the Administration Portal. The format is MM/DD/YYYY HH:MIN. Example: 07/22/2017 20:07

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Related Documentation

- Adding Service Provider Users on page 199
- Editing and Deleting Service Provider Users on page 200

Adding Service Provider Users

Use this page to add service provider users and assign roles to service provider users. After the service provider administrator adds the user, the user account is created in the Contrail Service Orchestration (CSO) and the user receives an e-mail with the initial login credentials.

NOTE: **Users with the MSP Operator role have read-only access to Customer Portal and APIs and they cannot add new users.**

To add a service provider user:

1. Select **Administration > Users**.

   The Users page appears.

2. Click the plus icon (+) or click **Add User**.

   The Add User page appears.

3. Complete the configuration as described in Table 104 on page 199.

4. Click **OK** to save the changes. If you want to discard the changes, click **Cancel** instead.

   The service provider user account is created in CSO.

   To enhance the security related to your login credentials, an automatically generated password is sent to the e-mail address that you have specified on the Add User page. You are prompted to change the password after you login 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 104: Fields on the Add User Page

Field	Description
First Name	Enter the first name as a string of alphanumeric characters and the special characters space, underscore (_), and period (.). The maximum length is 32 characters.
Last Name	Enter the last name as a string of alphanumeric characters and the special characters space, underscore (_), or period (.). The maximum length is 32 characters.
Username (E-mail)	Enter a valid e-mail address in the *user@domain* format.

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Table 104: Fields on the Add User Page (continued)

Field	Description
Role	Select the role—MSP Operator (default) or MSP Administrator—that you want to assign to the user. • **MSP Administrator**—Users with the MSP Administrator 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 MSP Administrator or MSP Operator roles, onboard tenants, and add the first tenant administrator during the onboarding process. They can also add tenant administrators or operators by switching the scope to a specific tenant. • **MSP Operator**—Users with the MSP Operator role have read-only access to Administration Portal and APIs. NOTE: Users with the MSP Operator role cannot add, edit, and delete users.

Related Documentation

- About the Service Provider Users Page on page 198
- Editing and Deleting Service Provider Users on page 200

Editing and Deleting Service Provider Users

You can edit the information of a service provider user, and delete one or more users.

NOTE: **Users with the MSP Operator role have read-only access to Administration Portal and APIs, and they cannot edit and delete users.**

- Editing Service Provider Users on page 200
- Deleting Service Provider Users on page 201

Editing Service Provider Users

To modify a service provider user:

1. Select **Administration > Users**.

   The Users page appears.

2. Select the user that you want to modify, and click the edit icon.

   The Edit User page appears. The options available on the Add User page are available for editing.

   NOTE: **You cannot modify the Username (E-mail) field.**

3. Update the fields as required.

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

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The modified service provider user information is saved in CSO.

Deleting Service Provider Users

To delete service provide users:

1. Select **Administration > Users**.

   The Users page appears.

2. Select the users that you want to delete and click the delete icon (X).

   The Confirm Delete page appears.

3. Click **Yes** to delete the user or **No** to cancel the deletion.

   If you click **Yes**, then the user is deleted and the user account is removed from the CSO.

Related Documentation

- About the Service Provider Users Page on page 198
- Adding Service Provider Users on page 199

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CHAPTER 16

Configuring Authentication

- Authentication Methods Overview on page 203
- About the Authentication Page on page 204
- Editing the Authentication Method on page 205
- Configuring a Single Sign-On Server on page 207
- Editing and Deleting SSO Servers on page 209
- Configuring SMTP Settings on page 210

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.

Related Documentation

- About the Authentication Page on page 204
- Editing the Authentication Method on page 205

- Configuring a Single Sign-On Server on page 207

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 205.
- Configure an SSO server. See "Configuring a Single Sign-On Server" on page 207.
- Edit and delete an SSO server. See "Editing and Deleting SSO Servers" on page 209.

Field Descriptions

Table 105 on page 204 provides guidelines on using the fields on the Authentication page.

Table 105: Fields on the Authentication Page

Field	Description
Authentication Method	
Users	View the user's type. Example : MSP Users or Tenant Users
Authentication Method	View the type of authentication method. Example: Local Authentication
Username Pattern	View the username pattern. Example: *@aaa-example.com*
Single Sign-On (SSO) Servers	
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: https://aaa-example.com/saml/metadata/64000

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Table 105: Fields on the Authentication Page (continued)

Field	Description
Usage	View the information about whether the SSO server is used for authenticating MSP users or tenant users. Example: MSP Users

Related Documentation

- Authentication Methods Overview on page 203
- Configuring a Single Sign-On Server on page 207
- Editing the Authentication Method on page 205

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 (MSP User or Tenant User) for which you want to change the authentication method, click the edit (pencil) 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 Authentication with SSO Server
4. When you select the **Authentication with SSO Server** or **Authentication and Authorization with SSO Server** method, you must enter the configuration described in Table 106 on page 205.

Table 106: Fields on the Authentication Type Page

Field	Description
SSO Server	Select the SSO server name from the list.

Table 106: Fields on the Authentication Type Page (continued)

Field	Description
SSO Initiated By	Select the SSO initiation method. • **Service Provider (CSO)**—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. • **Identity Provider (SSO Server)**—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.
When you select **Service Provider (CSO)** method, the following field is displayed:	
Username Pattern	Enter a list of username patterns separated by a comma, space, or semicolon. For example, **@aaa-example.com*; *@xyz-example.com. NOTE: 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.
When you select **Identity Provider (SSO Server)** 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	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: • **Use Tenant Name**—Select this option to identify the tenants by using the tenant name. • **Use OSS Tenant ID**—Select this options to identify the tenants by using the tenant ID.

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 on page 204
- Configuring a Single Sign-On Server on page 207
- Editing and Deleting SSO Servers on page 209

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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 MSP 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 107 on page 208.

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 107: Fields on the Single Sign-On Server Page

Field	Description
Basic Info	
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.
SAML Settings	
SAML URLs	CSO displays the SAML URL settings. The administrator use this information to configure the IdP.
Single Sign-On URL	Displays the SAML Assertion Consumer Service (ACS) URL for the application. Example: https://*aaa-example.com*/ssol/*sso server name*/SAML2/POST
Audience URI (SP Entity ID)	Displays the service provider entity ID of the application. Example: https://*aaa-example.com*/Shibboleth
Metadata URL	Displays the metadata URL of the application. Example: https://*aaa-example.com*/saml/metadata/64000
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.
SAML Attributes	The identity provider needs to provide the SAML attributes if the authentication method is configured as **Authentication and Authorization with SSO Server**. NOTE: No SAML attributes are required if the authentication method is configured as **Authentication with SSO Server**.
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. NOTE: This field is not required for users with the MSP Admin and MSP Operator roles.
role	This attribute has four values. See Table 108 on page 208.

Table 108: Attribute Values and Roles

Attribute Value	Role
cloud-admin	MSP Admin
cloud-operator	MSP Operator

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Table 108: Attribute Values and Roles (continued)

Attribute Value	Role
tenant-admin	Tenant Admin
tenant-operator	Tenant Operator

Related Documentation

- About the Authentication Page on page 204
- Editing and Deleting SSO Servers on page 209

Editing and Deleting SSO Servers

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 on page 209
- Delete SSO Server Configurations on page 209

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

- About the Authentication Page on page 204
- Configuring a Single Sign-On Server on page 207

Configuring SMTP Settings

Use this page to configure an SMTP e-mail 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 109 on page 210.

3. Click **Save**.

   The status of the save operation is displayed.

Table 109: SMTP Settings

Field	Description
Server Address	Specify the hostname for the SMTP e-mail server.
TLS	Enable this option to protect the transmission of the content of e-mail messages. This setting ensures that the information will be transmitted over an encrypted channel.
Port Number	Specify the port number to use for the mail server. Check with your e-mail service provider for this port number. Generally, the port number 587 is used for a Transport Layer Security (TLS) connection and the port number 25 is used for unencrypted connections.
SMTP Authentication	Use this option if the e-mail server requires authentication. The **Username** and **Password** fields are displayed when you enable this option. Disable this option if you want to configure an unauthenticated e-mail server. The **From Name** and **From E-Mail Address** fields are displayed when you disable this option.

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Table 109: SMTP Settings (continued)

Field	Description
Username	Enter a username for the SMTP server.
Password	Enter a password for the SMTP server.
From Name	Enter your username. Example: John Doe
From E-Mail Address	Enter your e-mail address.

Related Documentation

- Authentication Methods Overview on page 203
- About the Authentication Page on page 204

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CHAPTER 17

Configuring Licenses

- About the License Files Page on page 213
- Uploading a License File on page 214
- Editing and Deleting Licenses on page 215
- Pushing a License to Devices on page 216

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 214.
- Edit and delete license entries. See "Editing and Deleting Licenses" on page 215.
- Push Licenses to devices. See "Pushing a License to Devices" on page 216
- View details of 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 14.

Field Descriptions

Table 110 on page 213 describes the fields on the License Files page.

Table 110: Fields on the License Files Page

Field	Description
File Name	Displays the filename of the license. Example: license_Image_v1

Table 110: Fields on the License Files Page (continued)

Field	Description
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: May 2, 2018, 1:34:37 PM

Related Documentation

- Uploading a License File on page 214

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

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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 on page 213
- Device Images Overview on page 125

Editing and Deleting Licenses

The following sections describe the procedure for editing and deleting uploaded licenses:

- Editing a License Entry on page 215
- Deleting a License on page 215

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.

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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 on page 213
- Editing and Deleting Licenses on page 215

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CHAPTER 18

Customizing the Unified Portal

- Personalizing the Unified Administration and Customer Portal on page 217

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 > Preferences**.

   The Preferences page appears.

2. Complete the configuration according to the guidelines in Table 111 on page 217.

Table 111: Fields on the Preferences Page

Field	Action
Logo	
Portal (top left corner)	Click **Select** 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 **Select** 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.
Login Page	
Logo	Click **Select** 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.

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Table 111: Fields on the Preferences Page (continued)

Field	Action
Background Image	Select a background image or background color for the login page of the portal. • **Image**—Click **Select** 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.
Font	
Typeface	Select a font style for the navigation menu. If you want to upload a custom font style, click **Upload Custom Font**. • The **Upload Custom Fonts** page appears. • Click **Select** to upload custom font style 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. • Click **Ok**. A confirmation message is displayed and the custom font file is saved in CSO.
Color Palette	Click **Create Custom Palette** to create a custom color palette. The **Create Custom Palette** section is displayed.
Create Custom Palette	
Color Palette Name	Enter a unique name for your color palette. You can use alphanumeric characters, space, and underscore (_). The maximum length is 32 characters.
Primary Navigation Background	Select a background color for the primary left navigation bar and the left navigation menu.
Primary Navigation Active Background	Select the background color for the menu icon and color for the menu.
Primary Navigation Hover Background	Select the color for the navigation bar hover background.
Secondary Navigation Background	Select the background color for the secondary navigation bar.

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.

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- 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

- Logging in to Administration Portal on page 5

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CHAPTER 19

Managing Signature Database

- Signature Database Overview on page 221
- About the Active Database Page on page 222
- Downloading a Signature Database on page 223
- Download Locations for Signature Database on page 224
- Installing Signatures on page 225

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 on page 222
- Downloading a Signature Database on page 223
- Installing Signatures on page 225

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 223.
- Install signatures. See "Installing Signatures" on page 225.

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 112 on page 222 describes the fields on this page.

Table 112: Fields on the Active Database Page

Field	Description
Active Database	
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.
Latest List of Signatures	
Database Version	Version of latest signature database.
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.

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Table 112: Fields on the Active Database Page (continued)

Field	Description
Action	Full Download—Download the complete signature database; the download might take a while to complete.

Related Documentation

- Signature Database Overview on page 221
- Downloading a Signature Database on page 223
- Installing Signatures on page 225

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 113 on page 223.

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

Table 113 on page 223 describes the fields on the **Signature Download Setting** page.

Table 113: Fields on the Signature Download Settings Page

Field	Description
Download URL	Specifies the location of the Juniper hosted server from which the signature database is downloaded to the CSO server. The default download URL is https://signatures.juniper.net/. To download signatures from this location, you need an internet connection to be available to CSO. 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 **Download URL** field. 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 "Download Locations for Signature Database" on page 224.

Table 113: Fields on the Signature Download Settings Page (continued)

Field	Description
Signature Version	NOTE: The **Signature Version** field is enabled only when you change the value of **Download URL** from https://signatures.juniper.net/ to any other value. 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.

Type	You can chose to download the signature database immediately or schedule the download for a later time and date.
	
	• Select **Run now** to automatically download the signature database immediately.
	• Select **Schedule at a later time** to download the signature database at the specified date and time, as follows:
	  ◦ Click on the calendar icon to choose the date for the download.
	  ◦ 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.
	
	NOTE: The time-zone is picked-up based on the time-zone specified when CSO is installed.

Related Documentation

- Signature Database Overview on page 221
- About the Active Database Page on page 222
- Installing Signatures on page 225

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/***.

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Related Documentation

- Application Signatures Overview on page 173
- Signature Database Overview on page 613

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 *Cloud CPE Solution Release Notes* (available at 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.

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Related Documentation

- Signature Database Overview on page 221
- About the Active Database Page on page 222
- Downloading a Signature Database on page 223

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PART 2

Customer Portal

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- Managing Objects on page 241
- Monitoring Security Alerts and Alarms on page 243
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- Monitoring Applications on page 283
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- Managing Network Services on page 327
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- Managing SD-WAN on page 437
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- Managing SSL Proxies on page 481
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CHAPTER 20

Introduction

- Unified Administration and Customer Portal Overview on page 229
- Customer Portal Overview on page 230
- Switching the Tenant Scope on page 231
- Accessing Customer Portal on page 231
- Setting Up Your Network with Customer Portal on page 232
- Changing the Password on First Login on page 233
- Changing the Customer Portal Password on page 234
- Resetting the Password on page 234
- Extending the User Login Session on page 236

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 MSP administrator or the tenant administrator to configure policies for the tenant.

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

Related Documentation

- Customer Portal Overview on page 230
- Switching the Tenant Scope on page 231
- Firewall Policy Overview on page 343
- SLA Profiles and SD-WAN Policies Overview on page 437
- NAT Policies Overview on page 452

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/

Related Documentation

- Accessing Customer Portal on page 231
- Changing the Customer Portal Password on page 234

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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 on page 229
- Role-Based Access Control Overview on page 605

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 114 on page 232.

Table 114: Customer Portal Menu

Menu Name	Description
Dashboard	Configurable dashboard that offers you a customized view of network services through its widgets
Monitor	Monitor alerts and alarms, security, device, and software-defined WAN (SD-WAN) events; applications and jobs
Resources	Device and software image management
Configuration	Configure network services, shared objects, and policies (firewall, NAT, SD-WAN), and view and manage configuration deployments
Sites	Manage sites and site groups
Reports	Create report definitions and view reports
Administration	Manage users, licenses, and the signature database

Related Documentation

- Changing the Customer Portal Password on page 234
- Customer Portal Overview on page 230

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 site from the **Sites** page. Two types of on-premise sites can be added: spoke site and on-premise hub. See "Creating On-Premise Spoke Sites for SD-WAN Deployment" on page 549.
2. Activate the on-premise site. See "Configuring a Single Site" on page 567.
3. Deploy network services. See "Managing a Single Site" on page 566.
4. View and manage policies.
   - View and manage a firewall policy. See "Creating Firewall Policy Intents" on page 345 and "Deploying Policies" on page 532.
   - View and manage an SD-WAN policy. See "Creating SLA Profiles" on page 447, "Creating SD-WAN Policy Intents" on page 441, and "Deploying Policies" on page 532.

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Related Documentation

- Accessing Customer Portal on page 231

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 115 on page 233.

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 115: 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. NOTE: 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 **Show Password** to view the password.

Related Documentation

- Accessing Customer Portal on page 231
- Changing the Customer Portal Password on page 234
- Resetting the Password on page 234

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 on page 230
- Accessing Customer Portal on page 231

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.**

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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 116 on page 235.

5. Click **OK**.

Your password is reset.

Table 116: Fields on the Reset Password Page

Field	Description
Username	Enter your username.
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. NOTE: 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 **Show Password** to view the password.

Related Documentation

- Accessing Customer Portal on page 231
- Changing the Password on First Login on page 233

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- Changing the Customer Portal Password on page 234

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 on page 234

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CHAPTER 21

Using the Dashboard

- About the Customer Portal Dashboard on page 237

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 117 on page 238 describes the dashboard widgets.

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Table 117: Widgets on the Customer Portal Dashboard

Widget	Description
Alerts Donut Chart	View the total number of alerts grouped by severity level. Click each alert name to view the total number of tenant sites receiving alerts that are critical, major, or minor.
Top 5 Sites with Alerts	View the top five tenant sites receiving alerts. • **Name**—Name of the tenant site. • **Location**—Location of the tenant site. • **Status**—Type of alerts received: critical, major, or minor.
Top Sites not meeting SLA	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. Sort the information based on profile and period ranging from the last hour to the last month.
Top Profiles not meeting SLA	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. Sort the information based on location and period ranging from the last hour to the last month.
Top Sites Switching Links	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. Sort the information based on profile and period ranging from the last hour to the last month.
Top Profiles Switching Links	View a column chart of the top SLA profiles that switched WAN links and the number of link-switch events for the SLA profiles. Sort the information based on location and period ranging from the last hour to the last month.
Top Applications by Throughput	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. Sort the information based on profile, location, and time period.
Firewall: Top Denials	View a column chart of the top requests denied by the firewall based on their source IP addresses, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
Firewall: Top Events	View a bar chart of the top firewall events of the network traffic, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
IPS: Top Events	View the top IPS events of the network traffic, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.

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Table 117: Widgets on the Customer Portal Dashboard (continued)

Widget	Description
Applications: Most Sessions	View a bar chart of the top applications with a maximum number of sessions, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
IP: Top Destinations	View the top IP destination addresses of the network traffic, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
IP: Top Sources	View the top IP source addresses of the network traffic, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
IP: Top Spams by Source IPs	View the number of spams detected by the source IPs. Sort the information based on time period ranging from 5 minutes to 7 days.
Virus: Top Blocked	View viruses with the maximum number of blocks, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
Web Filtering: Top Blocked Websites	View a bar chart of websites with the maximum number of blocks, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
IP: Top Source IPs by Volume	View the top source IP addresses based on volume of traffic, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
Application: Top Application by Volume	View the applications based on volume of traffic, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
IP: Top Users/IP by Sessions	View the top source IP addresses by sessions, sorted by count. Sort the information based on time period ranging from 5 minutes to 7 days.
Threat Map: Virus	View a world map showing total virus event count across countries. Sort the information based on source, destination, and time period ranging from 5 minutes to 7 days.
Threat Map: IPS	World map showing total IPS event count across countries. Sort the information based on source, destination, and time period ranging from 5 minutes to 7 days.

Related Documentation

- Customer Portal Overview on page 230

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CHAPTER 22

Managing Objects

- Sorting Objects on page 241
- Viewing Object Details on page 241
- Searching for Text in an Object Data Table on page 242

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

- Searching for Text in an Object Data Table on page 242

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 on page 241

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 on page 241
- Viewing Object Details on page 241

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CHAPTER 23

Monitoring Security Alerts and Alarms

- About the Monitor Overview Page on page 243
- Security Alerts Overview on page 244
- About the Generated Alerts Page on page 245
- About the Security Alerts Definitions Page on page 246
- Creating Security Alert Definitions on page 247
- Editing and Deleting Security Alert Definitions on page 248
- Cloning Security Alert Definitions on page 249

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 on-premise hub site details.
- View cloud spoke sites.
- View cloud hub sites.
- View multiple sites.

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Field Descriptions

Table 118 on page 244 shows the descriptions of the fields on the Monitor Overview page.

Table 118: Fields on the Monitor Overview Page

Field	Description
Sites	View the sites at which the service is deployed. Click the **Sites** drop-down list and select **Show sites**
Connections	View the connections in the network. Click the **Connections** drop-down list and select **Show connections**.
Only the node with alerts	View the nodes with issues with the service. Click the drop-down list located next to the **Only the nodes with alerts** check box and select the type of alerts. • Critical—Issues that prevent the node from working and require action from the operator. The nodes with critical alerts are displayed in red. • 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. • 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. NOTE: The nodes without any alerts are displayed in blue.

Related Documentation

- About the Security Alerts Definitions Page on page 246
- Creating Security Alert Definitions on page 247

Security 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. See "Creating Security Alert Definitions" on page 247 for using data criteria from filters.
- Generating an alert message and notifying you when alert criteria are met.

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- 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 Security Alerts Definitions Page on page 246
- Creating Security Alert Definitions on page 247

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**.
- Select the generated alert and then right-click or click **More > Clear All Selections**.

Field Descriptions

Table 119 on page 245 provides guidelines on using the fields on the Generated Alerts page.

Table 119: Fields on the Generated Alerts Page

Field	Description
Time	View the date and time when the alert was generated.
Alert Name	View the name of the alert.
Alert Description	View the description of the alert.

Table 119: Fields on the Generated Alerts Page (continued)

Field	Description
Alert Source	View the source address of the alert.
Alert Type	View the type of alert.
Severity	View the severity of the alert.
Site	View the tenant site.
Object Type	View the object type.
Alert ID	View the alert ID.

Related Documentation

- About the Security Alerts Definitions Page on page 246

About the Security Alerts Definitions Page

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

Use this page 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 page:

- Create security alert definition. See "Creating Security Alert Definitions" on page 247.
- Edit and delete security alert definition. See "Editing and Deleting Security Alert Definitions" on page 248.
- Clone security alert definition. See "Cloning Security Alert Definitions" on page 249.

Field Descriptions

Table 120 on page 246 provides guidelines on using the fields on the Security Alert Definitions page.

Table 120: Fields on the Security Alert Definitions Page

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.

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Table 120: Fields on the Security Alert Definitions Page (continued)

Field	Description
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

- Security Alerts Overview on page 244
- Creating Security Alert Definitions on page 247

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 > Security Alert Definitions** .

   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 121 on page 247.

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 121: Fields on the Security Alert Definitions Page

Field	Description
General	

Table 121: Fields on the Security Alert Definitions Page (continued)

Field	Description
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.
Trigger	
Use Data Criteria from Filters	Specifies the data criteria from the list of default and user-created filters that are saved from the Event Viewer. To add saved filters: • Click the **Use data criteria** from filters link. The Add Saved Filters page appears. • Select the filters to be added. • Click **OK**.
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.
Recipient(s)	
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

- About the Security Alerts Definitions Page on page 246
- Editing and Deleting Security Alert Definitions on page 248

Editing and Deleting Security Alert Definitions

You can edit and delete security alert definitions.

- Editing Security Alert Definitions on page 249
- Deleting Security Alert Definitions on page 249

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Editing Security Alert Definitions

To edit the security alert definition:

1. Select **Monitor > Alerts & Alarms > Security Alert Definitions**.

   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.

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 > Security Alerts**.

   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

- About the Security Alerts Definitions Page on page 246
- Creating Security Alert Definitions on page 247

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 > Security Alert Definition**.

   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.

3. Click **OK** to save the configuration.

   A new alert definition is created.

Related Documentation

- About the Security Alerts Definitions Page on page 246
- Creating Security Alert Definitions on page 247

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CHAPTER 24

Monitoring Security and Device Events

- About the All Security Events Page on page 251
- About the Firewall Events Page on page 255
- About the Web Filtering Events Page on page 258
- About the IPsec VPNs Events Page on page 260
- About the Content Filtering Events Page on page 262
- About the Antispam Events Page on page 264
- About the Antivirus Events Page on page 266
- About the IPS Events Page on page 268
- About the Device Events Page on page 271
- About the Screen Events Page on page 275

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 252.
- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 252.

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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 122 on page 252 describes the widgets on the All Events Summary View page.

Table 122: 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).

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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 123 on page 253 describes the fields on the All Events Detail View Page.

Table 123: 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.
Site	View the name of the tenant site.
Source Country	View the source country name.

Table 123: Fields on the All Events Detail View Page (continued)

Field	Description
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.
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.

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Table 123: Fields on the All Events Detail View Page (continued)

Field	Description
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

- About the Firewall Events Page on page 255
- About the Web Filtering Events Page on page 258
- About the IPsec VPNs Events Page on page 260
- About the Content Filtering Events Page on page 262
- About the Antispam Events Page on page 264
- About the Antivirus Events Page on page 266
- About the IPS Events Page on page 268

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 256
- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 256.

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 124 on page 256 describes the widgets on the Summary View page.

Table 124: 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 125 on page 256 provides guidelines on using the fields on the Detail View page.

Table 125: Fields on the Detail View Page

Field	Description
Time	View the time when the log was received.

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Table 125: Fields on the Detail View Page (continued)

Field	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.
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.
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.

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Table 125: Fields on the Detail View Page (continued)

Field	Description
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

- About the All Security Events Page on page 251
- About the Web Filtering Events Page on page 258
- About the IPsec VPNs Events Page on page 260
- About the Content Filtering Events Page on page 262
- About the Antispam Events Page on page 264
- About the Antivirus Events Page on page 266
- About the IPS Events Page on page 268

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 259.
- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 259.

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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 126 on page 259 describes the widgets on the Summary View page.

Table 126: 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 127 on page 259 provides guidelines on using the fields on the Detail View page.

Table 127: 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.

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Table 127: Fields on the Detail View Page (continued)

Fields	Description
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.
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

- About the All Security Events Page on page 251
- About the Firewall Events Page on page 255
- About the IPsec VPNs Events Page on page 260
- About the Content Filtering Events Page on page 262
- About the Antispam Events Page on page 264
- About the Antivirus Events Page on page 266
- About the IPS Events Page on page 268

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.

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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 261.
- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 261.

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 128 on page 261 describes the widgets on the Summary View page.

Table 128: 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 129 on page 261 provides guidelines on using the fields on the Detail View page.

Table 129: 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.

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Table 129: Fields on the Detail View Page (continued)

Fields	Description
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.

Related Documentation

- About the All Security Events Page on page 251
- About the Firewall Events Page on page 255
- About the Web Filtering Events Page on page 258
- About the Content Filtering Events Page on page 262
- About the Antispam Events Page on page 264
- About the Antivirus Events Page on page 266
- About the IPS Events Page on page 268

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.

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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 263.
- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 263.

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 130 on page 263 describes the widgets on the Summary View page.

Table 130: 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.
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 131 on page 263 provides guidelines on using the fields on the Detail View page.

Table 131: 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.

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Table 131: 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.
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
Profile Name	View the name of the content filtering profile that triggered the event.

Related Documentation

- About the All Security Events Page on page 251
- About the Firewall Events Page on page 255
- About the Web Filtering Events Page on page 258
- About the IPsec VPNs Events Page on page 260
- About the Antispam Events Page on page 264
- About the Antivirus Events Page on page 266
- About the IPS Events Page on page 268

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 (blacklists and whitelists) 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

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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 265.
- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 265.

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 132 on page 265 provides guidelines on using the fields on the Detail View page.

Table 132: 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).

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Table 132: Fields on the Detail View Page (continued)

Fields	Description
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 content filtering profile that triggered the event.

Related Documentation

- About the All Security Events Page on page 251
- About the Firewall Events Page on page 255
- About the Web Filtering Events Page on page 258
- About the IPsec VPNs Events Page on page 260
- About the Content Filtering Events Page on page 262
- About the Antivirus Events Page on page 266
- About the IPS Events Page on page 268

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 267.

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- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 267.

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 133 on page 267 provides guidelines on using the widgets on the Detail View page.

Table 133: 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 134 on page 267 provides guidelines on using the fields on the Detail View page.

Table 134: 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).

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Table 134: Fields on the Detail View Page (continued)

Fields	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.
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.

Related Documentation

- About the All Security Events Page on page 251
- About the Firewall Events Page on page 255
- About the Web Filtering Events Page on page 258
- About the IPsec VPNs Events Page on page 260
- About the Content Filtering Events Page on page 262
- About the Antispam Events Page on page 264
- About the IPS Events Page on page 268

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

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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 269.
- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 269.

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 135 on page 269 provides guidelines on using the widgets on the Detail View page.

Table 135: 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.
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,

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severity for the event, event ID, traffic information, and how and when the event was detected.

Table 136 on page 270 provides guidelines on using the fields on the Detail View page.

Table 136: 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.
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.

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Table 136: Fields on the Detail View Page (continued)

Column	Description
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

- About the All Security Events Page on page 251
- About the Firewall Events Page on page 255
- About the Web Filtering Events Page on page 258
- About the IPsec VPNs Events Page on page 260
- About the Content Filtering Events Page on page 262
- About the Antispam Events Page on page 264
- About the Antivirus Events Page on page 266

About the Device Events Page

To access this page, click **Monitor** > **Device Events**.

Use the Device Events page to view information about device events such as routine operations, failure and error conditions, and emergency or critical conditions.

You can view comprehensive details of device events in a tabular format that includes sortable columns and a line graph (also known as swim lanes). The data presented in the line graph is refreshed automatically based on the selected time range. The line graph shows light blue areas that represent all device events and dark blue areas represent blocked device events

Tasks You Can Perform

You can perform the following tasks from this page:

- Click **Custom** button to select the date and time range to generate the device event.
- Show or hide time range in the carousel by clicking **show** or **hide** buttons at the top of the page.

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 IPs 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 IPs with or without specific destination IPs

  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

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Field Descriptions

Table 10 on page 26 provides guidelines on using the fields on the Device Events page.

Table 137: Fields on the Device Events Detailed View Page

Field	Description
Time	View the time when the log was received.
Event Name	View the event name of the log.
Site	View the name of the tenant site.
Source Country	View the name of source country from where the event originated.
Source IP	View the source IP address from where the event occurred.
Destination Country	View the name of destination country from where the event occurred.
Destination IP	View the destination IP address of the event.
Source Port	View the source port of the device event.
Destination Port	View the destination port of the device event.
Description	View the description of the log.
Attack Name	View the attack name of the log. For example, 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.
Argument	View the type of traffic. For example, ftp and http.
Action	View the action taken for the event. For example, warning, allow, or 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.

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Table 137: Fields on the Device Events Detailed View Page (continued)

Field	Description
Service Name	View 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 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	The name of the profile that triggered the event.
Event Count	View the number of events occurred.
Tenant	View the name of the tenant from which the event originated.

Related Documentation

- About the All Security Events Page on page 251

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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 275.
- View the comprehensive details of events in a tabular format that includes sortable columns. See "Detail View" on page 276.

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 138 on page 275 describes the widgets on the Detail View page.

Table 138: 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.

Table 138: Widgets on the Summary Page (continued)

Field	Description
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 139 on page 276 describes the fields on the Detail View page.

Table 139: 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).
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.

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Table 139: Fields on the Detail View Page (continued)

Fields	Description
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.
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.

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Table 139: Fields on the Detail View Page (continued)

Fields	Description
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

- About the All Security Events Page on page 251
- About the Firewall Events Page on page 255
- About the Web Filtering Events Page on page 258
- About the IPsec VPNs Events Page on page 260
- About the Content Filtering Events Page on page 262
- About the Antispam Events Page on page 264
- About the Antivirus Events Page on page 266
- About the IPS Events Page on page 268

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CHAPTER 25

Monitoring SD-WAN Events

- SD-WAN Events Overview on page 279
- About the SD-WAN Events Page on page 280

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 is 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 on page 280
- SLA Profiles and SD-WAN Policies Overview on page 437

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 15.
- 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 140 on page 280 describes the fields on the SD-WAN Events page.

Table 140: 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.
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.

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Related Documentation

- SD-WAN Events Overview on page 279

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CHAPTER 26

Monitoring Applications

- About the SLA Performance of a Single Tenant Page on page 283
- Viewing the SLA Performance of a Site on page 285
- Viewing the SLA Performance of an Application or Application Group on page 290
- Application Visibility Overview on page 291
- About the Application Visibility Page on page 291
- Selecting Devices on page 294

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.

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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 141 on page 284 describes the fields on the *Tenant-Name* SLA Performance page.

Table 141: 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, **Previous 1 day** 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	The sites that did not meet the defined SLA target values in the selected time range. Click each site to view more information about the SLA performance of the applications and application groups in the site. See "Viewing the SLA Performance of a Site" on page 285.
Sites Meeting SLAs With Switch	The sites that switched WAN links to meet the defined SLA target values in the selected time range. Click each site to view more information about the SLA performance of the applications and application groups in the site. See "Viewing the SLA Performance of a Site" on page 285.
Sites Meeting SLAs Without Switch	The sites that met the defined SLA target values in the selected time range without switching WAN links. Click each site to view more information about the SLA performance of the applications and application groups in the site. See "Viewing the SLA Performance of a Site" on page 285.

Table 142 on page 284 describes the fields in the card and grid views.

Table 142: 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.

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Table 142: Fields on the SLA Performance of a Single Tenant Page in Card and Grid Views (continued)

Field	View	Description
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 **Others**. The SLA profile priority is indicated inside a circle circle. You can define priority of the SLA profile when you create an SLA profile. Hover over the profile priority to view the SLA profile name.
Profile SLA Not Met	Grid	
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 on page 285
- Viewing the SLA Performance of an Application or Application Group on page 290
- SD-WAN Events Overview on page 279
- Creating SLA Profiles on page 447

Viewing the SLA Performance of a Site

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 on page 286
- Applications SLA Performance by Throughput on page 287
- SLA Performance for ALL on page 289

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.

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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 290.

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 143 on page 288 describes the fields on the Applications SLA Performance by Throughput grid view.

Table 143: 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 290.

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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 446 **page.**

Related Documentation

- About the SLA Performance of a Single Tenant Page on page 283
- Viewing the SLA Performance of an Application or Application Group on page 290

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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 144 on page 290 describes the fields on the application or application group SLA Performance details page.

Table 144: 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 time range.

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Table 144: Fields on the Application or Application Group Details Page (continued)

Field	Description
Global SLA Profile Performance	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. 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 **SLA Profile Performance** page appears. The SLA Profile Performance page displays the following fields: • SLA Profile—SLA profile associated with the application or application group • Target—Target throughput configured in the SLA profile • SLAs Not Met—Percentage of time SLA requirements were not met for the SLA profile • Sessions—Number of sessions consumed by the application or application group • Start Time—Time at which the WAN links associated with the application or application groups started to fail meeting the SLA requirements • End Time—Time at which SLA profile requirements started to be met again • Avg Val—Average throughput (in Mbps) when the SLA requirements started to fail • Duration—Total duration (in seconds) during which SLA requirements were not met • From—Source WAN link • To—Destination WAN link

Related Documentation

- About the SLA Performance of a Single Tenant Page on page 283
- Viewing the SLA Performance of a Site on page 285

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 on page 291
- Selecting Devices on page 294

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 292.
- View application visibility data in **Grid View**. See "Grid View" on page 293.
- Select a device to which the application visibility settings are applicable. See "Selecting Devices" on page 294.

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 145 on page 292 provides guidelines on using the fields on the **Chart View** of the **Application Visibility** page.

Table 145: Fields on the Chart View

Field	Description
All Devices	Displays application visibility data for all the sites managed by CSO. Click **Edit** to select individual devices for which you want to view the data.
Show By	Select from the following options to view a user's data: • Bandwidth—Shows data based on the amount of bandwidth the application has consumed for a particular time range. • Number of Sessions—Shows data based on the number of sessions consumed by the application.
Time Span	Select the required time range to view a user's data. 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.
Select graph	Select from the following graphical representations to view an application's data: • Bubble Graph • Heat Map • Zoomable Bubble Graph By default, data is shown in the Bubble Graph format.

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Table 145: Fields on the Chart View (continued)

Field	Description
Group By	Select from the following options to view the application's data: • Risk—Grouped by critical, high, unsafe, and so on. • Category—Grouped by categories such as web, infrastructure, and so on.
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.
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 146 on page 293 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 146 on page 293 provides guidelines on using the fields on the **Grid View** of the **Application Visibility** page.

Table 146: 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.

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Table 147 on page 294 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 147: 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 on page 291
- Selecting Devices on page 294
- About the SLA Performance of a Single Tenant Page on page 283

Selecting Devices

You can select the devices to which the application visibility settings are applicable. By default, these settings are applicable to all devices.

To select devices:

1. Select **Monitor > Applications > Visibility**.

   The **Application Visibility** page appears.

2. Click the **Edit** link that appears beside **All Devices**.

   The **Select Devices** page appears.

3. Choose the **Selective** option. The available devices are displayed in the **Available** column.

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4. Choose the devices from the **Available** column and click the greater-than icon (>) to move them to the **Selected** column.

5. Click **OK** to save your changes. If you want to discard your changes, click **Cancel** instead.

If you click **OK**, application visibility data will be displayed only for the selected devices.

Related Documentation

- Application Visibility Overview on page 291
- About the Application Visibility Page on page 291

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CHAPTER 27

Monitoring Threats

- About the Threats Map (Live) Page on page 297

About the Threats Map (Live) Page

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 on page 297
- Field Descriptions on page 299
- Threat Types on page 300

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 148 on page 298.

Table 148: Country-Specific Threat Information

Field	Description	Displayed In
Number-of-threat-events **Threat Events since 12:00 am**	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.	*Country-Name* pop-up
Inbound (*Number-of-threat-events*)	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.	*Country-Name* pop-up
Outbound (*Number-of-threat-events*)	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.	*Country-Name* pop-up
Number-of-threat-events **Events since 12:00 am**	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.	*Country-Name* (Details) panel
Number-of **Inbound Events**	Displays the total number of inbound threats for the country and the number of inbound threat events for each of the following categories: • IPS Threats • Virus • Spam • Device Authentication • Screen 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. Click the **Top 5 IP Addresses (Inbound)** to view the IP address and the number of events for that IP address for the top five inbound events.	*Country-Name* (Details) panel

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Table 148: Country-Specific Threat Information (continued)

Field	Description	Displayed In
Number-of **Outbound Events**	Displays the total number of outbound threats for the country and the number of outbound threat events for each of the following categories: • IPS Threats • Virus • Spam • Device Authentication • Screen 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. Click the **Top 5 IP Addresses (Outbound)** to view the IP address and the number of events for that IP address for the top five outbound events.	*Country-Name* (Details) panel

Field Descriptions

Table 149 on page 299 displays the fields the Threats Map (Live) page.

Table 149: Fields on the Threats Map (Live) Page

Field	Description
Total Threats Blocked & Allowed	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.
Threats Blocked & Allowed	Displays the total number of threats blocked and allowed by the following categories: • IPS Threats • Virus • Spam • Device Authentication • Screen 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).
Top Target Devices	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.
Top Destination Countries	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.

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Table 149: Fields on the Threats Map (Live) Page (continued)

Field	Description
Top Source Countries	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 150 on page 300 describes different types of threats blocked and allowed.

Table 150: Types of Threats

Attack	Description
IPS threat events	Intrusion detection and prevention (IDP) attacks detected by the IDP module. The information reported about the attack (displayed on the IPS Events page) includes information about: • Source of attack • Destination of attack • Type of attack • Session information • Severity • Policy information that permitted the traffic. • Action: traffic permitted or dropped.
Virus events	Virus attacks detected by the antivirus engine. The information reported about the attack (displayed on the Antivirus Events page) includes information about: • Source of the infected file • Destination • Filename • URL used for accessing the file
Spam events	E-mail spam that is detected based on the blacklist spam e-mails. The information reported about the attack (displayed on the Antispam Events page) includes information about: • Source • Action: E-mail is rejected or allowed. • Reason for identifying as e-mail spam.
Device authentications	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.

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Table 150: Types of Threats (continued)

Attack	Description
Screen events	Events that are detected based on screen options. The information reported about the attack (displayed on the Screen Events page) includes information about: • Internet Control Message Protocol (ICMP) screening • IP screening • TCP screening • UDP screening

Related Documentation

- About the All Security Events Page on page 251

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CHAPTER 28

Monitoring Jobs

- About the Jobs Page on page 303
- Editing and Deleting Scheduled Jobs on page 305
- Viewing Job Details on page 306

About the Jobs Page

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

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 306.
- Edit and delete scheduled jobs. See "Editing and Deleting Scheduled Jobs" on page 305.

Field Descriptions

Table 151 on page 303 provides guidelines on using the fields on the Jobs page.

Table 151: 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

Table 151: Fields on the Jobs Page (continued)

Field	Description
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 **site.ucpe-32** and **customer.sdwan** are associated with the job.
Job Type	View the job type. Example: tssm import pop
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 19 on page 46 provides guidelines on using the fields on the Scheduled Jobs page.

Table 152: 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 states 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.

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Related Documentation

- Editing and Deleting Scheduled Jobs on page 305

Editing and Deleting Scheduled Jobs

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

- Editing Scheduled Jobs on page 305
- Deleting Scheduled Jobs on page 305

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.

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Related Documentation

- About the Jobs Page on page 303
- Viewing Job Details on page 306

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 303 for a description of the fields on these pages.

Related Documentation

- About the Jobs Page on page 303

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CHAPTER 29

Managing Devices

- Multidepartment CPE Device Support on page 307
- About the Devices Page on page 308
- Performing Return Material Authorization (RMA) for a Single-CPE Device on page 310
- Performing Return Material Authorization (RMA) for Dual-CPE Devices on page 312
- Granting RMA for a Device on page 315
- Managing a Single CPE Device on page 319
- Rebooting a CPE Device on page 320

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.

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- 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 on page 283
- Viewing the SLA Performance of a Site on page 285

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 45 on page 92.
- Manage a single CPE. See "Managing a Single CPE Device" on page 319.
- Reboot a CPE device. See *Rebooting a CPE Device*.
- 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 310
  - For information on performing RMA on dual-CPE devices, see "Performing Return Material Authorization (RMA) for Dual-CPE Devices" on page 312
- View details about a CPE . 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 241.
- Show or hide columns about the CPE. See "Sorting Objects" on page 241.
- Search an object about the CPE. See "Searching for Text in an Object Data Table" on page 242.

Field Descriptions

- Table 45 on page 92 describes widgets on the Devices page.
- Table 46 on page 92 describes the fields on the Devices page.

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Table 153: Widgets on the Devices Page

Widget	Description
CPE by Status	View the management status of the CPE devices deployed in the cloud. • Pending Activation—Number of CPE devices that are yet to connect to the regional server. • Activation Failed—Number of CPE devices that could not connect to the regional server. • Expected—Number of CPE devices that have yet to connect to the regional server. • Active—Number of CPE devices that have downloaded images, but are not yet configured. • Provisioned—Number of CPE devices on which IPsec tunnels are fully operational. • Provision Failed—Number of CPE devices failed if the vSRX was not instantiated properly.

Table 154: Fields on the Devices Page

Field	Description
Device Name	View the name of the device. Example: sunny-NFX-250
Tenant	View the name of the tenant. Example: tenant-blue
Site Name	View the name of the tenant site. Example: site-blue-white
Management Status	View the management status of the CPE devices deployed in the cloud. • EXPECTED—Regional server has the activation details for the CPE device, but CPE device has not yet established a connection with the server. • RMA—CPE device has been tagged for RMA as a result of the user applying the **Initiate RMA** action on the device. • ACTIVE—CPE device has downloaded images, but not yet configured. • PROVISIONED—IPsec tunnel on NFX250 device is operational. • PROVISION_FAILED—CPE device failed when the vSRX was not instantiated properly.
Model	View the name of the device model. Example: NFX
Active Services	View the number of services that are activated for the device. Example: 3

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Table 154: Fields on the Devices Page (continued)

Field	Description
Location	View the name of the location. Example: San Jose, CA
Status Message	View the latest status message. Example: IPsec provision success
WAN Links	View the number of WAN links. Example: 2
POP Name	View the name of the POP. Example: pop_blue
Image Name	View the name of the device image file. Example: install_nfx_fmpm_agent_1_0.sh
OS Version	View the Junos OS Release version. Example: 15.1X49-D40
Serial Number	View the serial number of the device. Example: DD0416AA0117

Related Documentation

- Managing a Single CPE Device on page 319

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.

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**.

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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**.
- In the **Sites** > **Site Management** page, 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 315.

   NOTE: The **Grant RMA** option is enabled only if the management status is **RMA**.

4. To activate the device, select the device and click **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**.

5. To complete the RMA process, you must 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 520.

- Certificates—Import and install the required certificates on the replaced device. See "Importing a Certificate" on page 619 and "Installing and Uninstalling Certificates" on page 621.
- Policies—Push the defined firewall and NAT policies to the replaced device. See "About the Firewall Policy Page" on page 344 and "About the NAT Policies Page" on page 454.

After you complete these steps, the **Management Status** of the replacement device remains in **PROVISIONED** state. The RMA process is complete and the device is now ready to be used.

Related Documentation

- About the Devices Page on page 308
- Granting RMA for a Device on page 315

Performing Return Material Authorization (RMA) for Dual-CPE Devices

Sometimes, a single device or both the devices within an NFX or SRX cluster fail, and has to be replaced with a new or restored device(s). In such situations, you perform RMA to back-up the configuration of the faulty device(s), recall the faulty device and replace it with a new or restored device(s), push the required configuration to the replacement device(s), and activate the device(s) in order for CSO to recognize and manage the replacement device(s).

The following section discuss how you can perform RMA for an NFX or SRX cluster:

- Performing RMA for an NFX Cluster on page 312
- Performing RMA for an SRX Cluster on page 314

Performing RMA for an NFX Cluster

You can only perform RMA for an NFX cluster at the cluster level. That is, you have to perform RMA for both the devices in the NFX cluster even if only a single device in the cluster has failed.

NOTE: **You cannot select an individual device in the NFX cluster and perform RMA for it.**

To perform RMA for an NFX cluster:

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

   The **Devices** page appears displaying all the devices and clusters.

2. Select the NFX cluster for which you want to perform RMA and click **More** > **Initiate RMA**.

   A confirmation page appears requesting for confirmation to go ahead with the initiate RMA process for the selected NFX cluster. Click **Yes** to confirm RMA for the NFX cluster.

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Click **No** to cancel the process.

NOTE:

- The **Initiate RMA** option is enabled for an NFX cluster only if the management status is **PROVISIONED**.
- In the **Sites** > **Site Management** page, the **Site Status** for the NFX cluster 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 NFX cluster. The **Management Status** of the device changes to **RMA**.

After the NFX cluster is in the **RMA** state, you can raise a device replacement request for the faulty device(s) in the NFX cluster. This action is performed outside of CSO.

3. After you receive the replacement of the device(s), you have to provide the details of both the devices in the NFX cluster to CSO, by clicking **More** > **Grant RMA**. See "Granting RMA for a Device" on page 315.

   NOTE: The **Grant RMA** option is enabled only if the management status is **RMA**.

4. To activate the devices within the NFX cluster, select the cluster and click **Activate Device**. Enter the **Activation Code** for the primary and secondary devices to activate the devices of the NFX cluster for usage. When the device is activated, its **Management Status** changes to **PROVISIONED**.

5. To complete the RMA process, you must 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.

   - Application Signatures—Push the application signatures to the replaced device. See "About the Application Signatures Page" on page 520.
   - Certificates—Import and install the required certificates on the replaced devices. See "Importing a Certificate" on page 619 and "Installing and Uninstalling Certificates" on page 621.

- Policies—Push the defined firewall and NAT policies to the replaced devices. See "About the Firewall Policy Page" on page 344 and "About the NAT Policies Page" on page 454.

The RMA process is complete and the device(s) in the NFX cluster are now ready to be used.

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: **For the CSO Release 3.3, you cannot perform the RMA process for an SRX cluster at the cluster level.**

To return a faulty device within an SRX cluster 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 within the SRX cluster 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.**
   - **In the Sites > Site Management page, 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 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 device, provide the details of the replacement device by clicking **More** > **Grant RMA**. See "Granting RMA for a Device" on page 315.

   NOTE: **The Grant RMA option is enabled only if the management status is RMA.**

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After you complete these steps, the **Management Status** of the replacement device(s) is changed to **PROVISIONED** state. The RMA process is complete and the device is now ready to be used.

Related Documentation

- About the Devices Page on page 308
- Performing Return Material Authorization (RMA) for a Single-CPE Device on page 310
- Granting RMA for a Device on page 315

Granting RMA for a Device

- Granting RMA for a Single-CPE Device on page 315
- Granting RMA for a Dual-CPE Device on page 316
- Granting RMA for an SRX Device within an SRX Cluster on page 318

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.

2. Select the defective device that you have already performed RMA for 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 155 on page 316.

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** in the **Devices** page.

In the **Sites** > **Site Management** page, the **Site Status** for the device for which you performed **Grant RMA**, changes to **Expected**.

NOTE: You can see the progress of this job in 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 310.

Table 155 on page 316 provides guidelines on using the fields on the **Grant RMA for Device** panel.

Table 155: Fields on the Grant RMA for Single-CPE Device Page

Field	Description
Tenant 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 **Grant RMA** 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 will receive the activation code from the service provider, outside of CSO. Example: 545454

Granting RMA for a Dual-CPE Device

Before you perform **Grant RMA for a Device**, ensure that:

- You have received the replacement of the faulty device(s).
- You have the serial number(s) and the activation code(s) of the replacement device(s).

To perform **Grant RMA** for a cluster:

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

   The **Devices** page appears displaying all the devices and clusters.

2. Select the cluster that you have already performed RMA for and click **More** > **Grant RMA**.

   The **Grant RMA for Device** page appears.

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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 156 on page 317.

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(s) are added to the network.
   - The management status of the cluster changes to **Expected** in the **Devices** page.

     In the **Sites** > **Site Management** page, the **Site Status** for the cluster for which you performed **Grant RMA**, changes to **Expected**.

NOTE: You can see the progress of this job in the **Monitor** > **Jobs** page. This job might take around 15 minutes to complete.

Table 156 on page 317 provides guidelines on using the fields on the **Grant RMA for Device** panel.

Table 156: Fields on the Grant RMA for Dual-CPE Device Page

Field	Description
Tenant 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 cluster that will be replaced with new or restored devices through the **Grant RMA** 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 will receive the activation code from the service provider, outside of CSO. Example: 545476

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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 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.

2. Select the defective device that you have already performed RMA for 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 157 on page 318.

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 object in CSO is updated with the serial number and activation code for the replacement device.
   - The management status of the device is restored in the **Devices** page.

     In the **Sites** > **Site Management** page, the **Site Status** for the device for which you performed **Grant RMA**, changes to **PROVISIONED**.

   NOTE: You can see the progress of this job in the **Monitor** > **Jobs** page.

Table 157 on page 318 provides guidelines on using the fields on the **Grant RMA for Device** panel.

Table 157: Fields on the Grant RMA for Device Page (for SRX Device in an SRX Cluster)

Field	Description
Tenant Name	Displays the name of the tenant who is performing RMA.

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Table 157: Fields on the Grant RMA for Device Page (for SRX Device in an SRX Cluster) (continued)

Field	Description
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 **Grant RMA** 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 will receive the activation code from the service provider, outside of CSO. Example: 545454

Related Documentation

- About the Devices Page on page 308
- Performing Return Material Authorization (RMA) for a Single-CPE Device on page 310
- Performing Return Material Authorization (RMA) for Dual-CPE Devices on page 312

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***.

You can perform the following tasks from this page:

- 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.
  - Details of the device, such as serial number, management IP address, OS version, device template, tenant name, site name, and site location.
- 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.

Related Documentation

- About the Devices Page on page 308

Rebooting a CPE Device

You need to reboot a CPE device if the device is down, or if all troubleshooting options fail. A CPE device might be a tenant device or a cloud hub device.

To reboot a tenant device:

1. Select **Resources** > **Tenant Devices**.
2. Select the tenant 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.

To reboot a cloud hub device:

1. Select **Resources** > **Cloud Hub Devices**.
2. Select the cloud hub 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 cloud hub 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.

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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 Cloud Hub Devices Page on page 94
- About the Tenant Devices Page on page 91

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CHAPTER 30

Managing Device Images

- Device Images Overview on page 323
- About the Device Images Page on page 323
- Deleting Device Images on page 324

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 on page 323

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 14.
- Show or hide columns about the device image. See "Sorting Objects" on page 15.
- Search an object for a device image. See "Searching for Text in an Object Data Table" on page 15.

Field Descriptions

Table 65 on page 126 shows the fields on the Images page.

Table 158: 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 on page 323

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.

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Related Documentation

- About the Device Images Page on page 323

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CHAPTER 31

Managing Network Services

- Network Service Overview on page 327
- About the Network Services Page on page 328
- About the Service Overview Page on page 329
- About the Service Instances Page on page 331
- Configuring VNF Properties on page 333
- vSRX VNF Configuration Settings on page 333
- LxCIPtable VNF Configuration Settings on page 337
- Cisco CSR-1000v VNF Configuration Settings on page 340
- Riverbed Steelhead VNF Configuration Settings on page 341

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

- About the Network Services Page on page 328
- About the Service Overview Page on page 329
- About the Service Instances Page on page 331

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 327.

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 159 on page 328.
- 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 331.

Field Descriptions

Table 159 on page 328 shows the descriptions of the widgets that appear at the top of the Network Services page.

Table 159: Widgets on the Network Services Page

Widget	Description
Top Network Services Instantiated	View the numbers of instances of the three services that are most used by tenants in the network. This view helps you identify trends for network services, especially when you introduce a new service.
Services with Critical Alerts	View the top three network services receiving the maximum number of critical alerts.
Top Services by POP CPU Usage	View the top three network services using the largest percentage of CPU from the assigned CPU cores.

Table 160 on page 328 shows the descriptions of the fields on the Network Services page.

Table 160: 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 thenames of the tenants that have access to the network service.

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Table 160: Fields on the Network Services Page (continued)

Field	Description
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 161 on page 329 shows the descriptions of the fields on the Detail for *network service name* page.

Table 161: Fields on the Network Service Detail Page

Field	Description
General	
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
Performance Goals	View performance parameters of the network service that include bandwidth, number of sessions, latency, and license cost.

Related Documentation

- Network Service Overview on page 327
- About the Service Overview Page on page 329
- About the Service Instances Page on page 331

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 162 on page 330.
- View resources required for the service and its performance specification. See *Service Requirements* and *Service Performance* in Table 162 on page 330.
- View the service chain, with its constituent VNFs. See *Service Configuration* in Table 162 on page 330.
- Configure VNFs. Click a VNF in the service chain graphic. See "vSRX VNF Configuration Settings" on page 333.

Field Descriptions

Table 162 on page 330 provides guidelines on using the fields on the Service Overview page.

Table 162: Fields on the Service Overview Page

Field	Description
General Information	
Description	View a summary about the service's capabilities. The network service designer provides this summary.
State	View the state of the network service: • Discontinued—Service is no longer available for customers. • Published—Service designer has published service to network catalog, and it is available for customers.
Tenants	View the number of tenants using this service.
Service Requirements	
CPU	View the number of CPUs that the service needs (cores).
Memory	View the amount of RAM that the service needs in gigabytes (GB).
Service Performance	
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).

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Table 162: Fields on the Service Overview Page (continued)

Field	Description
License cost	Specify the license cost for the network service in USD.
Service Configuration (graphic of the service chain)	
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	Click to view settings for the VNF. See "vSRX VNF Configuration Settings" on page 333. The service designer can configure the VNF settings in Network Service Designer and the administrative user can configure the VNF settings in Customer Portal. 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.

Related Documentation

- Network Service Overview on page 327
- About the Network Services Page on page 328
- About the Service Instances Page on page 331

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 164 on page 332.
- 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 333.

Field Descriptions

Table 163 on page 332 shows the descriptions of the fields on the Service Instances page.

Table 163: 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: • Created—Administrative user for the tenant has enabled this service instance, which is active. • Blank—Administrative user for the tenant has disabled this service instance.
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 164 on page 332 shows the descriptions of the fields on the Detail for *Service-Instance-Name* page.

Table 164: Fields on the Service Instance Details Page

Field	Description
General	
Description	View information about this service instance. This information is generated from data in Customer Portal.

Related Documentation

- Network Service Overview on page 327
- About the Network Services Page on page 328
- About the Service Overview Page on page 329

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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 on page 331

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 165 on page 334 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 166 on page 335 shows the firewall settings you can configure.

Table 165: Fields for the vSRX Base Settings

Field	Description
Host Name	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. Example: vm-vsrx For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
Loopback Address	Specify an IPv4 loopback address for the management interface of the VM. Example: 192.0.2.25
DNS Servers	Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers. Example: 192.0.2.35
NTP Servers	Specify the FQDNs or IP addresses of one or more NTP servers. Example: 192.0.2.45
Syslog Servers	Specify the FQDNs or IP addresses of one or more system log servers. Example: 192.0.2.55
Enable Re-filter	Select **True** to enable a stateless firewall filter that protects the Routing Engine from denial-of-service (DoS) attacks or **False** to allow DoS attacks. Example: True
Enable Default Screens	For a cloud site, select **True** to enable the default screens security profile for the destination zone or **False** to disable default screening. Example: False You cannot configure this setting for an on-premise site.
Time Zone	Specify the time zone for the VM. Example: UTC

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Table 165: Fields for the vSRX Base Settings (continued)

Field	Description
Right Interface	Specify the identifier of the VM interface that transmits data. Example: ge-0/0/1 For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
Left Interface	Specify the identifier of the VM interface that receives data. Example: ge-0/0/0 For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
SNMP Prefix List	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. Example: 10.0.2.0/24
Ping Prefix List	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. Example: 10.0.2.1/24
Space Servers	If you set the Enable Re-filter field to **True**, specify the IP addresses of the VMs that contain the Junos Space Virtual Appliances. Example: 10.0.2.50

Table 166: Fields for the vSRX Firewall Settings

Field	Description
Policy Name	Specify the name of the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols. Example: policy-1
Source Zone	Select the security zone from which packets originate. • **left**—Interface that transmits data to the host • **right**— Interface that receives data transmitted from the host 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 *context*. Example: left

Table 166: Fields for the vSRX Firewall Settings (continued)

Field	Description
Destination Zone	Select the security zone to which packets are delivered. • **left**—Interface that transmits data to the host • **right**—Interface that receives data transmitted from the host 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 *context*. Example: right
Source Address	Specify the source IP address prefixes that the network service uses as match criteria for incoming traffic. To add source addresses: 1. Click the **Source Address** column. The source-address page appears. 2. Select **any** to match any source IP address of packets or **ipp** to match a specific prefix in the source IP address for which the application enforces the policy. 3. If you select **ipp**, specify a prefix. 4. Click **OK**. Example: 10.0.2.30
Destination Address	Specify the destination IP address prefixes that the network service uses as match criteria for outgoing traffic. To add a destination address: 1. Click the **Destination Address** column. The destination-address page appears. 2. Select **any** to match any source IP address of packets or **ipp** to match a specific prefix in the source IP address for which the application enforces the policy. 3. If you select **ipp**, specify a prefix. 4. Click **OK**. Example: 192.0.2.0/24
Action	Select **permit** to transmit packets that match the rule or **deny** to drop packets that match the rule. Example: permit

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Table 166: Fields for the vSRX Firewall Settings (continued)

Field	Description
Application	Specify the applications to which the policy applies. The applications are based on protocols and ports. To specify applications: 1. Click the **Application** column. The application page appears. 2. In the allowed_apps field, select **any** to match any application or **app** to choose specific applications. If you select **app**, press and hold the Ctrl key and click the required applications from the drop-down list. • junos-tcp-any • junos-udp-any • junos-ftp • junos-http • junos-https • junos-icmp-all • junos-icmp-ping • junos-telnet • junos-tftp 3. Click **OK**. Example: • junos-tcp-any • junos-udp-any

Related Documentation

- About the Network Services Page on page 328
- About the Service Overview Page on page 329
- About the Service Instances Page on page 331
- Configuring VNF Properties on page 333

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 167 on page 338 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 168 on page 338 shows the firewall settings you can configure.
- Table 169 on page 339 shows the Network Address Translation (NAT) settings you can configure.

Table 167: Fields for the LxCIP Base Settings

Field	Description
Loopback Address	Specify a loopback IP address. Example: 192.0.2.10
Operation	Select **add** to apply the policies to a specific route or **del** 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 168: Fields for the LxCIP Firewall Policy Settings

Field	Description
Firewall Policies	
Prevent SSH Brute	Select **True** to prevent SSH brute attacks or **False** to allow SSH brute attacks. Example: False
Prevent Ping Flood	Select **True** to prevent ping flood attacks or **False** to allow ping flood attacks. Example: False
Forwarding Rule Settings	
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

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Table 168: Fields for the LxCIP Firewall Policy Settings (continued)

Field	Description
Operation	Select the operation, which applies to a chain of rules of the same type, from the drop-down list. The following options are available: • **append**—Append the rule to a rule chain. • **insert-before**—Insert the rule before a rule with the same name. • **delete**—Replace an existing rule with this name. Example: append
Source Address	Specify the source IP address prefix that the network service uses as a match criterion for outgoing traffic. Example: 192.0.2.20/24
Name	Specify the name for the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols. Example: vsrx-fw-policy
Action	Select the action for the rule, which applies to all traffic that matches the specified criteria. • **accept**—Transmit packets that match the policy parameters. • **drop**—Drop packets that match the policy parameters. • **reject**—Reject packets that match the policy parameters. Example: accept
Service	Specify the service that you want the rule to match. Example: • http • smtp
Type	Select the type of packet that the rule matches. • **input**—Packets that the network service receives that are addressed to this VM • **forward**—Packets that the network service receives that are addressed to other VMs • **output**—Packets that the network service transmits The application creates a chain of all rules with a particular type. Example: input

Table 169: 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

Table 169: Fields for the LxCIP NAT Policy Settings (continued)

Field	Description
Right Interface	Specify the name of the interface on which the network service enforces NAT for outgoing traffic. Example: Eth2

Related Documentation

- Managing a Single Site on page 566

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 170 on page 340 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 171 on page 341 shows the firewall settings you can configure.

Table 170: 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

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Table 171: 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: • http • https • telnet • ftp • tcp • udp • icmp Example: http, https
Right to Left Allowed Apps	Select the application from the drop-down list for which the policy is enforced for incoming packets. The following applications are available: • http • https • telnet • ftp • tcp • udp • icmp Example: ftp, udp

Related Documentation

- Managing a Single Site on page 566

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 on page 566

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CHAPTER 32

Managing Firewall Policies

- Firewall Policy Overview on page 343
- About the Firewall Policy Page on page 344
- Creating Firewall Policy Intents on page 345
- Editing, Cloning, and Deleting Firewall Policy Intents on page 351
- Selecting Firewall Source on page 353
- Selecting Firewall Destination on page 356
- Firewall Policy Examples on page 359
- Firewall Policy Schedules Overview on page 389
- About the Firewall Policy Schedules Page on page 389
- Creating Schedules on page 390
- Editing, Cloning, and Deleting Schedules on page 392

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.

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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 396.

Related Documentation

- About the Firewall Policy Page on page 344
- Firewall Policy Examples on page 359
- Creating Firewall Policy Intents on page 345
- Editing, Cloning, and Deleting Firewall Policy Intents on page 351

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 345.
- Modify, clone or delete firewall policy intents. See "Editing, Cloning, and Deleting Firewall Policy Intents" on page 351.
- Deploy a firewall policy. See "Deploying Policies" on page 532.

  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 242.
- 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 172 on page 345 provides guidelines on using the fields on the **Firewall Policy** page.

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Table 172: 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.
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 on page 343
- Creating Firewall Policy Intents on page 345
- Firewall Policy Examples on page 359
- Editing, Cloning, and Deleting Firewall Policy Intents on page 351
- About the Deployments Page on page 530
- Deploying Policies on page 532

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 173 on page 346.

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 173 on page 346 provides guidelines on using the fields on the **Create Firewall Policy** page.

Table 173: Fields on the Create Firewall Policy Page

Field	Description
General Information	
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.
Identify the traffic that the intent applies to	
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 "Selecting Firewall Source" on page 353.
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 "Selecting Firewall Destination" on page 356.
Select Action	Click the add icon (+) to choose whether you want to permit, deny, or reject traffic between the source and destination. • Allow—Device permits traffic using the type of firewall authentication you applied to the policy. • Deny—Device silently drops all packets for the session and does not send any active control messages such as TCP Resets or ICMP unreachable. • 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.
Options	

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Table 173: Fields on the Create Firewall Policy Page (continued)

Field	Description
Scheduling	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. To add a schedule to a firewall policy: 1. Click on **Scheduling**, to enable scheduling. 2. Click the add icon (**+**), to add an existing schedule. If you want to view more results in the **End Points** pane, click **View more results**. Alternately, you can add a schedule from the **End Points** panel, by selecting the schedule and clicking on the check mark icon (**✓**). 3. The selected schedule is added to the firewall policy. You can also create new schedules and then associate the schedule to your firewall policy. To create a new schedule and then add it to a firewall policy: 1. Click on **Scheduling**, to enable scheduling. 2. Click the add icon (**+**), and then click **Add new schedule**. The **Create Schedules** page appears. 3. Alternately, click the lesser-than icon (<) to open the **End Points** panel. Click on the add icon (+) on the top right of the panel and select **Schedule**. The **Create Schedules** page appears. 4. Create a new schedule. See "Creating Schedules" on page 390. The new schedule appears in the list of schedules when you click on **Scheduling** and in the **End Points** tab, under **Schedules**. 5. Select the schedule and click on the add icon (+) to add it to the firewall policy.
Logging	Enable logging by selecting the **Logging** option. You can see the logged firewall events in the **Firewall Events** page by using **Monitor** > **Security Events** > **Firewall Events**. For more information on the **Firewall Events** page, see "About the Firewall Events Page" on page 255.

Table 173: Fields on the Create Firewall Policy Page (continued)

Field	Description
UTM	Enable the **UTM** option for protection against multiple threat types including spam and malware, and control access to unapproved websites and content. Click **Select UTM profile** to select a UTM profile from the list of UTM profiles displayed. • Click on **View more results** to see more UTM profile in the **Endpoints** panel on the right. • Click **Add new profile** to create a new UTM profile. See "Creating UTM Profiles" on page 401 for more information on creating a new UTM profile.
Create source and destination endpoints	

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Table 173: Fields on the Create Firewall Policy Page (continued)

Field	Description
End Points	

Table 173: Fields on the Create Firewall Policy Page (continued)

Field	Description
	To add an end point to the source or destination: 1. Click on **Source** or **Destination** and then click the lesser-than icon on the right side of the page to open the **End Points** panel. The **End Points** panel displayed the end points relevant to the source or destination based on your selection. • End points from addresses, departments, users, and sites are displayed for source. NOTE: If JIMS is not configured for CSO, users will not be listed in the **Endpoints** panel. Instead you will be provided with an option to import users through the **Administration > Identity Management** page. To import users, click **Set Up** and follow the steps provided in "About the Identity Management Page" on page 625. • End points from addresses, applications, departments, services, and sites are displayed for destination. NOTE: You can also search for a specific end point using the search option. 2. (Optional) Click on the edit icon (pencil symbol) to modify an end point. 3. (Optional) Click on the details icon on the right of the endpoint, to view more information about a source or destination endpoint. 4. Select the end point you want to add and click on the check mark icon (✓) to add it the source or destination. The selected end point is added to the source or destination. To create new source and destination endpoints: 1. Click the less-than icon (<) on the right side of the page, to open the **End Points** panel. 2. Click on the add icon (+) on the top right of the **End Points** panel. A list of end points that you can create is displayed. 3. Select the end point you want to create. You can create the following end points: • Create an address. See "Creating Addresses or Address Groups" on page 507. • Create a site group. See "Creating Site Groups" on page 584. • Create a department. See "Creating a Department" on page 525. • Create a service. See "Creating Services and Service Groups" on page 512. • Create an application signature group. See "Creating Application Signature Groups" on page 521. • Create a schedule. See "Creating Schedules" on page 390. 4. Click **Save** to create the new end point. The created end point is listed in the **End Points** panel.

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Table 173: Fields on the Create Firewall Policy Page (continued)

Field	Description
	5. Select the end point you want to add to the source or destination, and click on the check mark icon (✓). The end point is added to the source or destination.

Related Documentation

- Firewall Policy Overview on page 343
- About the Firewall Policy Page on page 344
- Firewall Policy Examples on page 359
- Editing, Cloning, and Deleting Firewall Policy Intents on page 351
- Creating Addresses or Address Groups on page 507
- Creating Site Groups on page 584
- About the Sites Page on page 535
- Creating a Department on page 525
- Creating Application Signature Groups on page 521
- Creating Services and Service Groups on page 512

Editing, Cloning, and Deleting Firewall Policy Intents

You can edit, clone, and delete firewall policy intents from the **Firewall Policy** page.

- Editing Firewall Policy Intents on page 351
- Cloning Firewall Policy Intents on page 352
- Deleting Firewall Policy Intents on page 352

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 345.

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 on page 343
- About the Firewall Policy Page on page 344
- Firewall Policy Examples on page 359

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- Creating Firewall Policy Intents on page 345

Selecting Firewall Source

The following procedures provides various methods using which you can chose a Firewall source end point:

- Adding an End Point as Firewall Source on page 353
- Selecting Firewall Source Using Abbreviations on page 354
- Selecting a Firewall Source from the End Points Panel on page 354
- Creating and Selecting a Firewall Source from the End Points Panel on page 355
- Creating Addresses from Source on page 355
- Creating Departments from Source on page 355

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 353.

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 355

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.

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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 507.
   - To create a new department, see "Creating a Department" on page 525.
   - To create a site or site group department, see "Creating Site Groups" on page 584.

   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 507.

  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.

Creating Departments from Source

Create a new department from the **Source** field and use the newly created department as a source end point:

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To create a new department from **Source**:

1. In **Source**, type **dept**. The link **Add new department** appears at the bottom of the list of departments.

2. Click on **Add new department**, to create a new department.

   The **Create Department** page appears.

3. Configure the new department. See "Creating a Department" on page 525.

4. Click **Save** to save the new department.

   The new department is created, and will be listed as an option for the source. Select the new department to add it to the source.

Related Documentation

- Selecting Firewall Destination on page 356
- Creating Firewall Policy Intents on page 345
- Firewall Policy Overview on page 343
- About the Firewall Policy Page on page 344
- Editing, Cloning, and Deleting Firewall Policy Intents on page 351

Selecting Firewall Destination

The following procedures provides various methods using which you can chose a firewall destination end point:

- Adding an End Point as Firewall Destination on page 357
- Selecting Firewall Destination Using Abbreviations on page 357
- Selecting a Firewall Destination from the End Points Panel on page 357
- Creating and Selecting a Firewall Destination from the End Points Panel on page 358
- Creating Addresses from Destination on page 358
- Creating Departments from Destination on page 359

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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 357.

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 358.

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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 507.
   - To create a new department, see "Creating a Department" on page 525.
   - To create a site or site group department, see "Creating Site Groups" on page 584.

   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.

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- 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 507.
  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 Departments from Destination

Create a new department from the **Destination** field and use the newly created department as a destination end point:

To create a new department from **Destination**:

1. In **Destination**, type **dept**. The link **Add new department** appears at the bottom of the list of departments.
2. Click on **Add new department**, to create a new department.

   The **Create Department** page appears.
3. Configure the new department. See "Creating a Department" on page 525.
4. Click **Save** to save the new department.

   The new department is created, and will be listed as an option for the destination. Select the new department to add it to the destination.

Related Documentation

- Creating Firewall Policy Intents on page 345
- Firewall Policy Overview on page 343
- About the Firewall Policy Page on page 344
- Editing, Cloning, and Deleting Firewall Policy Intents on page 351

Firewall Policy Examples

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

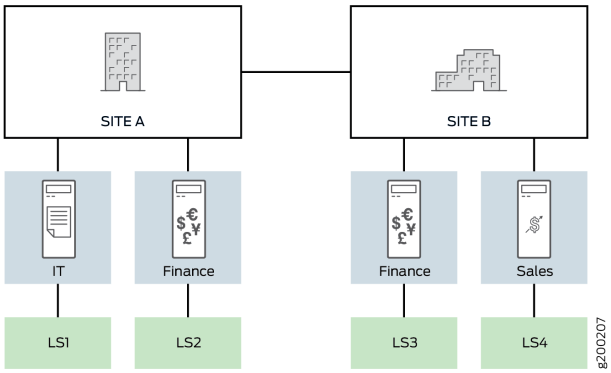
examples. Each of the examples provide detailed explanation about how a firewall policy intent defined through the CSO GUI resolves into configuration in the system.

NOTE: For more information, see "Firewall Policy Overview" on page 343 and "Creating Firewall Policy Intents" on page 345.

For easier understanding, all the examples have been defined to use the topology in illustrated in Figure 4 on page 360. 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 4: 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 174 on page 361 captures the addresses associated with the LAN segments used in the topology illustrated in Figure 4 on page 360.

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Table 174: 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 on page 361
- Example 2: Firewall Policy that Permits Internet Access for all Departments in Site A and Site B on page 363
- Example 3: Firewall Policy that Permits Any Public Internet Address to Access the Sales Department in Site B on page 365
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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 175 on page 362 shows the firewall policy intent that is defined:

Table 175: Firewall Policy Intent Definition for Example - 1

Source	Destination	Action
site A	site B	Permit

Table 176 on page 362 shows how this firewall policy intent is resolved:

Table 176: 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;
      }
         }
    }
```


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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 177 on page 363 shows the firewall policy intent that is defined:

Table 177: 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 178 on page 364 shows how this firewall policy intent is resolved:

Table 178: 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 {
```


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```
                    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 179 on page 365 shows the firewall policy intent that is defined:

Table 179: Firewall Policy Intent Definition for Example - 3

Source	Destination	Action
Internet	Sales, site B	Permit

Table 180 on page 365 shows how this firewall policy intent is resolved:

Table 180: 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 181 on page 366 shows the firewall policy intent that is defined:

Table 181: Firewall Policy Intent Definition for Example - 4

Source	Destination	Action
site A	Facebook	Permit

Table 182 on page 366 shows how this firewall policy intent is resolved:

Table 182: 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 {
```


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```
                    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 183 on page 368 shows the firewall policy intents that are to fulfil this requirement:

Table 183: 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
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 184 on page 368 shows how this firewall policy intent is resolved:

Table 184: 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

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Table 184: Firewall Policy Intent Resolution for Example - 5 (continued)

Source Department	Source Address	Zone	Destination Address	Service	Application Firewall Profile
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
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;
             }
            then {
                permit {
                    application-services {
                        application-firewall {
                            rule-set AppFwProfile_3;
                           }
                         }
                       }
                    }
                 }
              policy Intent_4__1 {
                match {
                source-address any;
                destination-address any;
                application [junos-telnet junos-ssh];
                 }
            then {
                deny;
                }
            }
        }
```

The hierarchy level for the following configuration sample is **[edit security application-firewall]**.

```
    rule-sets AppFwProfile_1-1 {
        rule rule-1 {
            match {
```

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```
                dynamic-application [junos:BBC junos:CNN];
                ssl-encryption any;
                 }
            then {
                permit;
                 }
               }
            default-rule {
            deny;
             }
           }
    rule-sets AppFwProfile_3 {
         rule rule-2 {
            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 {
```


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```
            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 185 on page 373 shows the firewall policy intent that is needed to fulfil this requirement:

Table 185: 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 186 on page 374 shows how this firewall policy intent is resolved:

Table 186: 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;
```


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```
                    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 187 on page 375 shows the firewall policy intents that are needed to fulfil this requirement:

Table 187: 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 188 on page 376 shows how this firewall policy intent is resolved:

Table 188: 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
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;
```


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```
            }
            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-f3d7-4cb3-89b6-78328e3bff38-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 {
```


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```
                        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-f3d7-4cb3-89b6-78328e3bff38-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 189 on page 380 shows the firewall policy intents that are needed to fulfil this requirement:

Table 189: 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 190 on page 380 shows how this firewall policy intent is resolved:

Table 190: 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

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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 191 on page 381 shows the firewall policy intents that are needed to fulfil this requirement:

Table 191: Firewall Policy Intent Definition for Example - 9

Source	Destination	Action
site A, Finance department	BitTorrent	Deny
site B, Finance department	BitTorrent	Deny

Table 192 on page 382 shows how this firewall policy intent is resolved:

Table 192: 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;
```


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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 Finance1 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 193 on page 384 shows the firewall policy intent that is needed to fulfil this requirement:

Table 193: Firewall Policy Intent Definition for Example - 10

Source	Destination	Action
user group A, site A	Facebook	Permit

Table 194 on page 384 shows how this firewall policy intent is resolved:

Table 194: 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;
```


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```
                }
            }
        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 195 on page 386 shows the firewall policy intent that is needed to fulfil this requirement:

Table 195: Firewall Policy Intent Definition for Example - 11

Source	Destination	Action
user B, site A	YouTube	Permit

Table 196 on page 387 shows how this firewall policy intent is resolved:

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Table 196: 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;
```


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```
    }
  ip-query {
    query-delay-time 15;
}
```

Related Documentation

- Firewall Policy Overview on page 343
- Creating Firewall Policy Intents on page 345

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

- About the Firewall Policy Schedules Page on page 389
- Firewall Policy Examples on page 359
- Creating Schedules on page 390
- Editing, Cloning, and Deleting Schedules on page 392

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 390.
- Modify, clone, or delete a firewall policy schedule. See "Editing, Cloning, and Deleting Schedules" on page 392.
- 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 241.
- Show or hide columns about the firewall policy schedule. See "Sorting Objects" on page 241.
- Search for a specific firewall policy schedule. See "Searching for Text in an Object Data Table" on page 242.

Field Descriptions

Table 197 on page 390 provides guidelines on using the fields on the **Firewall Policy Schedules** page.

Table 197: 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 on page 389
- Firewall Policy Examples on page 359
- Creating Schedules on page 390
- Editing, Cloning, and Deleting Schedules on page 392

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.

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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 198 on page 391.

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 198 on page 391 provides guidelines on using the fields to create a schedule.

Table 198: Fields on the Create Schedules Page

Field	Description
General Information	
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.
Dates	
Date Range	Select **Ongoing** if you want your schedules to always be active. Select **Custom** to configure two sets of start and end dates for a single schedule. For the first set, enter dates in the **Start Date** and **End Date** fields. You must enter the days in MM/DD/YYYY format. For the second set of the schedule, enter the start date in the **Second Start Date** field and enter the end date in the **Second End Date** field.
Times	
Time Ranges	Create a schedule to be active daily or for any specific times of the day.

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Table 198: Fields on the Create Schedules Page (continued)

Field	Description
Daily Options	Select **Daily** to make the schedule applicable daily. Select **Custom** 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. 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. Select **Specify the same time for all days** to enter a date and time that is applicable for all days.

Related Documentation

- Firewall Policy Schedules Overview on page 389
- About the Firewall Policy Schedules Page on page 389
- Firewall Policy Examples on page 359
- Editing, Cloning, and Deleting Schedules on page 392

Editing, Cloning, and Deleting Schedules

You can edit, clone, and delete schedules from the **Firewall Policy Schedules** page.

- Editing Schedules on page 392
- Cloning Schedules on page 393
- Deleting Schedules on page 393

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 390.

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

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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 390.

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

- Firewall Policy Schedules Overview on page 389
- About the Firewall Policy Schedules Page on page 389
- Creating Schedules on page 390
- Firewall Policy Examples on page 359

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CHAPTER 33

Unified Threat Management

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UTM Overview

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 on page 397
- UTM Components on page 397

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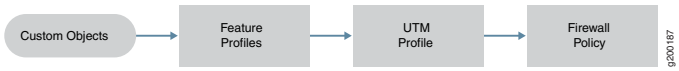
UTM Licensing

All UTM components require licenses with the exception of content filtering with custom URLs only. 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 5 on page 397.

Figure 5: 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

- Configuring UTM Settings on page 398
- About the UTM Profiles Page on page 399
- Creating UTM Profiles on page 401

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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 199 on page 398.

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 199: UTM Settings

Setting	Guideline
Antispam Settings	
Address Whitelist	Select the URL pattern to be used as the antispam whitelist. Alternatively, click **Create a New Pattern** to create a new URL pattern to use as a whitelist. The Create URL Patterns page appears. For more information, see "Creating URL Patterns" on page 429 for an explanation of the fields on this page.
Address Blacklist	Select the URL pattern to be used as the antispam blacklist. Alternatively, click **Create a New Pattern** to create a new URL pattern to use as a blacklist.
Antivirus Settings	
MIME Whitelist	Enter one or more MIME types (separated by commas) to exclude from antivirus scanning.
Exception MIME Whitelist	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 whitelist. This list is a subset of the MIME types that you specified in the MIME whitelist. For example, if you specify **video/** in the whitelist and **video/x-shockwave-flash** in the exception whitelist, all objects of MIME type **video/** except MIME type **video/x-shockwave-flash** are excluded from antivirus scanning.
URL Whitelist	Select the URL whitelist for the antivirus settings.

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Table 199: UTM Settings (continued)

Setting	Guideline
Web Filtering Settings	
URL Whitelist	Select the URL whitelist for the Web filtering settings; these URLs are excluded from Web filtering.
URL Blacklist	Select the URL blacklist for the Web filtering settings; these URLs are blocked from Web access.

Related Documentation

- About the UTM Profiles Page on page 399

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 401.
- Edit, clone, or delete a UTM profile—See "Editing, Cloning, and Deleting UTM Profiles" on page 403.
- 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 201 on page 400 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 200 on page 399 describes the fields on the UTM Profiles page.

Table 200: UTM Profiles Page Fields

Field	Description
Name	Name of the UTM profile.

Table 200: UTM Profiles Page Fields (continued)

Field	Description
Antispam	Information about the antispam profile associated with the UTM profile.
Antivirus	Information about the antivirus profiles associated with the UTM profile.
Content Filtering	Information about the content filtering profiles associated with the UTM profile.
Web Filtering	Information about the Web filtering profile associated with the UTM profile.
Description	Description of the UTM profile.

Table 201: UTM Profile Details Page Fields

Field	Description
General Information	
Name	Name of the UTM profile.
Description	Description of the UTM profile.
Traffic Options-	
Action When Connection Limit Is Reached	Action to be taken when the configured connection limit per client is reached.
Web Filtering Profile	
HTTP	Web filtering profile to be used for HTTP traffic.
Antivirus Profile	
HTTP	Antivirus profile to be used for HTTP traffic.
FTP Upload	Antivirus profile to be used for FTP upload traffic.
FTP Download	Antivirus profile to be used for FTP download traffic.
IMAP	Antivirus profile to be used for IMAP traffic.
SMTP	Antivirus profile to be used for SMTP traffic.
POP3	Antivirus profile to be used for POP3 traffic.
Antispam Profile	
SMTP	Antispam profile to be used for SMTP traffic.

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Related Documentation

- Creating UTM Profiles on page 401

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 202 on page 401.

   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 202: UTM Profile Settings

Setting	Guideline
General	
Name	Enter a unique name for the UTM profile. The maximum length is 29 characters.
Description	Enter a description for the UTM profile. The maximum length is 255 characters.
Traffic Options NOTE: 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.	

Table 202: UTM Profile Settings (continued)

Setting	Guideline
Connection Limit per Client	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.
Action when connection limit is reached	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 **Next** to continue.
Web Filtering	
HTTP	Select the Web filtering profile to be applied for HTTP traffic. Alternatively, click **Create Another Profile** to create a Web filtering profile. The Create Web Filtering Profiles wizard appears. See "Creating Web Filtering Profiles" on page 407 for an explanation of the fields on this wizard. Click **Back** to go the preceding step or click **Next** to go to the next step.
Antivirus	
Apply to all protocols	Select this check box to apply a single antivirus profile to all traffic protocols. and then specify the profile in the **Default Profile** field. Clear the check box if you want to apply traffic-specific profiles.
Default Profile	Select the antivirus profile to be applied to all traffic protocols. Click **Back** to go the preceding step or click **Next** to go to the next step.
NOTE: Click **Create Another Profile** to create an antivirus profile that you can then assign. The Create Antivirus Profiles wizard appears. See "Creating Antivirus Profiles" on page 414 for an explanation of the fields on this wizard.	
HTTP	Select the antivirus profile to be applied to HTTP traffic.
FTP Upload	Select the antivirus profile to be applied to FTP upload traffic.
FTP Download	Select the antivirus profile to be applied to FTP download traffic.
IMAP	Select the antivirus profile to be applied to IMAP traffic.
SMTP	Select the antivirus profile to be applied to SMTP traffic.
POP3	Select the antivirus profile to be applied to POP3 traffic. Click **Back** to go the preceding step or click **Next** to go to the next step.
Antispam	

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Table 202: UTM Profile Settings (continued)

Setting	Guideline
SMTP	Select the antispam profile to be applied for SMTP traffic. Alternatively, click **Create Another Profile** to create an antispam profile. The Create Antispam Profiles wizard appears. See "Creating Antispam Profiles" on page 419 for an explanation of the fields on this wizard. Click **Back** to go the preceding step or click **Next** to go to the next step.
Content Filtering	
Apply to all protocols	Select this check box to apply a single content filtering profile to all traffic protocols. and then specify the profile in the **Default Profile** field. Clear the check box if you want to apply traffic-specific profiles.
Default Profile	Select the content filtering profile to be applied to all traffic protocols. Click **Back** to go the preceding step or click **Next** to go to the next step.
NOTE: Click **Create Another Profile** to create a content filtering profile that you can then assign. The Create Content Filtering Profiles wizard appears. See "Creating Content Filtering Profiles" on page 424 for an explanation of the fields on this wizard.	
HTTP	Select the content filtering profile to be applied to HTTP traffic.
FTP Upload	Select the content filtering profile to be applied to FTP upload traffic.
FTP Download	Select the content filtering profile to be applied to FTP download traffic.
IMAP	Select the content filtering profile to be applied to IMAP traffic.
SMTP	Select the content filtering profile to be applied to SMTP traffic.
POP3	Select the content filtering profile to be applied to POP3 traffic. Click **Back** to go the preceding step.

Related Documentation

- About the UTM Profiles Page on page 399
- Configuring UTM Settings on page 398

Editing, Cloning, and Deleting UTM Profiles

You can edit, clone, and delete UTM profiles from the UTM Profiles page. This topic has the following sections:

- Editing UTM Profiles on page 404
- Cloning UTM Profiles on page 404
- Deleting UTM Profiles on page 405

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.

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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.

3. Click **Yes** to delete the selected UTM profiles.

   A confirmation message appears, indicating the status of the delete operation.

Related Documentation

- Creating UTM Profiles on page 401
- About the UTM Profiles Page on page 399

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 203 on page 405 lists the Web filtering solutions that are supported and the license requirements.

Table 203: 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.

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Table 203: Web Filtering Solutions Supported (continued)

Type	Description	License Requirement
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 whitelist or blacklist 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 407.
- Edit, clone, or delete a Web filtering profile—See "Editing, Cloning, and Deleting Web Filtering Profiles" on page 411.
- 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 205 on page 406 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 204 on page 406 describes the fields on the Web Filtering Profiles page.

Table 204: Web Filtering Profiles Page Fields

Field	Description
Name	Name of the Web filtering profile.
Profile Type	Type of engine used for the profile: Juniper-enhanced or Websense redirect.
Default Action	Default action taken when the specified connection limit per client is reached.
Timeout	
Description	Description of the Web filtering profile.

Table 205: Web Filtering Profile Details Page Fields

Field	Description
General Information	

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Table 205: Web Filtering Profile Details Page Fields (continued)

Field	Description
Name	Name of the Web filtering profile.
Description	Description of the Web filtering profile.
Engine Type	Type of engine used for the profile: Juniper-enhanced or Websense redirect.
Default Action	Default action taken when the specified connection limit per client is reached.
Fallback Options	
Default Action	Action taken for URL categories with no assigned action and for uncategorized URLs. This action is taken only if no reputation action is assigned.
Global Reputation Actions	Actions taken for the following site reputations: • **Very Safe** • **Moderately Safe** • **Fairly Safe** • **Suspicious** • **Harmful**
URL Categories	URL categories associated with the Web filtering profile.

Related Documentation

- Creating Web Filtering Profiles on page 407
- Editing, Cloning, and Deleting Web Filtering Profiles on page 411

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 206 on page 408.

   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 206: Creating Web Filtering Profiles Settings

Setting	Guideline
General Information	
Name	Enter a unique name for the Web filtering profile. The maximum length is 29 characters.
Description	Enter a description for the Web filtering profile. The maximum length is 255 characters.
Timeout	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.
Engine Type	Select an engine type for Web filtering: • (Default) Juniper Enhanced—UTM-enhanced Web filtering. • Websense Redirect—Redirect Web filtering profile.
Safe Search	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. NOTE: This option is available only for the Juniper Enhanced engine type. Save 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.
Custom Block Message/URL	Specify the redirect URL or a custom message to be sent when HTTP requests are blocked. The maximum length is 512 characters. NOTE: 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 **Back** to go the preceding step or click **Next** to go to the next step.

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Table 206: Creating Web Filtering Profiles Settings (continued)

Setting	Guideline
Custom Quarantine Message	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. The quarantine message contains the following information: • URL name • Quarantine name • Category (if available) • Site reputation (if available) 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: *****The requested webpage is blocked by your organization's access policy*****. Click **Back** to go the preceding step or click **Next** to go to the next step.
Account	Specify the user account associated with the Websense Web filtering profile.
Server	Specify the hostname or IP address for the Websense server.
Port	Enter the number of sockets used for communication between the client and the server. The default value is 8.
Sockets	Specify the port number to use to communicate with the Websense server. The default port value is 15968. Click **Back** to go the preceding step or click **Next** to go to the next step.
URL Categories	
Deny Action List	Click the **Add URL Categories** button to specify a list of URL categories that should be denied access. The Select URL Categories page appears. Complete the configuration according to the guidelines provided in Table 207 on page 410, The list of URL categories selected is displayed in a text box.
Log & Permit Action List	Specify a list of URL categories that are logged and then permitted. The Select URL Categories page appears. Complete the configuration according to the guidelines provided in Table 207 on page 410. The list of URL categories selected is displayed in a text box.
Permit Action List	Specify a list of URL categories that should be permitted access. The Select URL Categories page appears. Complete the configuration according to the guidelines provided in Table 207 on page 410 The list of URL categories selected is displayed in a text box.

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Table 206: Creating Web Filtering Profiles Settings (continued)

Setting	Guideline
Quarantine Action List	Specify a list of URL categories that should be quarantined. The Select URL Categories page appears. Complete the configuration according to the guidelines provided in Table 207 on page 410. The list of URL categories selected is displayed in a text box. Click **Back** to go the preceding step or click **Next** to go to the next step.
Fallback Options	
Global Reputation Actions	Select this check box (default) if you want to apply global reputation actions. 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. 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: • **Very Safe**—Permit, log and permit, block, or quarantine a request if a site reputation of 90 through 100 is returned. By default, Permit is selected. • **Moderately Safe**—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. • **Fairly Safe**—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. • **Suspicious**—Permit, log and permit, block, or quarantine a request if a site reputation of 60 through 69 is returned. By default, Quarantine is selected. • **Harmful**—Permit, log and permit, block, or quarantine a request if a site reputation of zero through 59 is returned. By default, Block is selected.
Default Action	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.
Fallback Action	Select the fallback action, which is used when: • The ThreatSeeker Websense Cloud servers are unreachable. • A timeout occurs for requests to ThreatSeeker Cloud. • There are too many requests to be handled by the device.

Table 207: Select URL Categories Settings

Setting	Guideline
Show	Choose which URL categories should be displayed for selection: **All categories**, **Custom URL categories**, or **Websense URL categories**. The **Available** column of the **URL Categories** field displays URL categories based on your selection.

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Table 207: Select URL Categories Settings (continued)

Setting	Guideline
URL Categories	Select one or more URL categories in the **Available** column and click the forward arrow to confirm your selection. The selected URL categories are displayed in the **Selected** column. Alternatively, click **Create New URL Category** to create a URL category and assign it to the URL category. The Create URL Categories page appears; for more information, see "Creating URL Categories" on page 433. Click **OK** to confirm your selection. You are returned to the Create Web Filtering Profiles page.

Related Documentation

- Creating UTM Profiles on page 401

Editing, Cloning, and Deleting Web Filtering Profiles

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 on page 411
- Cloning Web Filtering Profiles on page 412
- Deleting Web Filtering Profiles on page 412

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 on page 407
- About the Web Filtering Profiles Page on page 405

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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 414.
- Edit, clone, or delete an antivirus profile—See "Editing, Cloning, and Deleting Antivirus Profiles" on page 416.
- 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 209 on page 414 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 208 on page 413 describes the fields on the Antivirus Profiles page.

Table 208: 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.

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Table 209: Antivirus Profiles Details Page Fields

Field	Description
General Information	
Name	Name of the antivirus profile.
Description	Description of the antivirus profile.
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 on page 401

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.

4. Complete the configuration according to the guidelines provided in Table 210 on page 415.

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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** to 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 Antivirus Profiles page.

Table 210: Antivirus Profile Settings

Setting	Guideline
General Information	
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, **Sophos** 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.
Fallback Options	
	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. Specify the fallback options to use when there is a failure, or select the default action if no specific options are to be configured: • **Content Size**—Select an option to specify whether the content should be blocked (default) or logged and permitted if the content size the previously defined limit. • **Content Size Limit**—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. • **Engine Error**—Select the action to take (**Block** [default] or **Log and Permit**) when an engine error occurs. The term *engine error* refers all engine errors, including engine not ready, timeout, too many requests, password protected, corrupt file, decompress layer, and out of resources. • **Default Action**—Select the default action (**Block** [default] or **Log and Permit**) to take when an error occurs.
Notification Options	

Table 210: Antivirus Profile Settings (continued)

Setting	Guideline
	Use the notification options to configure a method of notifying the user when a fallback occurs or a virus is detected: • Fallback Deny—Select this option to notify mail senders that their messages were blocked. • Fallback Non-Deny—Select this option to warn mail recipients that they received unblocked messages despite problems. • Virus Detected—Select this option to notify mail recipients that their messages were blocked.

Related Documentation

- Creating UTM Profiles on page 401

Editing, Cloning, and Deleting Antivirus Profiles

You can edit, clone, and delete antivirus profiles from the Antivirus Profiles page. This topic has the following sections:

- Editing Antivirus Profiles on page 416
- Cloning Antivirus Profiles on page 417
- Deleting Antivirus Profiles on page 417

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.

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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

- Creating Antivirus Profiles on page 414
- About the Antivirus Profiles Page on page 413

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 419.
- Edit, clone, or delete an antispam profile—See "Editing, Cloning, and Deleting Antispam Profiles" on page 421.
- 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 212 on page 419 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 211 on page 418 describes the fields on the Antispam Profiles page.

Table 211: 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.

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Table 212: Antispam Profile Details Page Fields

Field	Description
Name	Name of the antispam profile.
Description	Description of the antispam profile.
Sophos Blacklist	Indicates whether Sophos Blacklist is enabled (server-based filtering) or disabled (local filtering).
Default Action	Action to be taken when spam is detected.
Custom Tag	Custom-defined tag that identifies an e-mail message as spam.

Related Documentation

- Creating UTM Profiles on page 401

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 whitelists (benign) and blacklists (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 213 on page 420.

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 213: Antispam Profile Settings

Setting	Guideline
General Information	
Name	Enter a unique name for the antispam profile. The maximum length is 29 characters.
Description	Enter a description for the antispam profile. The maximum length is 255 characters.
Sophos Blacklist	Select this check box (the default) to use server-based spam filtering. If you clear the check box, local spam filtering is used. 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. NOTE: Server-based spam filtering supports only IP-based spam block list blacklist lookup. Sophos updates and maintains the IP-based spam block list. Server-based antispam filtering is a separately licensed subscription service.
Action	
Default Action	Select the action to be taken when spam is detected: • **Tag Email Subject Line** • **Tag SMTP Header** • **Block Email** • **None**
Custom Tag	Enter a custom string for identifying a message as spam. The maximum length is 512 characters and the default is *****SPAM*****.

Related Documentation

- Creating UTM Profiles on page 401

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Editing, Cloning, and Deleting Antispam Profiles

You can edit, clone, and delete antispam profiles from the Antispam Profiles page. This topic has the following sections:

- Editing Antispam Profiles on page 421
- Cloning Antispam Profiles on page 421
- Deleting Antispam Profiles on page 422

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.

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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 on page 418

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 424.
- Edit, clone, or delete a content filtering profile—See "Editing, Cloning, and Deleting Content Filtering Profiles" on page 427.
- Clear the selected content filtering profiles—Click **Clear All Selections** to clear any content filtering profiles that you might have selected.

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- 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 215 on page 423 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 214 on page 423 describes the fields on the Content Filtering Profiles page.

Table 214: Content Filtering Profiles Page Fields

Field	Description
Name	Name of the content filtering profile.
Permit Command List	List of protocol commands permitted by the content filtering profile.
Block Command List	List of protocol commands blocked by the content filtering profile.
Notification Type	Type of notification that is sent when content is blocked.
Description	Description of the content filtering profile.

Table 215: Content Filtering Profiles Details Page Fields

Field	Description
General Information	
Name	Name of the content filtering profile.
Description	Description of the content filtering profile.
General Information	
Notify Mail Sender	Specifies whether the option to notify the e-mail sender is enabled or disabled.
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.

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Table 215: Content Filtering Profiles Details Page Fields (continued)

Field	Description
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 on page 401

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 216 on page 424 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 216: Supported Content Filter Types

Type	Description
MIME pattern filter	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. NOTE: The exception list has a higher priority than the block list.
Block Extension List	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.

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Table 216: Supported Content Filter Types (continued)

Type	Description
Protocol Command Block and Permit Lists	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. NOTE: If a protocol command appears on both the permit list and the block list, the command is permitted.

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 217 on page 425.

   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 217: Content Filtering Profile Settings

Setting	Guideline
General Information	

Table 217: Content Filtering Profile Settings (continued)

Setting	Guideline
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.
Notification Options	
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 (**Protocol** or **Message**) from the drop-down list.
Custom Notification Message	Enter a custom notification message. The maximum length is 512 characters.
Protocol Commands	
Command Block List	Enter the protocol commands to be blocked for the HTTP, FTP, SMTP, IMAP, and POP3 protocols. Use commas to separate each command. Protocol commands allow you to control traffic at the protocol-command level.
Command Permit List	Enter specific commands to be permitted for the HTTP, FTP, SMTP, IMAP, and POP3 protocols. Use commas to separate each command.
Content Types	
Block Content Type	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): • Active X • Windows executables (.exe) • HTTP cookie • Java applet • ZIP files
File Extensions	
Extension Block List	Use a file extension list to define a set of file extensions to block over HTTP, FTP, SMTP, IMAP, and POP3. Enter file extensions to block separated by commas. For example, exe, pdf, js, and so on.
MIME Types	
MIME Block List	Enter the MIME types you want to block over HTTP, FTP, SMTP, IMAP, and POP3 connections. Use commas to separate each MIME type.
MIME Permit List	Enter the MIME types you want to permit over HTTP, FTP, SMTP, IMAP, and POP3 connections. Use commas to separate each MIME type.

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Related Documentation

- Creating UTM Profiles on page 401

Editing, Cloning, and Deleting Content Filtering Profiles

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 on page 427
- Cloning Content Filtering Profiles on page 427
- Deleting Content Filtering Profiles on page 428

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 on page 424

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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 429.
- Edit, clone, or delete a URL pattern—See "Editing, Cloning, and Deleting URL Patterns" on page 431.
- 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 218 on page 429.
- 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 218 on page 429 describes the fields on the URL Patterns page.

Table 218: 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 on page 432

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 219 on page 430.

   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 219: 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 **Create New URL Category** to create a URL category, enter the URL category name in the text box, and click **Save** to assign the URL pattern to the new category.

Add URLs	Enter one or more URLs (separated by commas) in the text box, and click **Add**. The URLs are displayed in the URL List table.
	
	NOTE:
	• The following wildcard characters are supported:
	  ◦ asterisk (*)
	  ◦ period (.)
	  ◦ square brackets ([])
	  ◦ question mark (?)
	• Precede all wildcard characters with http://.
	• The asterisk (*) can only be used at the beginning of a URL and must be followed by a period (.).
	• The question mark (?) can only be used at the end of a URL.
	• The following are examples of wildcard syntaxes that are supported: http://*.example.net, http://www.example.ne?, and http://www.example.n??.
	• The following are examples of wildcard syntaxes that are not supported: *.example.???, http://*example.net, http://?, and www.example.ne?.

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Related Documentation

- Creating URL Categories on page 433

Editing, Cloning, and Deleting URL Patterns

You can edit, clone, and delete URL patterns from the URL Patterns page. This topic has the following sections:

- Editing URL Patterns on page 431
- Cloning URL Patterns on page 431
- Deleting URL Patterns on page 432

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.

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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 on page 429

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 433.
- Edit, clone, or delete a URL category—See "Editing, Cloning, and Deleting URL Categories" on page 434.
- Clear the selected URL categories—Click **Clear All Selections** to clear any URL categories that you might have selected.

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- 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 220 on page 433 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 220 on page 433 describes the fields on the URL Categories page.

Table 220: 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: • Predefined—URL categories that are loaded by default. • Custom—URL categories that are created by the user.
Description	Description of the URL category.

Related Documentation

- About the URL Patterns Page on page 429

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 221 on page 434.

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 221: Create URL Categories Settings

Settings	Guidelines
Name	Enter a unique name for the URL category. 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.
Description	Enter a description for the URL pattern. The maximum length is 255 characters.
URL Patterns	Select one or more URL patterns in the **Available** column and click the forward arrow to confirm your selection. The selected URL patterns are displayed in the **Selected** column. Alternatively, click **Create a New Pattern** to create a URL pattern and assign it to the URL category. The Create URL Patterns page appears. For more information, see "Creating URL Patterns" on page 429 NOTE: You must select at least one URL pattern.

Related Documentation

- Editing, Cloning, and Deleting URL Categories on page 434

Editing, Cloning, and Deleting URL Categories

You can edit, clone, and delete URL categories from the URL Categories page. This topic has the following sections:

- Editing URL Categories on page 434
- Cloning URL Categories on page 435
- Deleting URL Categories on page 435

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.

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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.

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Related Documentation

- Creating URL Categories on page 433

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CHAPTER 34

Managing SD-WAN

- SLA Profiles and SD-WAN Policies Overview on page 437
- About the SD-WAN Policy Page on page 440
- Creating SD-WAN Policy Intents on page 441
- Editing and Deleting SD-WAN Policy Intents on page 445
- About the Application SLA Profiles Page on page 446
- Creating SLA Profiles on page 447
- Editing and Deleting SLA Profiles on page 449

SLA Profiles and SD-WAN Policies Overview

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 87 on page 164 lists the categories of configurable constraints that are defined in an SLA profile.

Table 222: SLA Profile Categories

Category	Description
Path preference and priority	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 that are used for local breakout, you must select a path preference. For SLA profiles that are not associated with local breakout, you must select a path preference or configure at least one SLA parameter. MPLS is more latency-sensitive than Internet. 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.

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Table 222: SLA Profile Categories (continued)

SLA parameters	For SLA profiles that are not used for local breakout, you can also define one or more than one of the following SLA parameters: • Throughput—Amount of data (in Mbps) that is sent upstream and received downstream by the site during the selected time period • Latency—Amount of time (in ms) that a packet of data takes to travel from one designated point to another • Packet loss—Percentage of data packets dropped by the network to manage congestion • Jitter—Difference between the maximum and minimum round-trip times (in ms) of a packet of data 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.
Class of service	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.
Rate limiters	Rate limiters are defined for traffic shaping and efficient bandwidth utilization. You can define the following rate limiters: • Maximum upstream and downstream rates—The maximum upstream and downstream rate for all applications associated with the SLA profile. • 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.

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

SLA profiles are used by SD-WAN policy intents 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. 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.

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- SLA profile—An SLA profile that has the required constraints you want to apply to 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. The full mesh topology supports only static policies. Also, only static policies can be applied on links that have local breakout enabled.
- **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 on page 446
- About the SD-WAN Policy Page on page 440
- SD-WAN Events Overview on page 279
- Local Breakout Overview on page 537

About the SD-WAN Policy Page

To access this page, select **Configuration > SD-WAN > SD-WAN Policy** page in the Customer Portal.

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 441.
- Edit or delete SD-WAN policy intents. See "Editing and Deleting SD-WAN Policy Intents" on page 445.
- Deploy SD-WAN policy intents. See "Deploying Policies" on page 532.
- 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 223 on page 440 describes the fields on the SD-WAN Policy page.

Table 223: Fields on the SD-WAN Policy Page

Field	Description
Source	View 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	View 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.
SLA Profile	View the SLA profile associated with the policy intents. The SLA profiles are used by SD-WAN policy intents for managing traffic flow.
Options	• Name—View the name of the policy intents. • Description—View the descriptions of the policy intents.

Related Documentation

- SLA Profiles and SD-WAN Policies Overview on page 437
- Creating SD-WAN Policy Intents on page 441

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- Editing and Deleting SD-WAN Policy Intents on page 445

Creating SD-WAN Policy Intents

You can create policy intents for SD-WAN policies from the **SD-WAN Policy** page.

To create a policy intent:

1. Click the add icon (**+**) on the **Configuration** > **SD-WAN** > **SD-WAN Policy** in the Customer Portal.

   The options to create policy intents appear within the SD-WAN Policy page.

2. Enter the policy intent information according to the guidelines provided in Table 224 on page 442.

3. Click **Save** to create the policy intent.

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

Table 224: Fields on the Create SD-WAN Policy Intent Page

Field	Guidelines
Source	You can select the source endpoints in one of the following ways: • 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. • 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. 1. Click **View more results**. The complete list of departments, sites, and site groups is displayed in the **End Points** pane on the right. 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. 3. Click the add icon (**+**) to select the endpoint. • Enter an abbreviation in the **Source** 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: ◦ Click the endpoints in the filtered list to select them. ◦ Click **View more results** to select the endpoint from the complete list of departments, sites, and site groups. ◦ Click **Add new department** or **Add new sitegroup** to create new departments or site groups and select them. The Create Site Group page or Create Department page appears based on your selection. See "Creating a Department" on page 525 and "Creating Site Groups" on page 584 for information about creating site groups and departments. • Create site groups or departments to select the source endpoint from the newly created site group or department. To create site groups or departments: 1. Click anywhere within the **Source** field. 2. Click the lesser-than icon (**<**) on the right. The list of available departments, sites, and site groups is displayed in the **End Points** pane on the right. 3. (Optional) To view more information about a source endpoint, hover over the endpoint click the details icon. 4. Click the add icon (**+**) on the top right of the pane. 5. Click **Department** or **Site Group** as needed. The Create Department page or Create Site Group page appears based on your selection. See "Creating a Department" on page 525 and "Creating Site Groups" on page 584 for information about creating departments and site groups. 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 **Cancel** instead.

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Table 224: Fields on the Create SD-WAN Policy Intent Page (continued)

Field	Guidelines
Application	You can select the application endpoints in one of the following ways: • Select application endpoints from the displayed list of applications and application groups. Click the endpoints to select them. • Select the application endpoints from the complete list of applications and application groups. To view the complete list of applications and applications groups. 1. Click **View more results**. The complete list of applications and applications groups is displayed in the **End Points** pane on the right. 2. (Optional) Hover over an application group and click the edit icon to edit the application group. 3. (Optional) Hover over an application and click the details icon to view details about the application. 4. Click the add icon (**+**) to select the endpoint. • Enter an abbreviation in the **Application** 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: ◦ Click the endpoints in the filtered list to select them. ◦ Click **View more results** to select the endpoint from the complete list of applications and applications groups. ◦ Click **Add new application** to create a new application group and select the application group. The Create Application Signature Group page appears. See "Creating Application Signature Groups" on page 521 for information about creating application groups. • Create custom application groups to select the application endpoint from the newly created application group. To create an application group: 1. Click anywhere within the **Application** field. 2. Click the lesser-than icon (**<**) on the right. The list of available applications, departments, sites, and site groups is displayed in the **End Points** pane on the right. 3. Click the add icon (**+**) on the top right of the pane. 4. Click **Application**. The Create Application Signature Group page appears. See "Creating Application Signature Groups" on page 521 for information about creating application groups. 5. Click the check mark icon (**✓**) if you want to save the application signature group to the policy intent. Alternatively, if you want to discard your updates, click **Cancel** instead.

Table 224: Fields on the Create SD-WAN Policy Intent Page (continued)

Field	Guidelines
SLA Profile	Select an SLA profile to apply to the source and application endpoints. You can select the SLA profile in one of the following ways: • Select SLA profile from the displayed list of SLA profiles. Click the SLA profile to select it. • Select the SLA profile from the complete list of SLA profiles. To view the complete list of SLA profiles. 1. Click **View more results**. The complete list of SLA profiles is displayed in the **End Points** pane on the right. 2. Click the add icon (**+**) to select the SLA profile. • Select SLA profile by creating a custom SLA profile. To create an SLA profile: 1. Click anywhere within the SLA Profile field. 2. Click the lesser-than icon (**<**) on the right. The list of SLA profiles is displayed in the **End Points** pane on the right. 3. Click the add icon (**+**) on the top right of the pane. 4. Click **SLA Profile**. The Create SLA Profile Page appears. See "Creating SLA Profiles" on page 447 for information about creating SLA profiles. 5. Click the check mark icon (**✓**) if you want to save the SLA profile to the policy intent. Alternatively, if you want to discard your updates, click **Cancel** instead.
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 on page 437
- About the SD-WAN Policy Page on page 440
- Editing and Deleting SD-WAN Policy Intents on page 445
- Deploying Policies on page 532

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Editing and Deleting SD-WAN Policy Intents

You can edit or delete SD-WAN policy intents from the SD-WAN Policy page.

- Editing SD-WAN Policy Intents on page 445
- Deleting SD-WAN Policy Intents on page 445

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 441.

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

   Alternatively, click **Cancel** to discard your changes.

Deleting SD-WAN Policy Intents

If an SD-WAN intent is no longer needed, you can delete SD-WAN policy intents from the SD-WAN Policy page.

To delete SD-WAN policy intents:

1. Select one or more policy intents that you want to delete and click the delete icon (x).

   A page requesting confirmation of deletion appears.

2. Click **Yes** to confirm that you want to delete the selected policy intents.

   The policy intents are deleted.

Related Documentation

- SLA Profiles and SD-WAN Policies Overview on page 437
- About the SD-WAN Policy Page on page 440
- Creating SD-WAN Policy Intents on page 441

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 447.
- Edit the configuration of an existing SLA profile. See "Editing and Deleting SLA Profiles" on page 449.
- Show or hide columns that contain information about SLA profiles. See "Sorting Objects" on page 241.
- 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 225 on page 446 shows the descriptions of the fields on the Application SLA Profiles page.

Table 225: Fields on the Application SLA Profiles Page

Field	Description
Priority	View the SLA profile priority.
Name	View the SLA profile name.
Link Paths	View WAN link paths associated with the SLA profile.
Tenant	View the tenant associated with the SLA profile.
Class of Service	View the class of service associated with the SLA profile.
Local Breakout	View whether local breakout is enabled on the SLA profile.
Throughput Target	View the target throughput for the SLA profile.
Latency Target	View the target latency for the SLA profile.
Packet Loss Target	View the target packet-loss for the SLA profile.
Jitter Target	View the target jitter for the SLA profile.

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Table 225: Fields on the Application SLA Profiles Page (continued)

Field	Description
Delay Target	View the target delay for the SLA profile. Target delay is calculated as two times the target latency.

Related Documentation

- SLA Profiles and SD-WAN Policies Overview on page 437
- Local Breakout Overview on page 537
- Creating SLA Profiles on page 447
- Editing and Deleting SLA Profiles on page 449

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 226 on page 447.

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 226: Fields on the Create SLA Profile page

Field	Guidelines
General	
Name	Enter a name for the SLA profile. Can be a unique string of not more than 15 characters that contains alphanumeric characters and hyphen (-).
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 **Enabled** state.

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Table 226: Fields on the Create SLA Profile page (continued)

Field	Guidelines
Local Breakout	Enable local breakout for the SLA profile. Local breakout is the ability of the site to route Internet traffic directly from the site.
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. For SLA profiles that are used for local breakout, you must select a path preference. For SLA profiles that are not used for local breakout, you must select a path preference or configure at least one SLA parameter.
Failover	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. NOTE: The Failover option is supported only for bandwidth-optimized SD-WAN networks.
Path Failover Criteria	Choose one of the following options: • **Does not meet one or more SLA parameters**—This triggers the path failover if any of the SLA parameters is violated. • **Does not meet all SLA parameters**—This triggers the path failover only when all the SLA parameters are violated.
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.
Advanced Configuration–SLA Sampling	
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.
Advanced Configuration-Rate Limiting	

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Table 226: Fields on the Create SLA Profile page (continued)

Field	Guidelines
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 **High**. Other available values are **Medium High**, **Medium Low**, and **Low**.

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 on page 437
- About the Application SLA Profiles Page on page 446
- Editing and Deleting SLA Profiles on page 449

Editing and Deleting SLA Profiles

You can use the Applications SLA Profiles page to edit and delete SLA profiles.

- Editing an SLA Profile on page 449
- Deleting SLA Profiles on page 450

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 447. 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 447.

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 on page 437
- About the Application SLA Profiles Page on page 446
- Creating SLA Profiles on page 447

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CHAPTER 35

Managing NAT Policies

- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Creating NAT Policies on page 455
- Editing and Deleting NAT Policies on page 457
- About the Single NAT Policy Page on page 458
- Creating NAT Policy Rules on page 460
- Editing, Cloning, and Deleting NAT Policy Rules on page 466
- Deploying NAT Policy Rules on page 467
- Selecting NAT Source on page 468
- Selecting NAT Destination on page 472
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- About the NAT Pools Page on page 476
- Creating NAT Pools on page 477
- Editing, Cloning, and Deleting NAT Pools on page 479

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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

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  - 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 227 on page 453 shows the persistent NAT support for different source NAT and destination NAT addresses.

Table 227: 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 228 on page 454 and Table 229 on page 454 show the translated address pool selection for source NAT, destination NAT, and static NAT addresses.

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Table 228: 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 229: 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 on page 454
- Creating NAT Policies on page 455
- Editing and Deleting NAT Policies on page 457
- Editing, Cloning, and Deleting NAT Policy Rules on page 466

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.

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Tasks You Can Perform

You can perform the following tasks from this page:

- Create a NAT policy. See "Creating NAT Policies" on page 455.
- Modify or delete a NAT policy. See "Editing and Deleting NAT Policies" on page 457.
- Create, modify, clone, and delete NAT policy rules. See "About the Single NAT Policy Page" on page 458.
- Search for a specific NAT policy. See "Searching for Text in an Object Data Table" on page 242.
- Show or hide columns. Click the **Show Hide Columns** icon in the top right corner of the page.

Field Descriptions

Table 230 on page 455 provides guidelines on using the fields on the **NAT Policies** page.

Table 230: 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 on page 452
- Creating NAT Policies on page 455
- Editing and Deleting NAT Policies on page 457
- About the Single NAT Policy Page on page 458

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 231 on page 456.

   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 231 on page 456 provides guidelines on using the fields on the **Create NAT Policy** page.

Table 231: 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.
Manage Auto-Proxy ARP	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. A proxy ARP implies that the same interface will proxy for other IP addresses (that is, respond to ARP requests for other IP addresses). 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. NOTE: When creating a source NAT rule with pool translation, the address pool assigned must be in the same subnet as the outgoing interface selected. NOTE: 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.

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Table 231: Fields on the Create NAT Policy Page (continued)

Field	Description
Sites Applied On	Select the sites on which you want to apply the policy in the **Available** column and move them to the **Selected** column by clicking the greater-than icon (>). NOTE: The **Available** column lists only those sites that do not have a NAT policy associated with them.
Sequence No.	Click **Select Policy Sequence**. The **Select Policy Sequence** page appears, displaying all NAT policies. Select the policy you want to reorder and select **Move Policy Up** or **Move Policy Down** to reorder your NAT policy among the existing policies.

Related Documentation

- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Editing and Deleting NAT Policies on page 457
- About the Single NAT Policy Page on page 458
- Creating NAT Policy Rules on page 460
- Editing, Cloning, and Deleting NAT Policy Rules on page 466

Editing and Deleting NAT Policies

You can edit or delete a NAT policy from the **NAT Policies** page.

- Editing NAT Policies on page 457
- Deleting NAT Policies on page 458

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 455.

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

- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Creating NAT Policies on page 455
- Editing, Cloning, and Deleting NAT Policy Rules on page 466

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 460.
- 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 466.

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- Deploy a NAT rule. See "Deploying NAT Policy Rules" on page 467.
- Search for a specific NAT rule. See "Searching for Text in an Object Data Table" on page 242.
- Show or hide columns. Click the **Show Hide Columns** icon in the top right corner of the page.

Field Descriptions

Table 232 on page 459 provides information on the fields in the NAT rules contained within this NAT policy.

Table 232: 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 467.

Related Documentation

- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Creating NAT Policies on page 455
- Editing and Deleting NAT Policies on page 457
- Creating NAT Policy Rules on page 460
- Editing, Cloning, and Deleting NAT Policy Rules on page 466
- Deploying NAT Policy Rules on page 467

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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 your 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, displayed 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.

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4. Complete the configuration according to the guidelines provided in Table 233 on page 461.

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 233 on page 461 provides guidelines on using the fields on the **Single NAT Policy** page.

Table 233: Fields on the Single NAT Policy Page for Creating NAT Rules

Field	Description

Source	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.
	
	The possible endpoints for source differ based on whether the NAT rule is a source, destination, or static NAT rule.
	
	• The possible endpoints for source for a source NAT rule are:
	  ◦ Addresses
	  ◦ Routing instances, interfaces, or zones
	  ◦ Protocols
	  ◦ Ports
	• The possible endpoints for source for a destination NAT rule are:
	  ◦ Addresses
	  ◦ Routing instances, interfaces, or zones
	  ◦ Protocols
	• The possible endpoints for source for a static NAT rule are:
	  ◦ Addresses
	  ◦ Routing instances, interfaces, or zones
	  ◦ Ports
	
	You can also select a source endpoint by using the methods described in "Selecting NAT Source" on page 468.

Table 233: Fields on the Single NAT Policy Page for Creating NAT Rules (continued)

Field	Description

Destination	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.
	
	The possible endpoints for destination differ based on whether the NAT rule is a source, destination, or static NAT rule.
	
	• The possible endpoints for destination for a source NAT rule are:
	  • Addresses
	  • Routing instances, interfaces, or zones
	  • Services
	  • Ports
	• The possible endpoints for destination for a destination NAT rule are:
	  • Addresses
	  • Services
	  • Ports
	• The possible endpoints for destination for a static NAT rule are:
	  • Addresses
	  • Ports
	
	You can select a destination endpoint by using the methods described in "Selecting NAT Destination" on page 472.
	
	NOTE: 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.
	
	[Any.Address] --> [Wan.IP] :: [Dest-Pool-1]
	
	Therefore, the recommendation in such cases is to use a destination NAT rule with destination field as **[Address + Port]**. For example:
	
	[Any.Address] --> [Wan.IP + Port] :: [Dest-Pool-1]

Translation	

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Table 233: Fields on the Single NAT Policy Page for Creating NAT Rules (continued)

Field	Description
Translation Type	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. Chose one among the following translation types for a source NAT rule: • None—No translation is required for the incoming traffic. • Interface—Performs interface-based translations on the source or destination packet. • Pool—Performs pool-based translations on the source or destination packet. Click on the add icon (+) in the **Select Pool** field to choose the translation pool. You can also create a new pool by clicking **Add new pool**. See "Creating NAT Pools" on page 477. Chose one among the following translation types for a static NAT rule: • Address—Performs address-based translations on the source or destination packet. Click on the add icon (+) in the **Select Address** field to choose the translation address. You can also create a new address by clicking **Add new address**. See "Creating Addresses or Address Groups" on page 507. NOTE: 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 **Advanced Settings** page. For more information on **Advanced Settings**, see Table 235 on page 465. • Corresponding IPv4—Uses the corresponding IPv4 address to perform translations on the source or destination packet. Chose one among the following translation types for a destination NAT rule: • None—No translation is required for the incoming traffic. • Pool—Performs pool-based translations on the source or destination packet. Click on the add icon (+) in the **Select Pool** field to choose the translation pool. You can also create a new pool by clicking **Add new pool**. See "Creating NAT Pools" on page 477. NOTE: 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: **Address - IP1** **Site - the site hosting the webserver** **Routing instance - natVR_HR**
Advanced Settings (Optional)	Click **Configure** to configure advance settings for a source or static NAT rule. For more information about advanced settings for the translation types **Interface** and **Pool** for a source NAT rule, see Table 234 on page 464. For more information about advanced settings for the translation types **Interface** and **Pool** for a static NAT rule, see Table 235 on page 465
Details	
Name	Enter a unique string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 255 characters.

Table 233: Fields on the Single NAT Policy Page for Creating NAT Rules (continued)

Field	Description
Description	Enter a description for the policy intent; maximum length is 1024 characters.
End Points	Create source and destination endpoints such as addresses and services. • To create an address, click the add icon (+) and select **Address**. See "Creating Addresses or Address Groups" on page 507 to configure the parameters of the address. • To create a service, click the add icon (+) and select **Service**. See "Creating Services and Service Groups" on page 512 to configure the parameters of the service. To edit the configured parameters of an address or service, hover over it and click on the edit icon (pencil symbol).

Table 234 on page 464 provides guidelines on using the fields on the **Advanced Settings** page for a source NAT rule.

Table 234: Fields on the Advanced Settings Page for Source NAT Rule

Field	Description

Persistent	Enable the check box to ensure that all requests from the same internal transport address are mapped to the same reflexive transport address.
	NOTE: 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:
	`[Edit mode]`
	`set security nat source interface port-overloading off`

Persistent NAT Type	Configure persistent NAT mappings. • 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. • 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. • 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.
Inactivity Timeout	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.

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Table 234: Fields on the Advanced Settings Page for Source NAT Rule (continued)

Field	Description
Maximum Session Number	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. The range is 8 through 65,536. The default is 30 sessions.
Address Mapping	Select an address from the available list.
Pool Address	Displays the NAT pool address.
Host Address Base	Displays the base address of the original source IP address range. The host address base is used for IP address shifting.
Port Translation	Displays whether port translation is enabled or disabled for this NAT rule.
Overflow Pool Type	Displays the source pool to be used when the current address pool is exhausted.
Overflow Pool Name	Displays the name of the overflow pool.
Mapped Port Type	Specify the type of port mapping: • Port—Enter a value for **Port**, ranging from 0 through 65,535. • Range—Enter the port range values in the **Start** and **End** fields, ranging from 0 through 65,535.

Table 235 on page 465 provides guidelines on using the fields on the **Advanced Settings** page for a static NAT rule.

Table 235: Fields on the Advanced Settings Page for Static NAT Rule

Field	Description
Mapped Port Type	Specify the type of port mapping: • Port—Enter a value for **Port**, ranging from 0 through 65,535. • Range—Enter the port range values in the **Start** and **End** fields, ranging from 0 through 65,535.
Routing Instance	Select the routing instance for the static NAT rule.

Related Documentation

- About the Single NAT Policy Page on page 458
- Editing, Cloning, and Deleting NAT Policy Rules on page 466
- Deploying NAT Policy Rules on page 467
- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Creating NAT Policies on page 455

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- Editing and Deleting NAT Policies on page 457

Editing, Cloning, and Deleting NAT Policy Rules

You can edit, clone, or delete a NAT policy rule from the ***NAT Policy*** page.

- Editing NAT Policy Rules on page 466
- Cloning NAT Policy Rules on page 466
- Deleting NAT Policy Rules on page 467

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 460.

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.

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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.

Related Documentation

- About the Single NAT Policy Page on page 458
- Creating NAT Policy Rules on page 460
- Deploying NAT Policy Rules on page 467
- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Creating NAT Policies on page 455
- Editing and Deleting NAT Policies on page 457

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 532.

   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.**

Related Documentation

- About the Single NAT Policy Page on page 458
- Creating NAT Policy Rules on page 460
- Editing, Cloning, and Deleting NAT Policy Rules on page 466
- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Creating NAT Policies on page 455
- Editing and Deleting NAT Policies on page 457

Selecting NAT Source

The following procedures provides various methods using which you can choose an endpoint as a NAT source:

- Adding an Endpoint as NAT Source on page 468
- Selecting Interfaces when GWR Resides Inside an NFX Box on page 469
- Selecting NAT Source Using Abbreviations on page 469
- Selecting a NAT Source from the End Points Panel on page 470
- Creating and Selecting a NAT Source from the End Points Panel on page 470
- Creating Addresses from Source Field on page 471

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.

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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 236 on page 469. These are the default mappings provided by Cloud CPE Solution. You may change these interface mappings based on your requirements, see "Configuring a Single Site" on page 567.

Table 236: 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 468.

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 470.

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 507.
   - To create a new service, see "Creating Services and Service Groups" on page 512.
   - To create a new NAT pool, see "Creating NAT Pools" on page 477.

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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 507.
  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 NAT Destination on page 472
- Creating NAT Policy Rules on page 460
- Editing, Cloning, and Deleting NAT Policy Rules on page 466
- Deploying NAT Policy Rules on page 467
- About the Single NAT Policy Page on page 458
- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Creating NAT Policies on page 455
- Editing and Deleting NAT Policies on page 457

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Selecting NAT Destination

The following procedures provides various methods that you can use to choose an endpoint as a NAT destination:

- Adding an Endpoint as NAT Destination on page 472
- Selecting Interfaces when GWR Resides Inside an NFX Box on page 472
- Selecting NAT Destination Using Abbreviations on page 473
- Selecting a NAT Destination from the End Points Panel on page 473
- Creating and Selecting a NAT Destination from the End Points Panel on page 474
- Creating Addresses from Destination Field on page 474
- Creating Services from Destination Field on page 475

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 237 on page 472. These are the default mappings provided by Cloud CPE Solution. You may change these interface mappings based on your requirements, see "Configuring a Single Site" on page 567.

Table 237: 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

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Table 237: NFX and GWR Interface Mapping (continued)

NFX Physical Interface	GWR Virtual Interface
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 472.

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 474.

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 507.
   - To create a new service, see "Creating Services and Service Groups" on page 512.

   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.

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3. Configure the new address. See "Creating Addresses or Address Groups" on page 507.

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 512.

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

- About the Single NAT Policy Page on page 458
- Editing, Cloning, and Deleting NAT Policy Rules on page 466
- Creating NAT Policy Rules on page 460
- Deploying NAT Policy Rules on page 467
- NAT Policies Overview on page 452
- About the NAT Policies Page on page 454
- Creating NAT Policies on page 455
- Editing and Deleting NAT Policies on page 457

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.

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Related Documentation

- NAT Policies Overview on page 452
- About the NAT Pools Page on page 476
- Creating NAT Pools on page 477
- Editing, Cloning, and Deleting NAT Pools on page 479

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 477.
- Modify, clone, or delete a NAT pool. See "Editing, Cloning, and Deleting NAT Pools" on page 479.
- 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 241.
- Search for a specific NAT pool. See "Searching for Text in an Object Data Table" on page 242.
- Show or hide columns. Click the **Show Hide Columns** icon at the top right corner of the page.

Table 238 on page 476 provides description of the fields on the **NAT Pools** page.

Table 238: 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 **Source** or **Destination**.

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Related Documentation

- NAT Pools Overview on page 475
- Creating NAT Pools on page 477
- Editing, Cloning, and Deleting NAT Pools on page 479

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 239 on page 477.

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 239 on page 477 provides guidelines on using the fields on the **Create NAT Pool** page.

Table 239: Fields on the Create NAT Pool Page

Field	Description
General Information	
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: • Source • Destination
Pool Address	Select a NAT pool address or click **Add new address** to create a new NAT pool address.
Routing Instance	

Table 239: Fields on the Create NAT Pool Page (continued)

Field	Description
Site	Select the site to which the NAT pool is applicable. NOTE: In a hub and spoke topology, both hub and spoke sites are listed in the **Site** drop-down. Ensure that you select only a spoke site, when you are creating a destination NAT pool.
Routing Instance	Select the required routing instance from the list of available routing instances for the selected site.
Advanced	
Host Address Base	Enter the base address of the original source IP address range. The **Host Address Base** is used for IP address shifting.
Translation	Select the translation type for the incoming traffic: • No Translation—There is no translation required for the incoming traffic. • Port/Range—Set the global default single port range for source NAT pools with port translation. • Overload—Multiple source addresses are translated to pool addresses. If you set **Overload** as the translation type, the value of the **Pool Address** field cannot be an IP range or subnet, but it will be a single address.
Address Pooling	Select a NAT address pooling behavior: • 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. • Non-Paired—Use this option for applications that can be assigned IP addresses in a round-robin fashion.
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.

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Table 239: 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. • Interface—Allow the egress interface IP address to support overflow. • Pool—Name of the source address pool. ◦ 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.)

Related Documentation

- NAT Pools Overview on page 475
- About the NAT Pools Page on page 476
- Editing, Cloning, and Deleting NAT Pools on page 479

Editing, Cloning, and Deleting NAT Pools

- Editing NAT Pools on page 479
- Cloning NAT Pools on page 480
- Deleting NAT Pools on page 480

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 477.

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 on page 475
- About the NAT Pools Page on page 476
- Creating NAT Pools on page 477

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CHAPTER 36

Managing SSL Proxies

- SSL Forward Proxy Overview on page 481
- About the SSL Proxy Policy Page on page 486
- Creating SSL Proxy Policy Intents on page 487
- Editing, Cloning, and Deleting SSL Proxy Policy Intents on page 490
- Understanding How SSL Proxy Policy Intents Are Applied on page 492
- About the SSL Proxy Profiles Page on page 494
- Creating SSL Forward Proxy Profiles on page 496
- Editing, Cloning, and Deleting SSL Forward Proxy Profiles on page 500
- Configuring and Deploying an SSL Forward Proxy Policy on page 502

SSL Forward Proxy Overview

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

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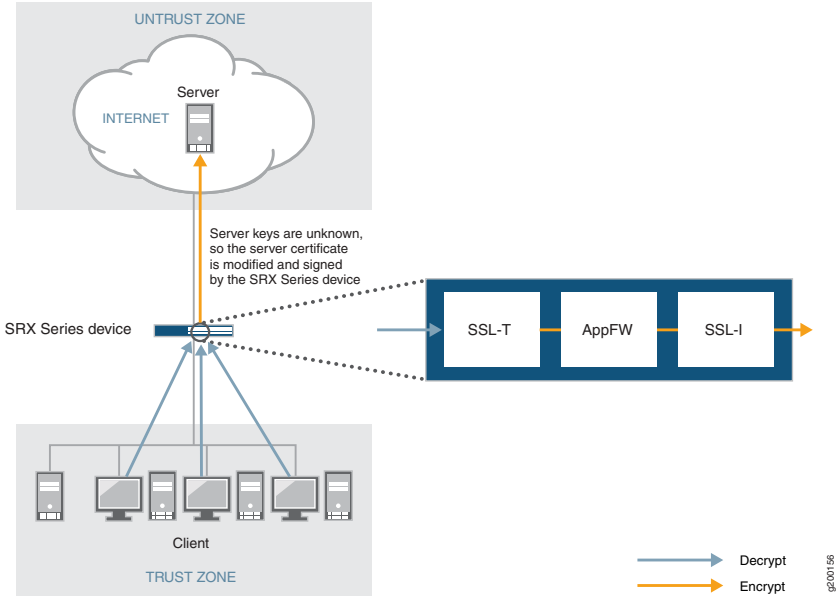
key (provided as a part of the proxy profile configuration). When the client accepts such a certificate, it sends a shared pre-master key encrypted with the public key on the certificate. Because SSL forward proxy replaced the original key with its own key, it is able to receive the shared pre-master key. Decryption and encryption take place in each direction (client and server), and the keys are different for both encryption and decryption.

Figure 6 on page 482 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 6: SSL Forward Proxy on an Encrypted Payload



This topic has the following sections:

- Supported Ciphers in Proxy Mode on page 483
- Server Authentication on page 483
- Root CA on page 484
- Trusted CA List on page 484
- Session Resumption on page 485
- SSL Proxy Logs on page 485

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Supported Ciphers in Proxy Mode

An SSL cipher comprises encryption ciphers, authentication method, and compression. Table 240 on page 483 displays a list of supported ciphers. NULL ciphers are excluded.

The following SSL protocols are supported:

- SSLv3
- TLS1

Table 240: 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
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

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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.

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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 241 on page 485.

Table 241: 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 whitelisted.
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 242 on page 485 identifies the source of the message. Other fields are descriptively labeled.

Table 242: 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.

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Table 242: SSL Proxy Log Prefixes (continued)

Prefix	Description
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 on page 486
- About the SSL Proxy Profiles Page on page 494
- Certificates Overview on page 617

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 487.
- Edit, clone, or delete SSL proxy policy intents—See "Editing, Cloning, and Deleting SSL Proxy Policy Intents" on page 490.
- 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

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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 532.

Field Descriptions

Table 243 on page 487 describes the fields on SSL Proxy Policy page.

Table 243: 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

- SSL Forward Proxy Overview on page 481

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 244 on page 488

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 redeploy 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 244: Create SSL Proxy Policy Intent Settings

Setting	Guideline

Source	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.
	
	NOTE: A source IP address value of **Any** signifies any IP address from any site.
	
	Specify one or more source endpoints in one of the following ways:
	
	• Click the add icon (**+**) and select the endpoints from the list of previously configured endpoints.
	• Filter the endpoints by entering a search term or one or more predefined keywords in the **Source** field and select one or more endpoints.
	Table 245 on page 490 displays the list of predefined keywords.
	• Click the **View more results** link to view additional configured endpoints. The list of endpoints is displayed in the **End Points** panel on the right.
	Do one of the following:
	  • To add one endpoint at a time, select an endpoint and click the check mark icon (✓) that appears when you hover over the endpoint.
	  • To add multiple endpoints, select one or more endpoints that you want to add, click the check mark icon (✓) at the top of the **End Points** panel, and select **Source**.
	  • Filter the endpoints by entering a search term or one or more predefined keywords in the **End Points** field and select one or more endpoints.
	  Table 245 on page 490 displays the list of predefined keywords.
	
	NOTE: You can also create endpoints by clicking the add icon (**+**) in the End Points panel. Table 246 on page 490 displays the endpoints that can be created.

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Table 244: Create SSL Proxy Policy Intent Settings (continued)

Setting	Guideline

Destination	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.
	
	NOTE: A destination IP address value of **Any** signifies traffic going to the Internet (any address). Traffic within sites (internal traffic) is not covered by the destination IP address value of **Any**.
	
	If you want to cover traffic between two sites, ensure that the sites are included in both the source and destination endpoints.
	
	Specify one or more destination endpoints in one of the following ways:
	
	• Click the add icon (**+**) and select the endpoints from the list of previously configured endpoints.
	• Filter the endpoints by entering a search term or one or more predefined keywords in the **Destination** field and select one or more endpoints.
	Table 245 on page 490 displays the list of predefined keywords.
	• Click the **View more results** link to view additional configured endpoints. The list of endpoints is displayed in the **End Points** panel on the right.
	Do one of the following:
	  • To add one endpoint at a time, select an endpoint and click the check mark icon (✓) that appears when you hover over the endpoint.
	  • To add multiple endpoints, select one or more endpoints that you want to add, click the check mark icon (✓) at the top of the **End Points** panel, and select **Destination**.
	  • Filter the endpoints by entering a search term or one or more predefined keywords in the **End Points** field and select one or more endpoints.
	  Table 245 on page 490 displays the list of predefined keywords.
	
	NOTE: You can also create endpoints by clicking the add icon (**+**) in the End Points panel. Table 246 on page 490 displays the endpoints that can be created.

SSL Proxy Profile	Specify an SSL proxy profile to associate with the SSL proxy policy intent in one of the following ways: • Click the add icon (**+**) and select the SSL proxy profile from the list of previously configured profiles. • Filter the profiles by entering a search term in the **SSL Proxy Profile** field and select a profile. • Create a SSL proxy profile—Click the **Add New Profile** link. The Create SSL Proxy Profiles page appears. See"Creating SSL Forward Proxy Profiles" on page 496. NOTE: You can also create profiles by clicking the add icon (**+**) in the End Points panel and selecting **SSL Proxy Profiles**. • Click the **View more results** link to view additional configured profiles. The list of SSL proxy profiles is displayed in the **End Points** panel on the right. To add a profile, select it and click the check mark icon (✓) that appears when you hover over the profile.
Details	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. Enter the description of the SSL proxy policy intent in the second text box.

Table 245: Keywords for Filtering Endpoints

Endpoint	Keyword	Applicable to
Address or Address Group	**addr** or **ADDR**	Source Destination
Site	**site** or **SITE**	Source Destination
Site Group	**stgp** or **STGP**	Source Destination
Department	**dept** or **DEPT**	Source Destination

Table 246: Creating Endpoints

Endpoint	Procedure
Address or Address Group	Click the add icon (**+**) and select **Address**. The Create Addresses page appears. See "Creating Addresses or Address Groups" on page 507.
Site Group	Click the add icon (**+**) and select **Site Group**. The Create Site Group page appears. See "Creating Site Groups" on page 584.
Department	Click the add icon (**+**) and select **Department**. The Create Department page appears. See "Creating a Department" on page 525.

Related Documentation

- SSL Forward Proxy Overview on page 481

Editing, Cloning, and Deleting SSL Proxy Policy Intents

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 on page 491
- Cloning SSL Proxy Policy Intents on page 491
- Deleting SSL Proxy Policy Intents on page 492

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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 487.

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 487.

4. Click **Save** to save your changes.

   The SSL proxy policy intent is cloned and a confirmation message is displayed.

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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 on page 486

Understanding How SSL Proxy Policy Intents Are Applied

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 polices 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.

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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 on page 493
- Example 2: Firewall Policy Intent and SSL Proxy Policy Intent Do Not Match on page 493
- Example 3: Applying SSL Proxy Policy Intents on Internal (Site-to-Site) Traffic on page 494

Example 1: Firewall Policy Intent and SSL Proxy Policy Intent Match

Table 247 on page 493 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 247: (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 248 on page 494 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.

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Table 248: (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 249 on page 494 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 249: (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 on page 481
- Configuring and Deploying an SSL Forward Proxy Policy on page 502

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:

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- Create an SSL proxy profile—See "Creating SSL Forward Proxy Profiles" on page 496.
- Edit, clone, or delete an SSL proxy profile—See "Editing, Cloning, and Deleting SSL Forward Proxy Profiles" on page 500.
- 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 251 on page 495 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 250 on page 495 describes the fields on the SSL Proxy Profiles page.

Table 250: Fields on the SSL Proxy Profiles Page

Field	Description
Name	Name of the SSL proxy profile.
Preferred Cipher	Preferred cipher associated with the profile.
Custom Ciphers	The set of ciphers, if the preferred cipher is **Custom**, which the SSH server uses to perform encryption and decryption functions.
Exempted Address	Addresses that can are exempted from SSL forward proxy processing.
Description	Description of the SSL proxy profile.
Root Certificate	Root certificate associated with the SSL proxy profile.

Table 251: View SSL Forward Proxy Profile Details Page Fields

Field	Description
General Information	
Name	Name of the SSL proxy profile.
Description	Description of the SSL proxy profile.
Preferred Cipher	Preferred cipher associated with the proxy profile.
Custom Ciphers	The set of ciphers, if the preferred cipher is **Custom**, which the SSH server uses to perform encryption and decryption functions.
Flow Trace Enabled	Indicates whether flow tracing is enabled or disabled.

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Table 251: View SSL Forward Proxy Profile Details Page Fields (continued)

Field	Description
Certificates	Displays the root certificate and the trusted certificate authorities associated with the root certificate.
Exempted Address	Addresses that can are exempted from SSL forward proxy processing.
Exempted URL Categories	URL categories that are exempted from SSL forward proxy processing.
Actions	
Ignore	Indicates whether server authentication failure is ignored (**Enabled**) or not (**Disabled**).
Session Resumption	Indicates whether session information is cached to enable session resumption (**Enabled**) or not (**Disabled**).
Logging	If logging is enabled, indicates the type of events that are logged.
Renegotiation	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 on page 486

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.

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3. Complete the configuration according to the guidelines provided in Table 252 on page 497.

   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 252: 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	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: • **None** (Default)—Do not specify a preferred cipher. • **Medium**—Use ciphers with key strength of 128 bits or greater. • **Strong**—Use ciphers with key strength of 168 bits or greater. • **Weak**—Use ciphers with key strength of 40 bits or greater. • **Custom**—Configure a custom cipher suite.

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Table 252: Creating SSL Forward Proxy Profile Settings (continued)

Setting	Guideline
Custom Ciphers	If you specified **Custom** as the preferred cipher, you can define a custom cipher list by selecting ciphers. Select the set of ciphers that the SSH server can use to perform encryption and decryption functions. The available custom ciphers are: • rsa-with-RC4-128-md5—RSA, 128- bit RC4, MD5 hash • rsa-with-RC4-128-sha—RSA, 128-bit RC4, SHA hash • rsa-with-des-cbc-sha—RSA, DES/CBC, SHA hash • rsa-with-3DES-ede-cbc-sha—RSA, 3DES EDE/CBC, SHA hash • rsa-with-aes-128-cbc-sha—RSA, 128-bit AES/CBC, SHA hash • rsa-with-aes-256-cbc-sha—RSA, 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, 256 bit AES/GCM, SHA384 hash • rsa-with-aes-256-cbc-sha256—RSA, 256 bit AES/CBC, SHA256 hash • rsa-with-aes-128-gcm-sha256—RSA, 128 bit AES/GCM, SHA256 hash • rsa-with-aes-128-cbc-sha256—RSA, 256 bit AES/CBC, SHA256 hash • ecdhe-rsa-with-aes-256-gcm-sha384—ECDHE, RSA, 256 bit AES/GCM, SHA384 hash • ecdhe-rsa-with-aes-256-cbc-sha384—ECDHE, RSA, 256 bit AES/CBC, SHA384 hash • ecdhe-rsa-with-aes-256-cbc-sha—ECDHE, RSA, 256 bit AES/CBC, SHA hash • ecdhe-rsa-with-aes-3des-ede-cbc-sha—ECDHE, RSA, 3DES, EDE/CBC, SHA hash • ecdhe-rsa-with-aes-128-gcm-sha256—ECDHE, RSA, 128 bit AES/GCM, SHA256 hash • ecdhe-rsa-with-aes-128-cbc-sha256—ECDHE, RSA, 128 bit AES/CBC, SHA256 hash • ecdhe-rsa-with-aes-128-cbc-sha—ECDHE, RSA, 128 bit AES/CBC, SHA hash
Flow Trace	Select this option to enable flow tracing to enable the troubleshooting of policy-related issues.
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	Choose whether you want to add all trusted certificates present on the device (**All**) or select specific trusted certificates. Before establishing a secure connection, the SSL proxy checks CA certificates to verify signatures on server certificates. NOTE: • 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. • 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.
Actions	

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Table 252: Creating SSL Forward Proxy Profile Settings (continued)

Setting	Guideline
Exempted Addresses	Exempted addresses include addresses that you want to exempt from undergoing SSL proxy processing. To specify exempted addressees, select one or more addresses in the **Available** column and click the forward arrow to confirm your selection. The selected addresses are then displayed in the **Selected** column. These addresses are used to create whitelists that bypass SSL forward proxy processing. Because SSL encryption and decryption are complicated and expensive procedures, network administrators can selectively bypass SSL proxy processing for some sessions. 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 whitelists. NOTE: You can also add addresses by clicking **Add New Address**. The Create Addresses page appears. See "Creating Addresses or Address Groups" on page 507.
Exempted URL Categories	Select the previously defined URL categories to create whitelists that bypass SSL forward proxy processing. The selected URL categories are exempted during SSL inspection.
Server Auth Failure	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. 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.
Session Resumption	Select this check box to disable session resumption. This check box is cleared by default. 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.
Logging	Select one or more events to be logged. You can choose to log all events, warnings, general information, errors, or different sessions (whitelisted, allowed, dropped, or ignored). Logging is disabled by default.
Renegotiation	Select one of the following options if a change in SSL parameters requires renegotiation: • **None** (default)—Indicates that renegotiation is not required. • **Allow**—Allow secure and nonsecure renegotiation. • **Allow-secure**—Allow secure negotiation only. • **Drop**—Drop session on renegotiation request. 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. When session resumption is enabled, session renegotiation is useful in the following situations: • Cipher keys need to be refreshed after a prolonged SSL session. • Stronger ciphers need to be applied for a more secure connection.

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Related Documentation

- About the SSL Proxy Policy Page on page 486

Editing, Cloning, and Deleting SSL Forward Proxy Profiles

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 on page 500
- Cloning SSL Forward Proxy Profiles on page 500
- Deleting SSL Forward Proxy Profiles on page 501

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.

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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 on page 496
- About the SSL Proxy Profiles Page on page 494

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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 619.

4. (Optional) Install the imported certificate on one or more sites (on the Install Certificate page); see "Installing and Uninstalling Certificates" on page 621.

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 496.

   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 487.

8. Deploy the SSL proxy policy; see "Deploying Policies" on page 532.

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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 on page 481
- Understanding How SSL Proxy Policy Intents Are Applied on page 492

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CHAPTER 37

Managing Shared Objects

- Addresses and Address Groups Overview on page 505
- About the Addresses Page on page 506
- Creating Addresses or Address Groups on page 507
- Editing, Cloning, and Deleting Addresses and Address Groups on page 509
- Services and Service Groups Overview on page 511
- About the Services Page on page 511
- Creating Services and Service Groups on page 512
- Creating Protocols on page 514
- Editing and Deleting Protocols on page 517
- Editing, Cloning, and Deleting Services and Service Groups on page 518
- Application Signatures Overview on page 520
- About the Application Signatures Page on page 520
- Creating Application Signature Groups on page 521
- Editing, Cloning, and Deleting Application Signature Groups on page 522
- About the Departments Page on page 524
- Creating a Department on page 525
- Modifying a Department on page 526
- Deleting a Department on page 526

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.

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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 on page 506
- Creating Addresses or Address Groups on page 507
- Editing, Cloning, and Deleting Addresses and Address Groups on page 509

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 507.
- Modify, clone, or delete an address or address group. See "Editing, Cloning, and Deleting Addresses and Address Groups" on page 509.
- 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 241.
- Show or hide columns about the address or address group. See "Sorting Objects" on page 241.
- Search for an address or address group. See "Searching for Text in an Object Data Table" on page 242.

Field Descriptions

Table 253 on page 506 provides guidelines on using the fields on the Addresses page.

Table 253: 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.

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Table 253: Fields on the Addresses Page (continued)

Field	Description
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 on page 505
- Creating Addresses or Address Groups on page 507
- Editing, Cloning, and Deleting Addresses and Address Groups on page 509

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 254 on page 507 and Table 255 on page 508.

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 254: 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. Table 255 on page 508 describes address group configuration parameters.

Table 254: Fields on the Create Addresses Page (continued)

Field	Description
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.

Type	Select a type of address and fill in the corresponding fields. Available types are:
	• Host
	  ◦ Host IP—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 **Look up hostname**.
	  ◦ Hostname—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 **Look up IP address**. For example, enter www.company.com and click **Look up IP address**. Hostname lookup is supported for IPv4 and IPv6 addresses.
	• Range
	  ◦ Start Address—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.
	  ◦ End Address—Enter an ending IPv4 or IPv6 address for the address range. The range is validated after you enter the address.
	NOTE: 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.
	• Network
	  ◦ Network—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.
	  ◦ Subnet Mask—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.
	• Wildcard
	  ◦ Network—Enter the network IPv4 or IPv6 address. For example: 192.0.2.0 or 2001:db8:4136:e378:8000:63bf:3fff:fdd2.
	  ◦ Wildcard Mask—Enter the wildcard mask for the network range. For example: 0.0.0.255.
	• DNS Host
	  ◦ DNS Name—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.

Table 255: 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. Table 254 on page 507 describes address group configuration parameters.

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Table 255: Address Group Settings (continued)

Field	Description
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 **Available** column to the **Selected** 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 on page 505
- About the Addresses Page on page 506
- Editing, Cloning, and Deleting Addresses and Address Groups on page 509

Editing, Cloning, and Deleting Addresses and Address Groups

You can edit, clone, and delete addresses and address groups from the **Addresses** page.

- Editing Addresses and Address Groups on page 509
- Cloning Addresses and Address Groups on page 510
- Deleting Addresses and Address Groups on page 510

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 507.

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

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When you click **OK**, the modified address or address group is displayed on the **Addresses** page.

NOTE: When you edit an address that is a 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 532 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.

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If you select **Yes**, the selected address or address group is deleted, unless it is referenced in a policy.

Related Documentation

- Addresses and Address Groups Overview on page 505
- About the Addresses Page on page 506
- Creating Addresses or Address Groups on page 507
- Viewing Object Details on page 14
- Sorting Objects on page 15
- Searching for Text in an Object Data Table on page 15

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

- About the Services Page on page 511
- Creating Services and Service Groups on page 512
- Editing, Cloning, and Deleting Services and Service Groups on page 518

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.

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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 512.
- Modify, clone or delete a service or service group. See "Editing, Cloning, and Deleting Services and Service Groups" on page 518.
- 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 241.
- Show or hide columns about the services or service groups. See "Sorting Objects" on page 241.
- Search a specific service or service group. See "Searching for Text in an Object Data Table" on page 242.

Field Descriptions

Table 256 on page 512 provides guidelines on using the fields on the **Services** page.

Table 256: 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

- Services and Service Groups Overview on page 511
- Creating Services and Service Groups on page 512
- Editing, Cloning, and Deleting Services and Service Groups on page 518

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.

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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 257 on page 513.

   If you want to configure a service group, see Table 258 on page 513.

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 257 on page 513 provides guidelines on using the fields to create a service.

Table 257: Service Settings

Field	Description
Object Type	Select **Service** or **Service Group**. If you select **Service Group**, 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	Select the protocol you want to associate with the service. You can use existing protocols that are listed in the **Protocols** table. You can also create a new protocol, or edit existing protocols: • To create a new protocol, click on the add icon (+). See "Creating Protocols" on page 514. • To edit an existing protocol, click on the edit icon (pencil symbol). See "Editing and Deleting Protocols" on page 517.

Table 258 on page 513 provides guidelines on using the fields to create a service group.

Table 258: Service Group Settings

Field	Description
Object Type	Select **Service** or **Service Group**. If you select **Service Group**, then the screen changes so you can select the services you want to include in your service group.

Table 258: Service Group Settings (continued)

Field	Description
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 **Available** column to the **Selected** 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 on page 511
- About the Services Page on page 511
- Editing, Cloning, and Deleting Services and Service Groups on page 518
- Creating Protocols on page 514
- Editing and Deleting Protocols on page 517

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.

3. Click the add icon (+) that appears about the **Protocols** table.

   The **Create Protocol** page appears.

4. Complete the configuration of the protocol according to the guidelines provided in Table 259 on page 515 and Table 260 on page 515.

5. 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.

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Table 259 on page 515 provides guidelines on using the fields to create a protocol.

Table 259: Fields on Create Protocol Page Settings

Field	Description
General Information	
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 Table 260 on page 515 for the other protocol types.
Destination Port	Enter a destination port number for TCP. The range is from 0 to 65, 535.
Advanced Settings	
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 260 on page 515 includes the settings and guidelines for the various protocol types.

Table 260: Create Protocol Type Settings

Field	Description
UDP	
Destination Port	Enter a destination port number for UDP. This is a value or value range from 0 through 65,535.
Advanced Settings	
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.
ICMP	
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.

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Table 260: Create Protocol Type Settings (continued)

Field	Description
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.
SUN-RPC	
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.
MS-RPC	
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.
ICMPv6	
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.

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Related Documentation

- Editing and Deleting Protocols on page 517
- About the Services Page on page 511
- Creating Services and Service Groups on page 512

Editing and Deleting Protocols

You can edit and delete protocols through the **Services** page.

- Editing Protocols on page 517
- Deleting Protocols on page 518

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 514.

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

- Services and Service Groups Overview on page 511
- About the Services Page on page 511
- Creating Services and Service Groups on page 512
- Editing, Cloning, and Deleting Services and Service Groups on page 518
- Creating Protocols on page 514

Editing, Cloning, and Deleting Services and Service Groups

You can edit, clone, and delete services and service groups from the **Services** page.

- Editing Services and Service Groups on page 518
- Cloning Services or Service Groups on page 519
- Deleting Services and Service Groups on page 519

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**.

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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 512.

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

- Services and Service Groups Overview on page 511
- About the Services Page on page 511

- Creating Services and Service Groups on page 512

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

- About the Application Signatures Page on page 520
- Creating Application Signature Groups on page 521
- Editing, Cloning, and Deleting Application Signature Groups on page 522
- Signature Database Overview on page 613

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 521.
- Modify, clone, or delete an application signature group. See "Editing, Cloning, and Deleting Application Signature Groups" on page 522.
- 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 241.
- Show or hide columns in the **Application Signatures**. See "Sorting Objects" on page 241.

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- Search for a specific application signature or application signature group. See "Searching for Text in an Object Data Table" on page 242.
- 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 261 on page 521 provides guidelines on using the fields on the **Application Signatures** page.

Table 261: 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 **Category** can be Messaging, Web, Infrastructure, Remote-Access, Multimedia, and so on.
Subcategory	UTM subcategory of the application signature. For example, the value of **Subcategory** 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 **Risk** 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 on page 520
- Creating Application Signature Groups on page 521
- Editing, Cloning, and Deleting Application Signature Groups on page 522
- Signature Database Overview on page 613
- About the Active Database Page on page 614

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 262 on page 522.
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 262 on page 522 provides guidelines on using the fields on the **Create Application Signature Group** page.

Table 262: 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 **Add Application Signatures** page, select the check boxes next to the signatures you want to add to the group.

Related Documentation

- Application Signatures Overview on page 520
- About the Application Signatures Page on page 520
- Editing, Cloning, and Deleting Application Signature Groups on page 522
- Signature Database Overview on page 613
- About the Active Database Page on page 614

Editing, Cloning, and Deleting Application Signature Groups

You can edit, clone, and delete application signature groups from the **Application Signatures** page.

- Editing Application Signature Groups on page 523
- Cloning Application Signature Groups on page 523
- Deleting Application Signature Groups on page 523

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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 521.

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

- Application Signatures Overview on page 520
- About the Application Signatures Page on page 520
- Creating Application Signature Groups on page 521
- Signature Database Overview on page 613

About the Departments Page

To access this page, click **Configuration > Network Services > Shared Objects > Departments**.

You can use the Departments page to create, view, edit, 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:

- Create a Department. Click **Configuration > Shared Objects > Departments > Create**. See "Creating a Department" on page 525.
- Edit a Department. Select a department and click **Edit**. See "Modifying a Department" on page 526.
- Delete a department. Select a department and click **Delete**. Before you delete a department, you must reassign all the LAN segments that are assigned to the department. You cannot delete a department that has a LAN segment assigned to it. See "Deleting a Department" on page 526.

Field Descriptions

Table 263 on page 524 shows the descriptions of the fields on the **Departments** page.

Table 263: Fields on the Departments Page

Field	Description
Name	Displays the name of the department.
Site/LAN Segments	Displays the LAN segments that are assigned to the department.

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Table 263: Fields on the Departments Page (continued)

Field	Description
VPN	Displays the VPN to which the department is assigned.
Description	Displays a description of the department.

Related Documentation

- Creating a Department on page 525
- Modifying a Department on page 526
- Deleting a Department on page 526

Creating a Department

You can create new departments from the **Configuration > Shared Objects > Departments** page.

To create a department:

1. Click the add icon (**+**) on the **Departments** page.

   The **Create Department** page appears.

2. Complete the configuration settings according to the guidelines provided in Table 264 on page 525.

Table 264: Fields on the Create Departments Page

Field	Description
Name	Enter a name for the department. Enter a unique string of 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	Select a VPN to which you want to assign the department.

3. Click **OK**.

   The new department is displayed on the **Departments** page.

Related Documentation

- About the Departments Page on page 524
- Modifying a Department on page 526
- Deleting a Department on page 526

Modifying a Department

You can modify a department on the **Configuration > Shared Objects > Departments** page.

To modify a department:

1. Select a department and click the edit icon on the **Departments** page.

   The **Edit Department** page appears.

2. Complete the configuration settings according to the guidelines provided inTable 265 on page 526.

Table 265: Fields on the Edit Department Page

Field	Description
Name	Modify the name of the department, as needed.
Description	Modify the description of the department.
VPN	Select a VPN to which you want to assign the department.

3. Click **OK**.

   The updated department is displayed on the **Departments** page.

Related Documentation

- About the Departments Page on page 524
- Creating a Department on page 525
- Deleting a Department on page 526

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 if it has policies associated with it or LAN segments assigned to it. Before you delete the department, you must reassign the LAN segments assigned to that department.

To delete a department:

1. Select the department that you want to delete.

2. Click the delete icon (**X**).

   The Delete Department page appears.

3. Click **OK** to confirm deletion.

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The department is deleted.

Related Documentation

- About the Departments Page on page 524
- Creating a Department on page 525
- Modifying a Department on page 526

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CHAPTER 38

Managing Deployments

- Deploying Policies Overview on page 529
- About the Deployments Page on page 530
- Using the Deployment Icon to Deploy Policies on page 531
- Deploying Policies on page 532

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 531.

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NOTE: The deployment icon is highlighted in orange if there are undeployed configurations.

- Use the **Deployments** page. See "About the Deployments Page" on page 530.
- Select a firewall, NAT or SD-WAN policy from its respective landing pages and click **Deploy**. For more information, see "Deploying Policies" on page 532.

Related Documentation

- Using the Deployment Icon to Deploy Policies on page 531
- About the Deployments Page on page 530
- Deploying Policies on page 532

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 532.

Field Descriptions

Table 266 on page 530 provides guidelines on using the fields on the **Deployments** page.

Table 266: Fields on the Deployments Page

Field	Description
Awaiting Deployment	The **Awaiting Deployment** tab displays all the policies that are awaiting deployment. The following fields provide more information about the undeployed policies: • **Name**—Name of the policy that needs to be deployed. • **Deployment Type**—Type of the policy that needs to be deployed. • **Summary**—Description of the policy. • **Owner**—The tenant who has created the policy. • **Last updated**—The last time the policy was updated. If you want to deploy a policy, select the policy and click **Deploy**. The policy is deployed and will no longer appear in the **Awaiting Deployment** tab. If you want to refresh the **Awaiting Deployment** tab, click the refresh icon provided below the details table.

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Table 266: Fields on the Deployments Page (continued)

Field	Description
Scheduled	The **Scheduled** 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: • **Name**—Name of the policy. • **Deployment Type**—Type of the policy that needs to be deployed. • **Summary**—Description of the policy. • **Schedule**—The date and time at which the policy is scheduled to be deployed. • **Status**—Displays whether the scheduled policy has been deployed or not. • **Next Run**—Date and time when the scheduled deployments will be run. If you want to deploy a scheduled policy immediately, select the policy and click **Deploy Now**. If you want to modify the deployment schedule of a policy, select the policy and click the edit icon (pencil icon). The **Deploy** page appears displaying the current scheduling information. See "Deploying Policies" on page 532, to update the schedule.
History	The **History** tab displays all the policies that have been deployed. The following fields provide more information about deployed policies: • **Name**—Name of the deployed policy. • **Deployment Type**—Type of the deployed policy. • **Summary**—Description of the policy. • **Status**–Displays the status of the deployed policy. • **Job Details**—Details of the job. • **Deployed On**—Date and time the policy was deployed. If you want to redeploy a policy, select the policy and click **Re-Deploy**. The policy is redeployed and the **History** tab details changes to reflect this information.

Related Documentation

- Deploying Policies Overview on page 529
- Using the Deployment Icon to Deploy Policies on page 531
- Deploying Policies on page 532

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 267 on page 532.

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 532.

Table 267 on page 532 provides guidelines on using the fields on the deployment panel.

Table 267: Fields on the Deployment Panel

Field	Description
Awaiting Deployment	The **Awaiting Deployment** tab displays all the policies that are awaiting deployment.
In Progress	The **In Progress** tab displays all the policies that are currently being deployed.

Related Documentation

- Deploying Policies Overview on page 529
- About the Deployments Page on page 530
- Deploying Policies on page 532

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 531.

     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**.

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- 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 268 on page 533.

3. Click **Deploy**.

Table 268 on page 533 provides guidelines on using the fields on the **Deploy** page.

Table 268: Fields on the Deploy Page

Field	Description
Summary	
Policies	The summary of the policy that is to be deployed.
Choose Deployment Time	
Type	• Select **Run now** if you want to deploy the policy immediately. • Select **Schedule at a later time** if you want to schedule the deployment for a later date and time.

Related Documentation

- Deploying Policies Overview on page 529
- Using the Deployment Icon to Deploy Policies on page 531
- About the Deployments Page on page 530

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CHAPTER 39

Managing Sites

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- Local Breakout Overview on page 537
- Multihoming Overview on page 538
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- Creating Spoke Sites for Hybrid WAN Deployment on page 541
- Creating Local Service Edge Sites for Hybrid WAN Deployment on page 543
- Creating Regional Service Edge Sites for Hybrid WAN Deployment on page 545
- Creating On-Premise Hub Sites for SD-WAN Deployment on page 547
- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549
- Creating Cloud Hub Sites for SD-WAN Deployment on page 554
- Creating Cloud Spoke Sites for SD-WAN Deployment on page 556
- Provisioning a Cloud Spoke Site in AWS VPC on page 561
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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 on-premise sites and cloud sites. You can also use this page to view site configuration and device activation information.

Tasks You Can Perform

You can perform the following tasks from this page:

- View information about a site. Click the details icon that appears when you hover over the name of a site or click **More** > **Detailed View**. See "Viewing Object Details" on page 241.
- Click on the site name to view the site details and to manage the site configurations for a single site. See "Managing a Single Site" on page 566.
- Configure a site by uploading a JSON file. . See "Importing Multiple Sites" on page 565
- View device activation logs. Click **Device Activation Logs**. See "Viewing the History of Tenant Device Activation Logs" on page 100.
- Create the following sites for a Hybrid WAN topology:
  - Create a spoke site. See "Creating Spoke Sites for Hybrid WAN Deployment" on page 541.
  - Create a local service edge site. See "Creating Local Service Edge Sites for Hybrid WAN Deployment" on page 543.
  - Create a regional service edge site. See "Creating Regional Service Edge Sites for Hybrid WAN Deployment" on page 545.
- Create the following sites for an SD-WAN topology:
  - Create on-premise hub site. See "Creating On-Premise Hub Sites for SD-WAN Deployment" on page 547.
  - Create on-premise spoke site. See "Creating On-Premise Spoke Sites for SD-WAN Deployment" on page 549.
  - Create a cloud hub site. See "Creating Cloud Hub Sites for SD-WAN Deployment" on page 554.
  - Create a cloud spoke site. See "Creating Cloud Spoke Sites for SD-WAN Deployment" on page 556.
- Delete a site. Select a site and click the delete icon (**X**).
- Configure a site. Select a site and click **Configure Site**. See "Configuring a Single Site" on page 567.

Field Descriptions

Table 269 on page 536 describes the fields on the **Sites** page.

Table 269: Fields on the Sites Page

Field	Description
Site Name	Displays the name of the tenant site.
Location	Displays the location of the tenant site.

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Table 269: Fields on the Sites Page (continued)

Field	Description
Connected To	Displays the point of presence (POP) that the site is connected to.
State	View the current status of the tenant site. The possible statuses are **Active**, **Provisioned**, and **Failed**.
Device Status	Displays the device status. The status indicates whether or not a device is provisioned for the site.
Role	Indicates whether the site is a hub site or a spoke site.
Active Services	Displays the number of active services configured for the site.
Device Serial Number	Displays the serial number of the device that is provisioned for the site.
Local Breakout	Indicates whether local breakout is enabled or disabled on the site.
Auto-NAT	Indicates whether **Autocreate Source NAT Rule** is enabled or disabled on the site.

Related Documentation

- Local Breakout Overview on page 537
- Creating Cloud Hub Sites for SD-WAN Deployment on page 554
- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549

Local Breakout Overview

The local breakout feature enables Contrail Service Orchestration (CSO) to route Internet traffic directly from a site in a software-defined WAN (SD-WAN) implementation. In the full mesh topology, local breakout is supported on the branch sites. In the hub-and-spoke topology, local breakout is supported on the on-premise hub site and the spoke site. If local breakout is not enabled on the spoke site, then Internet traffic is routed from the hub site if local breakout is enabled on the hub site. Local breakout is not supported on cloud hub sites.

When creating sites, you need to enable local breakout and configure the WAN links that are used for local breakout traffic on the site. You also need to specify whether the WAN links are used exclusively for local breakout traffic or for both local breakout and non-Internet traffic. If a specific WAN link is used exclusively for local breakout, then overlay tunnels for that WAN link are not created. Enabling a WAN link to be used exclusively for local breakout traffic reduces the number of overlay tunnels created between spoke and hub sites, thereby conserving bandwidth.

You can create a source Network Address Translation (NAT) rule while enabling local breakout on a spoke site. The source NAT rule is interface-based and is implicitly defined and applied to the site. This automatically created source NAT rule is not visible on the **NAT Policies** page. The automatically created source NAT rule has the least priority

among rules and can be overridden by a user-created NAT policy. The automatically created source NAT rule can be enabled and disabled only from the **Configuring a Site** page. For an on-premise hub site, the option for automatic creation of source NAT rule is not available on the **Configuring a Site** page, and you need to create a source NAT rule.

You can enable SLA profiles to be associated with local breakout and map the SLA profile to static SD-WAN policies. For SLA profiles that are used for local breakout, you must select a path preference. Static SD-WAN policies are used to route the traffic of the applications defined in the static policies by using the preferred path in the attached SLA profile.

Applications are classified into the following categories:

- Cacheable applications—Cacheable applications are applications 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. Only cacheable applications and application groups are supported during the creation of local breakout-specific static SD-WAN policies.
- Noncacheable applications—Noncacheable applications 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. Noncacheable applications cannot be used for local breakout-specific static SD-WAN policies.

Related Documentation

- SLA Profiles and SD-WAN Policies Overview on page 437
- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549
- Configuring a Single Site on page 567
- Creating SLA Profiles on page 447

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:

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- 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.

Related Documentation

-

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:

- AppQOE (latency-optimized SLA)
- CPE in Full-mesh Topology
- LTE WAN backup link
- Service chain support
- Hub in Hub-Spoke Topology

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:

- NFX_SDWAN_Dual_CPE—Supports dual CPE NFX Series devices on an SD-WAN site.
- SRX_SDWAN_Dual_CPE—Supports dual CPE SRX Series devices on an SD-WAN site.

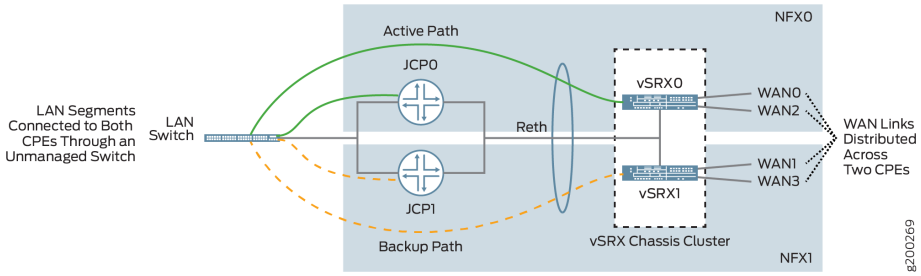
Create and Configure an SD-WAN Site

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 "Creating On-Premise Spoke Sites for SD-WAN Deployment" on page 549 and "Configuring a Single Site" on page 567.

Dual CPE Devices Logical Topology for NFX Network Services Platform

Figure 1 on page 99 shows the logical topology of the NFX Series dual CPE devices.

Figure 7: 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.

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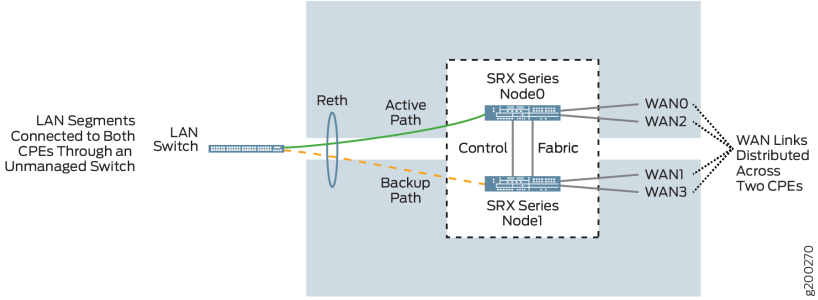
Dual CPE Devices Logical Topology for SRX Series Gateway Devices

Figure 2 on page 99 shows the logical topology of the SRX Series dual CPE devices.

Figure 8: 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.

Related Documentation

- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549
- Configuring a Single Site on page 567
- Activating Dual CPE Devices (Device Redundancy) on page 576

Creating Spoke Sites for Hybrid WAN Deployment

You create a spoke site from the **Site** page. This page describes how to create a spoke site for a tenant in hybrid WAN deployment.

To create a cloud 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 270 on page 541.

Table 270: Fields on the Add Spoke Site Page

Field	Description
General	

Table 270: Fields on the Add Spoke Site Page (continued)

Field	Description
Site Name	Enter a site name. You can use any number of alphanumeric characters, including special characters. The maximum length is 15 characters.
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
Address	
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 .
Contact Information	
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.
Connectivity Requirements 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	

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Table 270: Fields on the Add Spoke Site Page (continued)

Field	Description
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	Displays the link type for WAN underlays. The default link types supported by the device templates are listed below: • NFX_deployment_option_1—Link type for WAN_0 is MPLS and WAN_1 is Internet. • SRX_deployment_option_1—Link type forWAN_0 is MPLS and WAN_1 is Internet. • SRX_Managed_Internet_CPE—Link type forWAN_0 is Internet. • NFX_Managed_Internet_CPE—Link type for WAN_0 is Internet. • NFX_deployment_option_4—Link type for WAN_0 is Internet.

4. Review the configuration and modify the settings, if needed, from the **Summary** tab.

5. Click **OK**.

   The newly created spoke site is displayed on the **Sites** page.

Related Documentation

- About the Sites Page on page 535
- About the Site Groups Page on page 583

Creating Local Service Edge Sites for Hybrid WAN Deployment

You create 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 create the local service edge site.

To create 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 271 on page 544.

Table 271: Fields on the Add Local Service Edge Site Page

Field	Description
Site Information	
Site Name	Enter a site name. You can use any number of alphanumeric characters, including special characters. The maximum length is 15 characters.
Address	
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.
Contact Information	
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.
Configuration	
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. • Enabled : Managed—Select Managed option if you use Contrail Service Orchestration to manage the device. • Disabled : Unmanaged—Select Unmanaged option if you use another application to manage the device.

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Table 271: Fields on the Add Local Service Edge Site Page (continued)

Field	Description
PE Router	Specify the name of the device.
VRF Name	Specify the name of the virtual routing and forwarding (VRF) instance for the tenant.
Service Attachment Points	
Local Internet Breakout	Enable or disable Internet access 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.
Right Network - Internet Information	
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 created cloud site is displayed on the **Sites** page.

Related Documentation

- About the Sites Page on page 535
- About the Site Groups Page on page 583

Creating Regional Service Edge Sites for Hybrid WAN Deployment

You create 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 create a cloud site from the **Sites** page. This page describes how to create a regional service edge site for a tenant.

To create 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 272 on page 546.

Table 272: Fields on the Add Regional Service Edge Site Page

Field	Description
Site Information	
Site Name	Enter a site name. You can use any number of alphanumeric characters, including special characters. The maximum length is 15 characters.
Address	
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.
Contact Information	
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.
Configuration	
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.
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.
Service Attachment Points	

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Table 272: Fields on the Add Regional Service Edge Site Page (continued)

Field	Description
Local Internet Breakout	Click the toggle button to enable or disable the Internet access to the site.
Internet Network Name	Select the network to which the site transmits Internet traffic.

4. Click **OK**.

   The newly created cloud site is displayed on the **Sites** page.

Related Documentation

- About the Sites Page on page 535
- About the Site Groups Page on page 583

Creating On-Premise Hub Sites for SD-WAN Deployment

An on-premise hub represents an automation end point that is part of customer premise equipment at headquarter or main branch office. The hub site is connected to multiple spoke sites using the overlay connections. You create an on-premise hub site from the **Sites** page.

To create an on-premise hub site:

1. Click **Add** and select **On-Premise Hub**.

   The **Add Site for *Tenant*** page appears.

2. Complete the configuration settings according to the guidelines provided in Table 273 on page 547.

Table 273: Fields on the Add On-Premise Hub Site Page

Field	Description
General	
Site Name	Enter a site name for the tenant.
Site Type	Displays the site type. This field cannot be modified.
Tenant Topology	Displays the topology of the tenant that was selected while creating the tenant. This field cannot be modified.
Site Group	Select a site group to which you want to assign the site.
Street Address	Enter the street address of the site.
City	Enter the name of the city where the site is located.

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Table 273: Fields on the Add On-Premise Hub Site Page (continued)

Field	Description
State/Province	Select the state or province where the site is located.
ZIP/Postal Code	Enter the postal code for 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 .
Contact Name	Enter the name of the contact person at the site.
Email	Enter the e-mail address of the contact person at the site.
Phone	Enter the phone number for the site.
Connectivity Requirements	
Connectivity Requirements for the Selected Plan	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 SD-WAN features supported, and the number of links supported.
WAN Underlay Links	
WAN_0 WAN_1 WAN_2 WAN_3	Displays the WAN link. Depending on the connection plan selected, you can configure up to four WAN links per site that support SD-WAN. You can configure these links as MPLS or Internet links.
Enable WAN_0 Enable WAN_1 Enable WAN_2 Enable WAN_3	Select this check box to enable the WAN link.
Name	Displays the name of the WAN link. This field cannot be modified.
Type	Select the link type of the WAN link—MPLS or Internet.

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Table 273: Fields on the Add On-Premise Hub Site Page (continued)

Field	Description
Subscribed Bandwidth	Enter the maximum bandwidth to be allowed for a specific WAN link.
Provider	Enter the name of the Internet Service Provider (ISP).
Cost/Month	Enter the cost per month in the specified currency for the subscribed bandwidth.
Additional Requirements	
Site Type	Displays the site type. This field cannot be modified.
Local Breakout	
Enable Local Breakout	Select this option to enable local breakout on the site. Local breakout is the ability of the site to route Internet traffic directly from the site.
Links for Breakout	Select the WAN links on which you want to enable local breakout. You can also choose to use each WAN link exclusively for local breakout traffic or for both local breakout as well as WAN traffic. You cannot select previously selected default WAN links to be used exclusively for local breakout traffic. NOTE: You must select at least one WAN link to enable breakout.
LAN Segment	
NOTE: A hub site does not require a LAN Segment. Please click next and proceed.	

3. Review the configuration and modify the settings, if needed, from the **Summary** tab.

4. Click **OK**.

   The newly created site is displayed on the **Sites** page.

Related Documentation

- About the Sites Page on page 535
- Local Breakout Overview on page 537

Creating 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 create an on-premise spoke site from the **Sites** page.

You can also add an SD-WAN on-premise site using dual CPE devices. The workflow to add a site with dual CPE devices is similar to the single CPE device. When you create a

site, select the appropriate connection plan, which supports the dual CPE solution. The device templates that support the dual CPE device solution are as follows:

- NFX_SDWAN_Dual_CPE—Supports dual CPE devices on NFX250 Network Services Platform devices.
- SRX_SDWAN_Dual_CPE—Supports dual CPE devices on SRX300 line of devices or SRX550 Services Gateway devices.

After you select the connection plan, enable the required WAN links (MPLS or Internet). These WAN links are distributed across two NFX250, SRX300 line of devices, or SRX550 devices.

NOTE: **You must enable at least one WAN link per CPE device.**

To create an on-premise spoke site:

1. Click **Add** and select **On-Premise Spoke**.

   The **Add Site for *Tenant*** page appears.

2. Complete the configuration settings according to the guidelines provided in Table 274 on page 550.

Table 274: Fields on the Add On-Premise Spoke Site Page

Field	Description
General	
Site Name	Enter a site name for the tenant. You can use alphanumeric characters and hyphen (-). The maximum length is 15 characters.
Site Type	Displays the site type. This field cannot be modified.
Tenant Topology	Displays the topology of the tenant that was selected while creating the tenant. This field cannot be modified.
Site Group	Select a site group to which you want to assign the site.
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.

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Table 274: Fields on the Add On-Premise Spoke Site Page (continued)

Field	Description
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 .
Contact Name	Enter the name of the contact person at the site.
Email	Enter the e-mail address of the contact person at the site.
Phone	Enter the phone number for the site.
Connectivity Requirements	
Connectivity Requirements for the Selected Plan	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 SD-WAN features supported, and the number of links supported.
WAN Underlay Links	
WAN_0 WAN_1 WAN_2 WAN_3	Displays the WAN link. Depending on the connection plan selected, you can configure up to four WAN links per site that support SD-WAN. You can configure these links as MPLS or Internet links.
Enable WAN_0 Enable WAN_1 Enable WAN_2 Enable WAN_3	Select this check box to enable the WAN link.
Name	Displays the name of the WAN link.
Type	Select the connection type of the WAN link—MPLS or Internet.

Table 274: Fields on the Add On-Premise Spoke Site Page (continued)

Field	Description
Access Type	Select the access type for WAN connectivity. • Ethernet—Enables WAN connectivity through Ethernet port. • LTE—Enables Long-Term Evolution (LTE) USB dongle support. NOTE: • The LTE access type is supported only on NFX250 devices. You can select only one WAN link with LTE access type. • LTE is not supported when you create an SD-WAN on-premise site with dual CPE devices. NOTE:
Subscribed Bandwidth	Enter the maximum bandwidth to be allowed for a specific WAN link. The range is 1 through 999999999. NOTE: If the access type for the WAN link is LTE, then you cannot configure the bandwidth. NOTE: LTE is not supported when you create an SD-WAN on-premise site with dual CPE devices.
Provider	Enter the name of the Internet Service Provider (ISP).
Cost/Month	Enter the cost per month of the subscribed bandwidth in the specified currency. The range is 1 through 999999999.
WAN Link (Primary or Secondary)	Displays whether it is a primary device WAN link or secondary device WAN link. This field cannot be modified and it is displayed only when you select a SRX or NFX dual CPE connection plan.
Additional Requirements Based on the connectivity requirement, the following fields are populated:	
Site Type	Displays the site type. This field cannot be modified.
Default Link	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. 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).

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Table 274: Fields on the Add On-Premise Spoke Site Page (continued)

Backup Link	Select a backup link through which traffic can be routed when the primary links are unavailable. In the hub-and-spoke topology, if an LTE link is available, the LTE link is by default selected as the backup link. You cannot change the default selection. If no LTE link is assigned, you can select any of the links other than the default links. Note that you cannot assign the backup link for exclusive breakout traffic (the **Use only for breakout traffic** 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. 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. NOTE: LTE is not supported when you create an SD-WAN on-premise site with dual CPE devices.
Enable Local Breakout	Click the toggle button to enable local breakout on the site. If you specify LTE as the access type for a WAN link, by default, the WAN link is selected as the local breakout link. NOTE: LTE is not supported when you create an SD-WAN on-premise site with dual CPE devices.
Links for Breakout	Select the WAN links on which you want to enable local breakout. You can also choose to use each WAN link exclusively for local breakout traffic or for both local breakout and WAN traffic. You cannot select previously selected default WAN links to be used exclusively for local breakout traffic.
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. If you select LTE as the access type for a WAN link, by default, the WAN link is selected as the local breakout link. NOTE: LTE is not supported when you create an SD-WAN on-premise site with dual CPE devices.
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. To enable multihoming on a site, you must select the hub-and-spoke topology when you create the tenant.
Device Redundancy	Displays the device redundancy mode. This field cannot be modified. • true—Supports dual CPE devices on an SD-WAN on-premise spoke site • false—Does not support dual CPE devices on an SD-WAN on-premise spoke site.
Add LAN Segment NOTE: You must add at least one LAN segment.	
Name	Enter a unique string of alphanumeric characters and special characters (. -). No spaces are allowed and the maximum length is 15 characters.
Port	Select a port number from the list. Depending on the device configured in the connection plan, you can specify up to two port numbers.
VLAN ID	Enter the VLAN ID that is associated with the MPLS data link in the range 1 through 4094.
Department	Select a department to which the LAN segment is to be assigned. Click **Create Department** to create a new department and assign the LAN segment to it. You group LAN segments as departments for ease of management and for applying policies at the department-level.

Table 274: Fields on the Add On-Premise Spoke Site Page (continued)

DHCP	Enable or disable DHCP. Enable DHCP to assign IP addresses by using a DHCP sever. Disable DHCP to assign static IP addresses. By default, DHCP is disabled.
IP Address Prefix	Enter one or more IPv4 prefixes for the site management network.
Subnet	Enter the subnet mask of the DHCP IP address pool.
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 of time (in seconds) for which a client can request for and hold a lease on a DHCP server. You can enter a value in the range 0 through 4,294,967,295 seconds.
Name Server	Enter the IPv4 address of the DNS server. DNS servers are used for resolving host names to IP addresses.

3. (Optional) You can review the configuration in the **Summary** tab and modify the settings, if required.

4. Click **OK**.

   The newly created site is displayed on the **Sites** page.

Related Documentation

- About the Sites Page on page 535
- Local Breakout Overview on page 537

Creating Cloud Hub Sites for SD-WAN Deployment

In a cloud site, customers access network services from the service provider's cloud. You create a cloud site from the **Sites** page. This page describes how to create a cloud site for a tenant.

To create a cloud site:

1. Select **Sites > Site Management**.

   The Sites page appears.

2. Click **Add** and select **Cloud Site**.

   The **Add Cloud Site** page appears.

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3. Complete the configuration settings in the Site Information, Configuration, and Service Attachment Points sections according to the guidelines provided in Table 275 on page 555.

Table 275: Fields on the Add Cloud Site Page

Field	Description
Site Information	
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	Select the cloud hub type—Regional Service Edge, Local Service Edge, or Cloud Hub. All three hub types are hosted on a point of presence (POP). However, on a POP, you can configure only one hub type at a time. By default, the **Cloud Hub** type is displayed when configuring a cloud site. Select **Local Service Edge** if the site is directly connected to the Internet. Traffic from customer site is serviced and forwarded to Internet. This is similar to the local breakout feature. Select **Regional Service Edge** when you want to assign common services, such as NAT or UTM to multiple sites.
Address	
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.
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.
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.
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 name for the site.

Table 275: Fields on the Add Cloud Site Page (continued)

Field	Description
GRE Interfaces	(Optional) Select one or more generic routing encapsulation (GRE) tunnel interfaces. All the interfaces configured while adding a cloud hub device are listed. A subset of the interface(s) can also be selected. To delete the interface name, click **x**.
MS Interfaces	(Optional) Select one or more multiservices (MS) tunnel interfaces. All the interfaces configured while adding a cloud hub device are listed. A subset of the interfaces can also be selected. To delete the interface name, click **x**.
VT Interfaces	(Optional) Select one or more virtual tunnel (VT) interfaces. All the interfaces configured while adding a cloud hub device are listed. A subset of the interface(s) can also be selected. To delete the interface name, click **x**.
Logical Interface Unit Range	(Optional) Enter the logical interface range for the tunnel interface. The default range is set during CSO setup. If you do not specify any value, then the default range is considered.
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.
Service Attachment Points	
Local Internet Breakout	Enable or disable Internet access to the site.
Left Subnet Prefix	Select one or more IPv4 prefixes for the management network.
Internet Network Name	Select the network to which the site transmits Internet traffic.

4. Click **OK**.

   The newly created cloud site is displayed on the **Sites** page.

Related Documentation

- About the Sites Page on page 535
- About the Site Groups Page on page 583

Creating 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 create a cloud site for a tenant.

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To create 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 276 on page 557.

Table 276: Fields on the Add Cloud Spoke Site Page

Field	Description
Site Information	
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 **Spoke**. This field cannot be modified.
Tenant Topology	Displays the topology of the tenant that was selected during the creation of the tenant. This field cannot be modified. NOTE: Only hub-and-spoke topology is supported.
Site Group	(Optional) Select a site group to which you want to assign the site. Example: cloud-spoke
Cloud Information	
Region	Select the region to which the site belongs. The regions in CSO are mapped to the regions in the AWS account. Example: Ohio

Table 276: Fields on the Add Cloud Spoke Site Page (continued)

Field	Description
VPC ID	Enter the VPC ID from the AWS account. Ensure that the VPC is attached to the Internet gateway. To obtain VPC ID: a. Log in to AWS account. b. Search for VPC service. c. Click the VPC dashboard. d. Select a VPC ID. Ensure that the VPC is attached to the Internet gateway. To check whether VPC is attached: a. Log in to AWS account. b. Search for VPC service. c. Click the Internet Gateway dashboard. d. Check whether the VPC state is **attached**. Example: vpc-6d810314
Management Subnet	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: • Use an existing subnet in AWS account • Create new
IP Prefix	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. Example: 105.0.1.5/24
Connectivity Requirements	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 SD-WAN features supported, and the number of links supported. NOTE: vSRX_AWS_SDWAN_Endpoint_option_1 template supports cloud spoke site for AWS VPC.
WAN Underlay Links	

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Table 276: Fields on the Add Cloud Spoke Site Page (continued)

Field	Description
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.
Name	Displays the name of the WAN link. This field cannot be modified.
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 Internet Service Provider (ISP).
Cost/Month	Enter the cost per month of the subscribed bandwidth in the specified currency.
Static IP Prefix	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. Example: 105.0.2.12/24
Gateway IP	Enter the IPv4 address for the gateway. Typically, the first IP address in the subnet is selected for gateway IP address. Example: 105.0.2.1
Elastic IP	Elastic IP address is a public, static IPv4 address designed for dynamic cloud computing. The public IP address is mapped to the privet 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. Example: 34.213.255.184
Traffic Type	Select the traffic type. The options available are: • DATA_ONLY—Select this option if you want to use the WAN link to transmit only data traffic. • OAM_AND_DATA—Select this option if you want to use the WAN link to transmit both data traffic and management traffic. NOTE: You must select at least one WAN link with the OAM_AND_DATA traffic type.
Additional Requirements	Based on the connectivity requirement, the following fields are populated:
Default Links	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. 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).

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Table 276: Fields on the Add Cloud Spoke Site Page (continued)

Field	Description
Backup Link	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 **Use only for breakout traffic** 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. 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.
Enable Local Breakout	Click the toggle button to enable local breakout on the site.
Links for Breakout	Select the WAN links on which you want to enable local breakout. You can also choose to use any one WAN link exclusively for local breakout traffic or for both local breakout and WAN traffic.
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.
LAN Segments	Add at least one LAN segment.
Name	Enter a unique string of alphanumeric characters and special characters (-). No spaces are allowed and the maximum length is 15 characters.
Ports	Select a LAN port from the drop-down list. NOTE: 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.
IP Address Prefix	Enter one or more IPv4 prefixes for the LAN segment for the service. 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. Example: 105.0.4.5/24
Department	Select a department to which you want to assign the LAN segment. Click **Create Department** to create a new department and assign the LAN segment to it. You group LAN segments as departments for ease of management and for applying policies at the department level.
Departments	Create departments to group LAN segments within a site. You use departments to apply specific policies to LAN segments that are members of a department.
Name	Enter a name for the department.
Description	Enter a description for the department.
VPN	Select a VPN to which you want to assign the department.

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4. Review the configuration and modify the settings, if needed, from the **Summary** tab.

5. Click **OK**.

   The newly created cloud site is displayed on the **Sites** page.

Related Documentation

- Provisioning a Cloud Spoke Site in AWS VPC on page 561
- About the Sites Page on page 535
- About the Site Groups Page on page 583

Provisioning a Cloud Spoke Site in AWS VPC

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.

To set up and monitor your network:

- Add a Cloud Spoke Site on page 561
- Configure the Cloud Spoke Site on page 562
- Download the Cloud Formation Template on page 563
- Provision the Device on AWS Server on page 563
- Activate the Device on page 564

Add a Cloud Spoke Site

To add a cloud spoke site:

1. Select **Sites > Site Management > Add > Cloud Spoke**.

2. Specify the site information such as, site name, AWS region, VPC ID, management subnet, IP prefix and click **Next**.

3. Specify vSRX_AWS_SDWAN_Endpoint_option_1 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.

4. Provide the WAN details and click **Next**.

   The WAN traffic page appears, displaying a set of values for the WAN link configuration.

5. Specify additional requirements and click **Next**.

6. Specify LAN segment information and click **Next**.

7. In the **Summary** tab, check the configuration and click **Edit** to modify the settings.

8. 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**.

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Download the Cloud Formation Template

To download the cloud formation template:

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

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. Search the public AMI for media-srxmr-vmdisk-*Version-Number*, where *Version-Number* is the vSRX software image supported on AWS, and note down the AMI ID (for your region) that corresponds to this image.

      For example, if the supported software version is 15.1X49.D133, then search the public AMI for media-srxmr-vmdisk-15.1X49-D133 and note down the AMI ID.

   b. 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 pages 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.

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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

- Creating Cloud Spoke Sites for SD-WAN Deployment on page 556

Importing Multiple Sites

You can use the **Import Sites** page to configure a site by uploading a JSON file. To configure a site by using the site upload feature, specify the site parameters in a JavaScript Object Notation (JSON) file. You can also use the site upload feature to edit the configuration information of a site. This method enables you to modify only the required parameters without going through the site creation workflow.

TIP: You can download a sample JSON file from the **Download Sample JSON** link and edit the parameters based on the requirements of the site that you want to configure.

To configure a site by uploading a JSON file:

1. Click **Sites > Add > Import Sites**.

   The **Import Sites** page is displayed.

2. Click **Browse** and navigate to the directory that contains the JSON file.

   Alternatively, download a sample JSON file by clicking the **Download Sample JSON** link and edit the parameters according to the requirements of the site.

3. Select the file and click **Open**.

4. Click **Import**.

   A success message is displayed indicating that the file is uploaded successfully.

Related Documentation

- About the Sites Page on page 535

Managing a Single Site

You can use the **Site Management** page to view the site details and to manage the site configurations for a single site. To access the page, click **Sites > Site Management >** ***Site-Name***.

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.

  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. Because the full mesh topology supports only static SD-WAN policies, SLA parameters such as throughput, latency, packet loss, delay, and jitter are not computed.

- 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.

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- 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 570.
- On the **Devices** tab, view a list of devices in your network. See "About the Devices Page" on page 308.

Related Documentation

- About the Sites Page on page 535

Configuring a Single Site

You can specify the underlay configuration of a hub device by using the **Configure Site** feature on the **Site Management** page.

You can also configure an SD-WAN on-premise spoke site using dual CPE devices. The workflow to configure a site with dual CPE devices is similar to single CPE device. You need at least one WAN link per CPE to act as a OAM_AND_DATA for redundancy, so that the individual nodes establish connectivity with CSO.

You must provide the serial number and the activation code for both the primary and the secondary devices.

To configure a site:

1. Click the **Configure Site** button on the **Sites > Site Management** page.

   The **Configure Site** ***Site Name*** page is displayed.

2. Complete the configuration settings according to the guidelines provided in Table 277 on page 567.

Table 277: Fields on the Configure Site Page

Field	Description
Site Type	Displays the site type.

Table 277: Fields on the Configure Site Page (continued)

Field	Description
Management Region	Displays the regional server with which the CPE device communicates based on the information in the device profile. This field cannot be modified.
Selected Plan	Displays the connection plan that you selected when you created the site. This field cannot be modified.
Hub Multihoming	Displays whether multihoming was enabled or disabled on the site during the creation of the site. This field cannot be modified.
Configuration	
Connectivity	
Management Connectivity	
OAM Traffic Information	Enable Operation, Administration, and Maintenance (OAM) traffic information to specify the OAM VLAN ID, IP prefix for the site management network, and gateway IP address of the default route.
VLAN ID	Specify the OAM VLAN ID for in-band management of the site.
IP Prefix	Specify one or more prefixes for the site management network. You can specify IPv4 or IPv6 addresses. Example: 10.0.2.16/24
Gateway IP	Specify the IP address of the default route for the management network. You can use an IPv4 or IPv6 address.
WAN_0, WAN_1, WAN_2, WAN_3	
WAN Interface	Displays the interface name configured in the device profile. This field cannot be modified.
Link Type	Displays the link type (MPLS or Internet) configured in the device profile. This field cannot be modified.
Address Assignment	Select the method of IP address assignment. Select DHCP to assign IP addresses by using a DHCP sever or Static to assign a static IP address.
Traffic Type	Select the traffic type. You specify whether you want to use the WAN link to transmit only data traffic or both management traffic and data traffic. You must select the traffic type as **OAM_and_DATA** when you configure a site with dual CPE devices. You need at least one WAN link per CPE to act as a OAM_AND_DATA for redundancy.
Data VLAN ID	VLAN ID associated with the WAN link.

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Table 277: Fields on the Configure Site Page (continued)

Field	Description
Local Breakout	Displays whether local breakout was enabled on the WAN link during creation of the site. This field cannot be modified. If the WAN link is selected to be used for only local breakout traffic, then the *Overlay Tunnel* section is not displayed.
Autocreate Source NAT Rule	Select this option to enable interface-based source NAT on the WAN link. NOTE: If this option is enabled for a WAN interface **W1** during the site creation 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. For example, the following zone to **W1** interface rule-set might be created: **Zone1 --> W1: Translation=Interface** **Zone2 --> W1: Translation=Interface** **Zone3 --> W1: Translation=Interface** 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: **Zone1 --> W1 : Translation=Pool-2** The manually created NAT rule is placed at a higher priority than the corresponding automatically created NAT rule. You can also add other fields (such as addresses, ports, protocols, and so on) as part of the source or destination endpoints. For example: **Zone1, Port 56578 --> W1: Translation=Pool-2**
Overlay Tunnel	
Tunnel Type	Select the tunnel type—GRE or GRE over IPsec.
Peer Device	Displays the hub device to which the site is connected.
Interface Name	Select the name of the interface of the hub device to which the MPLS or Internet link is connected.
Devices	
Assign CPE Devices	
Device Redundancy	Displays whether device redundancy is enabled or disabled for an SD-WAN on-premise spoke site.
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.

Table 277: Fields on the Configure Site Page (continued)

Field	Description
Primary Device Activation Code	Enter the activation code of the primary device that your service provider supplied for the device. NOTE: If you do not want to specify an activation code, on the **Resources > Device Templates > Template Settings** page, disable the **ACTIVATION_CODE_ENABLED** field and save the changes.
Secondary Device Serial Number	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.
Activation Code	Enter the activation code of the secondary device that your service provider supplied for the device. NOTE: If you do not want to specify an activation code, on the **Resources > Device Templates > Template Settings** page, disable the **ACTIVATION_CODE_ENABLED** field and save the changes.
Boot Image	(Optional) Select the boot image from the drop-down list. The boot image is the device image that was previously uploaded to the image management system through the "Images" page. 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. See "Uploading a Device Image" on page 129.

3. Click **OK**.

Related Documentation

- About the Sites Page on page 535
- Local Breakout Overview on page 537

Managing LAN Segments on a Tenant Site

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.

- Creating LAN Segments on page 570
- Deploying a LAN Segment on page 572
- Reassigning a LAN Segment to a Department on page 572
- Deleting LAN Segments on page 573

Creating LAN Segments

You create LAN segments from the **Sites > Site Management >** ***Site Name*** page.

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To create a LAN segment:

1. Click the add icon (**+**) on the **LAN** tab.

2. Complete the configuration settings according to the guidelines provided in Table 278 on page 571.

Table 278: Create LAN Segment Page

Field	Description
Name	Enter a unique string of alphanumeric characters and some special characters (. -). No spaces are allowed and the maximum length is 15 characters.
Ports	Select a port number from the list. Depending on the device configured in the connection plan, you can select up to two port numbers.
VLAN ID	Specify the VLAN ID that is associated with the MPLS data link.
DHCP	Enable or disable DHCP. Enable DHCP to assign IP addresses by using a DHCP sever. Disable DHCP to assign static IP addresses. By default, DHCP is disabled.
Subnet	Enter the IP address and subnet mask for the DHCP address pool. For example, 192.0.2.0/24. The subnet mask is validated as you enter it.
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 of time (in seconds) for which a client can request for and hold a lease on a DHCP server. You can enter a value in the range 0 through 4,294,967,295 seconds.
Name Server	Enter the IPv4 address of the DNS server. DNS servers are used for resolving hostnames to IP addresses.
Department	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. To create a new department and assign the LAN segment to it, click the **Create Department** link. See "Creating a Department" on page 525.

NOTE: **You must select at least one port, one IP address prefix, or one VLAN ID.**

3. Click **OK**.

   The new LAN segment is displayed on the tenant site page.

Deploying a LAN Segment

After you create a LAN segment and assign it to a department, you need deploy the LAN segment. You can deploy LAN segments from the **Sites > Site Management >** ***Site Name*** page.

To deploy a LAN segment:

1. Click the **LAN** tab.

2. Select the LAN segment that you want to deploy and click **Deploy**.

   A **Deploy LAN Segment** job is created.

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 LAN Segment to a Department

You can reassign the department assigned to a LAN segment from the **Sites > Site Management >** ***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.

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Deleting LAN Segments

You can delete a LAN segments from the **Sites** > **Site Management** > ***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 279 on page 575.

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.

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- **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:

a. Log in to the device and access the Junos OS CLI (operational mode).

b. 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.

c. Exit the Junos OS CLI and log out of the device.

Table 279: 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 Hub	View the name of the hub to which the CPE device is connected.
Device Model	View the device model.
Serial Number	View the serial number of the CPE device.
Activation Code	Specify the 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.
Recipient	View the recipient details.

Related Documentation

- http://www.juniper.net/techpubs/en_US/release-independent/junos/information-products/pathway-pages/nfx-series/product/

- About the Sites Page on page 535
- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549
- Configuring a Single Site on page 567
- About the Certificates Page on page 617

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 280 on page 576.

Table 280: Fields on the Activate Device Page

Field	Description
Site Name & Type	View the name of the site on which the CPE device is activated.

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Table 280: Fields on the Activate Device Page (continued)

Field	Description
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	Enter the activation code of the primary device that your service provider supplied for the device. NOTE: If you do not want to specify an activation code, on the **Resources > Edit Template > Template Settings** page, disable the ACTIVATION_CODE_ENABLED field and save the changes.
Secondary Device Serial Number	View the serial number of the secondary CPE device.
Secondary Device Activation Code	Enter the activation code of the secondary device that your service provider supplied for the device. NOTE: If you do not want to specify an activation code, on the **Resources > Edit Template > Template Settings** page, disable the ACTIVATION_CODE_ENABLED field and save the changes.

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 on page 539
- Activating a CPE Device on page 573
- About the Sites Page on page 535
- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549
- Configuring a Single Site on page 567
- About the Certificates Page on page 617

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 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 48 on page 100 describes the fields on the Activation Logs page.

3. Click a task name.

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The ZTP Logs page appears. Table 49 on page 101 describes the fields on the ZTP Logs page.

4. Click the Task Name.

   The Job Status page appears. Table 50 on page 101 describes the fields on the Job Status page.

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

Table 281: 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.
Log	View the import logs. Click a log to access more detailed information about the imported log.

Table 282: 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 283: 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.

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Table 283: Fields on the Job Status Page (continued)

Field	Description
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 on page 91

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 284 on page 580.

5. Click **OK**.

Table 284: 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

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Table 284: Fields on the Device Configuration Page (continued)

Field	Description
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
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

- Creating On-Premise Spoke Sites for SD-WAN Deployment on page 549

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CHAPTER 40

Managing Site Groups

- About the Site Groups Page on page 583
- Creating Site Groups on page 584

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 14.
- Create site groups. See "Creating Site Groups" on page 584.
- 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 285 on page 583 shows the descriptions of the fields on the **Site Groups** page.

Table 285: Fields on the Site Groups Page

Field	Description
Name	Displays the name of the site group.
Sites	Displays the names of the sites that are members of a site group.

Related Documentation

- Creating Site Groups on page 584

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 on page 583

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CHAPTER 41

Security Reports

- Reports Overview on page 585
- About the Security Report Definitions Page on page 586
- Performing Different Actions on Reports on page 587
- About the Security Generated Reports Page on page 588
- Creating Log Report Definition on page 589
- Creating Bandwidth Report Definition on page 591
- Editing and Deleting Log Report Definitions on page 592
- Editing and Deleting Bandwidth Report Definitions on page 593

Reports Overview

Reports are generated based on the summary of network activity and overall network status. You can use the predefined reports as-is, or you can build custom reports that meet your needs for specific data.

Using reports, you can:

- Schedule reports based on the defined filters.
- Schedule reports based on the available default reports.
- Generate reports with multiple sections, where each section has its own criteria.

The generated report will have a table of contents (TOC) with links to each section of the report. When the system generates a report, you and other designated recipients will receive the report in PDF format through e-mail.

Reports enable you to perform trend analysis of your network's activities.

The following are the types of security reports:

- **Log Based Reports**—Allows you to schedule reports based on the default reports and the default defined filters. You can also generate reports with different data criteria, which includes filters, aggregation criteria, and time range.
- **Bandwidth Based Reports**—Allows you to analyze the bandwidth usage of an application or a user.

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The following are the types of SD-WAN reports:

- **SD-WAN Tenant Performance Reports**—Enables you to view the parameters (top applications by bandwidth, top sites not meeting the SLA, top sites meeting the SLA with switching, and sites meeting the SLA without switching applications) that measure the SLA performance across all sites in a tenant.
- **SD-WAN Site Performance Reports**—Enables you to view 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 generate report up to five sites in a tenant.

Related Documentation

- About the Security Report Definitions Page on page 586
- About the SD-WAN Report Definitions Page on page 595

About the Security Report Definitions Page

To access this page, click **Customer Portal > Reports > Report Definitions > Security**.

The Security Report Definitions page shows a list of predefined and custom reports. You can use the predefined reports as-is, or you can build custom reports.

Tasks You Can Perform

You can perform the following tasks from this page:

- Create a log report definition. See "Creating Log Report Definition" on page 589.
- Create a bandwidth report definition. See "Creating Bandwidth Report Definition" on page 591.
- You can also edit, run, and clone reports. See "Performing Different Actions on Reports" on page 587.

Field Descriptions

Table 286 on page 586 provides guidelines on using the fields on the Report Definitions page.

Table 286: Fields on the Report Definitions Page

Field	Description
Name	View the name of the report (user created or predefined). Example: Top Destination Countries
Description	View the description of the report definition. Example: Report for Top Destinations by Countries

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Table 286: Fields on the Report Definitions Page (continued)

Field	Description
Type	View the type of report definition used such as bandwidth report or log report. Example: BANDWIDTH
Definition Type	View the type of report definition. Example: PREDEFINED
Report Content	View the details of the sections in the report. For example, Top Applications, Top Applications Blocked, Top Roles, and so on.
Schedule	View the report generation schedule whether to run the report immediately or schedule it for a later date and time.
Recipients	View the recipients of the generated reports.
Last Generated	View the time when the last report was generated if the report is scheduled at a later time.
Job ID	View the Job ID of the report.

Related Documentation

- Reports Overview on page 585
- Creating Log Report Definition on page 589
- Creating Bandwidth Report Definition on page 591

Performing Different Actions on Reports

You can perform various actions on reports such as running a report immediately, editing a schedule, editing e-mail recipients, previewing a report in PDF, sending reports, and cloning reports.

To perform these actions on the report:

1. Select **Reports** > **Report Definitions**.
2. Select the report definition or right-click the report definition or click the **More** drop-down list.
3. Select the appropriate action from the drop-down list:

- **Delete Report**—You can select one or more report definitions and click the delete icon (X) to delete the report definition (s).
- **Run Now**—Runs the report immediately and provides a link to view the report in PDF format. You can view the archived reports by clicking the **Generated Reports** link on the left navigation pane.

  This option is also available as the **Run Now** button on the Report Definitions page.
- **Preview as PDF**—Provides the PDF preview of the report.
- **Send Report**—Sends the report through e-mail to the recipient immediately. The user receives a notification once the report is sent. The user can also use the job ID to see more details of the job.
- **Edit Schedule**—Allows user to edit the schedule such as adding a recurrence, start date, end date, and time.
- **Edit Recipients**—Allows user to edit or add the recipients, e-mail address, subject, and comments.
- **Clone**— Allows the user to clone an existing report definition.

Related Documentation

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 287 on page 588 provides guidelines on using the fields on the Generated Reports page.

Table 287: 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.

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Table 287: Fields on the Generated Reports Page (continued)

Field	Description
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

- Reports Overview on page 585
- About the Security Report Definitions Page on page 586

Creating Log Report Definition

You can use this page to create log report definitions. Log-based reports help you to schedule reports based on default reports and default defined filters. You can also generate reports with additional data criteria, including filters, aggregation criteria, and time range.

1. Select **Reports > Report Definitions**.

   The 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 288 on page 589.

4. Click **OK** to save the log report definition. If you want to discard your changes, click **Cancel** instead.

Table 288: Fields on the Create Log Report Definition Page

Field	Description
General	
Report Name	Enter a unique name for the report definition that is a string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 29 characters.
Description	Enter a description for the report definition; maximum length is 1024 characters.
Content	

Table 288: Fields on the Create Log Report Definition Page (continued)

Field	Description
Use Data Criteria from Filters	Click Use Data Criteria from Filters. Select the data criteria from the list of default and user--created filters that are saved from the Events and Logs page. The details of the filters displayed are: • **Filter Name**—Name of the filter. • **Filter Description**—Description of the filter. • **Group By**—Selected Group By option. • **Time Span**—Duration for which the data is displayed. • **Filter By**—List of default and user-created filters. NOTE: The default time stamp value is the last 3 hours.
Schedule	
Add Schedule	Click **Add Schedule**. Select the type of report schedule that you want to use: • **Run now**—Select this option to schedule and publish the configuration at the current time. • **Schedule at a later time**—Select this option if you want to schedule and publish the configuration at a later time.
E-Mail	
Add E-Mail Recipients	Click **Add E-mail Recipients**. • Recipients—Enter or select the e-mail addresses of the recipients. By default, you can search by first name and select registered users. You can also type in external e-mail addresses. • **Subject**—Enter the subject for the e-mail notification. • **Comment**—Enter the comments for the e-mail notification. NOTE: The reports are not sent if a specified recipient does not have permission for a device or domain included in the report configuration when the report is generated.

Related Documentation

- About the Security Report Definitions Page on page 586
- Creating Bandwidth Report Definition on page 591

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Creating Bandwidth Report Definition

You can use this page to create bandwidth report definitions. Bandwidth reports helps in analyzing the bandwidth usage of an application or a user. It gives you important information on bandwidth usage and helps you identify top applications and top users consuming bandwidth.

1. Select **Reports > Report Definitions**.

2. Click **Create > Bandwidth Report Definitions**.

   The Create Bandwidth Report Definition page appears.

3. Complete the configuration according to the guidelines provided in Table 289 on page 591.

4. Click **OK** to save the log report definition. If you want to discard your changes, click **Cancel** instead.

Table 289: Fields on the Create Bandwidth Report Definition Page

Field	Description
General	
Report Name	Enter a unique name for the report definition that is a string of alphanumeric 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; maximum length is 1024 characters.
Content	
Show Top	Specify the number of top events to be displayed. The value ranges from 1-20. The default value is 10.
Last	Specify the time period to generate the report from the last 3, 6, 12, or 24 hours.
Schedule	
Add Schedule	Click **Add Schedule**. Select the type of report schedule that you want to use: • Run now—Select this option to schedule and publish the configuration at the current time. • Schedule at a later time—Select this option if you want to schedule and publish the configuration at a later time.
E-Mail	

Table 289: Fields on the Create Bandwidth Report Definition Page (continued)

Field	Description
Add E-Mail Recipients	Click **Add E-mail Recipients**. • Recipients—Enter or select the e-mail addresses of the recipients. By default, you can search by first name and select registered users. You can also type in external e-mail addresses. • Subject—Enter the subject for the e-mail notification. • Comment—Enter the comments for the e-mail notification. NOTE: The reports are not sent if a specified recipient does not have permission for a device or domain included in the report configuration when the report is generated.

Related Documentation

- About the Security Report Definitions Page on page 586
- Editing and Deleting Log Report Definitions on page 592
- Editing and Deleting Bandwidth Report Definitions on page 593

Editing and Deleting Log Report Definitions

You can edit and delete log report definitions. This topic contains the following sections:

- Editing the Log Report Definition on page 592
- Deleting Log Report Definitions on page 592

Editing the Log Report Definition

To edit the log report definition:

1. Select **Reports > Report Definitions**.

   The Report Definitions page appears.

2. Select the check box of the log report definition that you want to modify, and click the edit icon.

   The Edit Log Report Definition page appears. The options available on the Create Log Report 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.

Deleting Log 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 log report definitions.

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NOTE: You can delete only custom log report definitions.

To delete log report definition:

1. Select **Reports > Report Definitions**.

   The Report Definitions page appears.

2. Select the log 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 log report definition or **No** to cancel the deletion.

   The log report definition is deleted from the main page.

Related Documentation

- About the Security Report Definitions Page on page 586
- Creating Log Report Definition on page 589

Editing and Deleting Bandwidth Report Definitions

You can edit and delete bandwidth report definitions. This topic contains the following sections:

- Editing the Bandwidth Report Definition on page 593
- Deleting Bandwidth Report Definitions on page 594

Editing the Bandwidth Report Definition

To edit the bandwidth report definition:

1. Select **Reports > Report Definitions**.

   The Report Definitions page appears.

2. Select the check box of the log report definition that you want to modify, and click the edit icon.

   The Edit Bandwidth Report Definition page appears. The options available on the create bandwidth report 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.

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Deleting Bandwidth 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 log report definitions.

NOTE: **You can delete only custom bandwidth report definitions.**

To delete bandwidth report definition:

1. Select **Reports > Report Definitions**.

   The Report Definitions page appears.

2. Select the bandwidth report definition or right click on the report definition that you want to delete and click the X icon.

   The Confirm Delete page appears.

3. Click **Yes** to delete the bandwidth report definition or **No** to cancel the deletion.

   The bandwidth report definition is deleted from the main page.

Related Documentation

- About the Security Report Definitions Page on page 586
- Creating Bandwidth Report Definition on page 591

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CHAPTER 42

SD-WAN Reports

- About the SD-WAN Report Definitions Page on page 595
- Editing and Deleting SD-WAN Report Definitions on page 596
- Creating SD-WAN Tenant Performance Report Definition on page 598
- Creating SD-WAN Site Performance Report Definition on page 600
- About the SD-WAN Generated Reports Page on page 602

About the SD-WAN Report Definitions Page

To access this page, click **Customer Portal > Reports > Report Definitions > SD-WAN.**

You can use the SD-WAN Report Definitions page to view a list of predefined and custom report definitions. You can use the predefined report definition as-is, or you can create custom report definitions. You can use SD-WAN reports to view the SLA performance of SD-WAN 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.

You must create a report definition to generate a report. You can generate an SLA performance report for all sites in a tenant or for specific sites in a tenant.

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 Definition" on page 598
- Create SD-WAN site performance report definitions. See "Creating SD-WAN Site Performance Report Definition" on page 600
- Run a report immediately, edit a schedule, edit e-mail recipients, preview a report in PDF, send reports, and clone reports. See "Performing Different Actions on Reports" on page 587

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Field Descriptions

Table 290 on page 596 provides guidelines on using the fields on the SD-WAN Report Definitions page.

Table 290: 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 on page 596
- Creating SD-WAN Tenant Performance Report Definition on page 598
- Creating SD-WAN Site Performance Report Definition on page 600

Editing and Deleting SD-WAN Report Definitions

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 on page 597
- Deleting SD-WAN Report Definitions on page 597

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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.

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Related Documentation

- About the SD-WAN Report Definitions Page on page 595

Creating SD-WAN Tenant Performance Report Definition

Use this page to create SD-WAN report definitions for all sites in a tenant and generate the report based on the definitions. You can also schedule a report generation and add one or more recipients to whom you want to send the reports.

The SD-WAN tenant performance report includes SLA performance of the following SLA events:

- Top Applications By Bandwidth
- Top Sites Not Meeting SLA
- Top Sites Meeting SLA with Switching
- Sites Meeting SLA without Switching

NOTE: **Only users with the MSP Administrator or Tenant Administrator role can create SD-WAN tenant performance report definitions.**

To create 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 291 on page 598.

4. Click **OK** to save the report definition.

   An SD-WAN tenant performance report definition is created and saved in the report definitions page.

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

Table 291: Fields on the Create Tenant Performance Report Definition

Field	Description
General	
Report Name	Enter a unique name for the report definition. You can use a string of alphanumeric characters, colons, periods, dashes, and underscores. No spaces are allowed and the maximum length is 63 characters.

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Table 291: Fields on the Create Tenant Performance Report Definition (continued)

Field	Description
Description	Enter a description for the report definition; maximum length is 1024 characters.
Content	
Duration	Specify the duration (custom, last 24 hours, last 7 hours, or last 30 hours) for which the report is generated. When you select the custom option, you must specify the From and To date (in MM/DD/YYYY and HH:MM:SS formats). The predefined options are Last 24 hours, Last 30 hours, and Last 7 hours.
NOTE: The **From** and **To** fields are populated only when you select the **Custom** 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 that you want to retrieve for each section in the report. The value ranges from 1 to 20 and the maximum value is 20.
Report Content	Select the report content that you want to view in the report. • **Top Applications By Bandwidth**—Displays report on top applications by bandwidth. • **Top Sites Not Meeting SLA**—Displays report on top sites not meeting the SLA performance. • **Top Sites Meeting SLA with Switching**—Displays report on top sites meeting SLA performance with link switching. • **Sites Meeting SLA without Switching**—Displays report on sites meeting SLA performance without switching.
Schedule Report	
Add Schedule	Click **Add Schedule** to schedule the report generation. The Add Report Schedule page is displayed. Specify whether you want to generate the report immediately or schedule it for a later date and time. • **Run now**—Select this option to generate the report immediately • **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).
Email Recipients	
Add Email Recipients	Click **Add Email Recipients** to add e-mail addresses of recipients to whom you want to send the SD-WAN reports. The Add Recipients page is displayed. • **Recipients**—Select valid e-mail addresses of the recipients. You can select more than one e-mail address. • **Subject**—Enter the subject line for the e-mail that is sent with the generated report. The maximum length is 2048 characters. • **Comment**—Enter any comments, which will be sent in the body of the e-mail that is sent with the generated report. The maximum length is 2048 characters.

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Related Documentation

- Creating SD-WAN Site Performance Report Definition on page 600
- About the SD-WAN Report Definitions Page on page 595
- Editing and Deleting SD-WAN Report Definitions on page 596

Creating SD-WAN Site Performance Report Definition

Use this page to create SD-WAN report definitions for specific sites in a tenant and generate the report based on the definitions. You can also schedule a report generation and add one or more recipients to whom you want to send the reports.

The SD-WAN site performance report includes SLA performance of the following SLA events:

- Top 10 Applications for site
- Link Utilization for site
- Top Profiles Not Meeting SLA
- Top Profiles Switching Links

NOTE: **Only users with the MSP 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 292 on page 600.

4. Click **OK** to save the report definition.

   A report definition is created and saved in the SD-WAN report definitions page.

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

Table 292: Fields on the Site Performance Report Definition Page

Field	Description
General	

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Table 292: Fields on the Site Performance Report Definition Page (continued)

Field	Description
Report Name	Enter a unique name for the report definition. You can use a string of alphanumeric 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; maximum length is 1024 characters.
Content	
Duration	Specify the duration (custom, last 24 hours, or last 7 hours) for which the report is generated. When you select the custom option, you must specify the From and To date (in MM/DD/YYYY and HH:MM:SS formats). The predefined options are Last 24 hours, Last 30 hours, and Last 7 hours.
NOTE: The **From** and **To** fields are populated only when you select the **Custom** 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 that you want to retrieve for each section in the report. The value ranges from 1 to 20 and the maximum value is 20.
Sites	Select one or more sites for which you want to generate the report. You can select up to five sites.
Sections	Select the section for which you want to generate the report up to 5 sites in a tenant. By default, all sections are selected. • **Top 10 Applications and Link Utilization**—Displays report on top 10 applications and link utilization for the selected sites. • **Top Profiles Not Meeting SLA**—Displays report on top SLA profiles not meeting SLA for the selected sites. • **Top Profiles Switching Links**—Displays report on top SLA profiles switching links for the selected sites.
Schedule	
Add Schedule	Click **Add Schedule** to schedule the report generation. The Add Report Schedule page is displayed. You must specify whether you want to generate the report immediately or schedule it for a later date and time. • **Run now**—Select this option to generate the report immediately • **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).
E-Mail	

Table 292: Fields on the Site Performance Report Definition Page (continued)

Field	Description
Add E-Mail Recipients	Click **Add Email Recipients** to add e-mail addresses of recipients to whom you want to send the SD-WAN reports. The Add Recipients page is displayed. • **Recipients**—Select valid e-mail addresses of the recipients. You can select more than one e-mail address. • **Subject**—Enter the subject line for the e-mail that is sent with the generated report. The maximum length is 2048 characters. • **Comment**—Enter any comments, which will be sent in the body of the e-mail that is sent with the generated report. The maximum length is 2048 characters.

Related Documentation

- Creating SD-WAN Tenant Performance Report Definition on page 598
- About the SD-WAN Report Definitions Page on page 595
- Editing and Deleting SD-WAN Report Definitions on page 596

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 293 on page 602 provides guidelines on using the fields on the SD-WAN Generated Reports page.

Table 293: 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.

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Table 293: Fields on the SD-WAN Generated Reports Page (continued)

Field	Description
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 on page 585
- About the SD-WAN Report Definitions Page on page 595

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CHAPTER 43

Managing Tenant Users

- Role-Based Access Control Overview on page 605
- About the Tenant Users Page on page 606
- Adding Tenant Users on page 607
- Editing and Deleting Tenant Users on page 608

Role-Based Access Control Overview

Contrail Service Orchestration supports the authentication and authorization of users. Both MSP and tenant users access the pages within the unified Administration and Customer Portal based on their role and access permissions.

Table 102 on page 197 shows MSP and Tenant roles and their access privileges.

Table 294: Roles and Access Privileges

Role	Access Privileges
MSP Administrator	Users with the MSP Administrator 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 MSP Administrator or MSP Operator roles, onboard tenants, and add the first tenant administrator during the onboarding process. They can also add tenant administrators or operators by switching the scope to a specific tenant.
MSP Operator	Users with the MSP Operator role have read-only access to the Administration Portal UI and APIs.
Tenant Administrator	Users with the Tenant Administrator 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	Users with the Tenant Operator role have read-only access to the Customer Portal UI and APIs.

Related Documentation

- About the Tenant Users Page on page 606

About the Tenant Users Page

To access this page, click **Administration** > **Users**.

Use the Users page to add, edit, and delete users for a tenant. You can also assign roles to tenant users. The MSP Administrator, MSP Operator, Tenant Administrator, and Tenant Operator can access the Users page for tenants. The MSP Administrator and the MSP Operator can switch from all-tenants scope to specific-tenant scope. To know more about tenant users roles and access permissions, see "Role-Based Access Control Overview" on page 197.

The information listed on the Users page changes depending on the authentication mode configured:

- **Local Authentication** —The **Users** page lists tenant-specific local users that you can add, edit, and delete.
- **Authentication with SSO Server**—The **Add User** page does not display the password field because you can assign a role only to an external user.
- **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

The tenant administrator can perform the following tasks from this page:

- Add a tenant user. See "Adding Tenant Users" on page 607.
- Edit and delete a tenant user. See "Editing and Deleting Tenant Users" on page 608.

Field Descriptions

Table 295 on page 606 provides guidelines on using the fields on the Users page.

Table 295: Fields on the Users Page

Field	Description
Username	Username of the tenant user. Example: *abc@example.com*
First Name	First name of the tenant user.
Last Name	Last name of the tenant user.
Role	Role assigned to the tenant user. Example: Tenant Operator

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Table 295: Fields on the Users Page (continued)

Field	Description
Last Login	Date and time of the last login. The format is MM/DD/YYYY HH:MIN. Example: 07/22/2017 20:07

Related Documentation

- Adding Tenant Users on page 607.
- Editing and Deleting Tenant Users on page 608.
- Switching the Tenant Scope on page 231

Adding Tenant Users

Use this page to add tenant users and assign roles to users. After the tenant administrator adds the user, the user account is created in the Contrail Service Orchestration (CSO) and the user receives an e-mail with the initial login credentials.

NOTE: **Users with the Tenant Operator role have read-only access to Customer Portal and APIs, and they cannot add new users.**

To add a tenant user:

1. Select **Administration > Users**.

   The Users page appears.

2. Click the add icon (+) or click **Add User**.

   The Add User page appears.

3. Complete the configuration as described in Table 296 on page 608.

4. Click **OK** to save the changes. If you want to discard the changes, click **Cancel** instead.

   The tenant user account is created in CSO.

   To enhance the security related to login credentials, an automatically generated password is sent to the e-mail address that you have specified on the Add User page. 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 233.

Table 296: Fields on the Add User Page

Field	Description
First Name	Enter the first name as a string of alphanumeric characters and the special characters space, underscore (_), or period (.). The maximum length is 32 characters.
Last Name	Enter the last name as a string of alphanumeric characters and the special characters space, underscore (_), or period (.). The maximum length is 32 characters.
Username (E-mail)	Enter a valid e-mail address in the *user@domain* format.
Role	Select the role—Tenant Operator (default) or Tenant Administrator—that you want to assign to the user. • **Tenant Administrator**—Users with the Tenant Administrator role have full access to the Customer Portal UI and APIs. They can add one or more users with Tenant Administrator or Tenant Operator roles. • **Tenant Operator**—Users with the Tenant Operator role have read-only access to the Customer Portal UI and APIs.

Related Documentation

- About the Tenant Users Page on page 606
- Editing and Deleting Tenant Users on page 608

Editing and Deleting Tenant Users

You can edit tenant users' information and delete one or more tenant users.

NOTE: **Users with the Tenant Operator role have read-only access to the Customer Portal and APIs, and they cannot edit and delete users.**

- Editing Tenant Users on page 608
- Deleting Tenant Users on page 609

Editing Tenant Users

To modify a tenant user:

1. Select **Administration > Users**.

   The Users page appears.

2. Select the user that you want to modify, and click the edit icon.

   The Edit User page appears. The options available on the Add User page are available for editing.

   NOTE: **You cannot modify the Username (E-mail) field.**

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3. Update the configuration as needed.

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

   The modified tenant user information is saved in CSO.

Deleting Tenant Users

To delete tenant users:

1. Select **Administration > Users**.

   The Users page appears.

2. Select the users that you want to delete and click the delete icon (X).

   The Confirm Delete page appears.

3. Click **Yes** to delete the user or **No** to cancel the deletion.

   If you click **Yes**, then the user is deleted and the user account is removed from the CSO.

Related Documentation

- About the Tenant Users Page on page 606
- Adding Tenant Users on page 607

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CHAPTER 44

Licenses

- About the Licenses Page on page 611

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 241.
- Show or hide columns about the license. See "Sorting Objects" on page 241.
- Search an object about the license. See "Searching for Text in an Object Data Table" on page 242.

Field Descriptions

Table 297 on page 611 describes the fields on the License Files page.

Table 297: Fields on the License Files Page

Field	Description
License Name	View the filename of the license. Example: license_Image_v1
Build	View the build name of the license. Example: 1
Version	View the version number of the license. Example: 1.1

Table 297: Fields on the License Files Page (continued)

Field	Description
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 on page 14

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CHAPTER 45

Signature Database

- Signature Database Overview on page 613
- About the Active Database Page on page 614
- Installing Signatures on page 615

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 on page 614
- Installing Signatures on page 615

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 615.

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 298 on page 614 describes the fields on this page.

Table 298: Fields on the Active Database Page

Field	Description
Active Database	
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.
Latest List of Signatures	
Database Version	Version of latest signature database.
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.

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Related Documentation

- Signature Database Overview on page 613
- Installing Signatures on page 615

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 on page 613
- About the Active Database Page on page 614

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CHAPTER 46

Managing Certificates

- Certificates Overview on page 617
- About the Certificates Page on page 617
- Importing a Certificate on page 619
- Installing and Uninstalling Certificates on page 621

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 on page 481
- About the SSL Proxy Profiles Page on page 494

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.

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Tasks You Can Perform

You can perform the following tasks from this page:

- View information about the existing certificates; see Table 299 on page 618.
- Import a certificate—Select **More > Import Certificate**. See "Importing a Certificate" on page 619.
- 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 621.
- Uninstall a certificate from a site—Select a certificate and then select **More > Uninstall Certificate**. See "Installing and Uninstalling Certificates" on page 621.
- View details about a certificate—Select a certificate and then select **More > Detailed View**. The Detailed View page appears. See Table 300 on page 618 for an explanation of fields on this page.

Field Descriptions

Table 299 on page 618 displays the fields on the Certificates page.

Table 299: Fields on the Certificates Page

Field	Description
Certificate Name	Name of the certificate.
Type	Type of the certificate: • Root certificate • Trusted certificate
Description	Description of the certificate.

Table 300: Fields on the Detailed View Page

Field	Description
Certificate Name	See Table 299 on page 618.
Type	See Table 299 on page 618.
Valid From	Date and time (UTC) from which the certificate is valid.
Valid Upto	Date and time (UTC) until which the certificate is valid.

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Table 300: Fields on the Detailed View Page (continued)

Field	Description
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 on page 494

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 301 on page 620.

   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 301: Import Certificate Settings

Setting	Guideline
Certificate Name	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.
Certificate Type	Select an option to specify whether the certificate that you are importing is a root certificate (**Root CA**) or a trusted certificate (**Trusted CA**).
Passphrase	Enter the passphrase to protect the private key or key pair of the Privacy-Enhanced Mail (PEM) certificate file.
Description	Enter a description for the certificate.
Certificate Content	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.
Paste Certificate Content	Depending on the method you choose in the preceding field, do one of the following: • Import the certificate content directly from a file—Click **Browse**, and in the File Upload dialog, select a file and click **Open**. The filename of the file that you uploaded is displayed. • Paste the certificate content directly from a file—Copy the certificate content from the file and paste it in the text box. NOTE: • The following certificate file extensions are supported: **.cert**, **.pem**, and **.txt**. • The certificate content must be in the X.509 ASCII format. • If the certificate type is **Root CA**, then the both the certificate content and private key must be specified.

The following is an example of root certificate content.

```
-----BEGIN PRIVATE KEY-----
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123AbcXyz123A
-----END PRIVATE KEY-----
-----BEGIN CERTIFICATE-----
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456DefQrs456A
-----END CERTIFICATE-----
```


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Related Documentation

- Installing and Uninstalling Certificates on page 621
- Creating SSL Forward Proxy Profiles on page 496

Installing and Uninstalling Certificates

You can install and uninstall certificates from the Certificates page. This topic has the following sections:

- Installing a Certificate on page 621
- Uninstalling a Certificate on page 621

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**.

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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 on page 619

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CHAPTER 47

Managing Juniper Identity Management Service

- Juniper Identity Management Service Overview on page 623
- About the Identity Management Page on page 625
- Configuring CSO and JIMS Connection on page 626
- Configuring JIMS for an SRX Device on page 628

Juniper Identity Management Service Overview

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.

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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 on page 624
- Batch or Periodic Query on page 624
- IP Address Query on page 624
- User Mapping Query on page 625

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.

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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

- About the Identity Management Page on page 625
- Configuring CSO and JIMS Connection on page 626
- Configuring JIMS for an SRX Device on page 628

About the Identity Management Page

To access this page, select **Administration** > **Identity Management**.

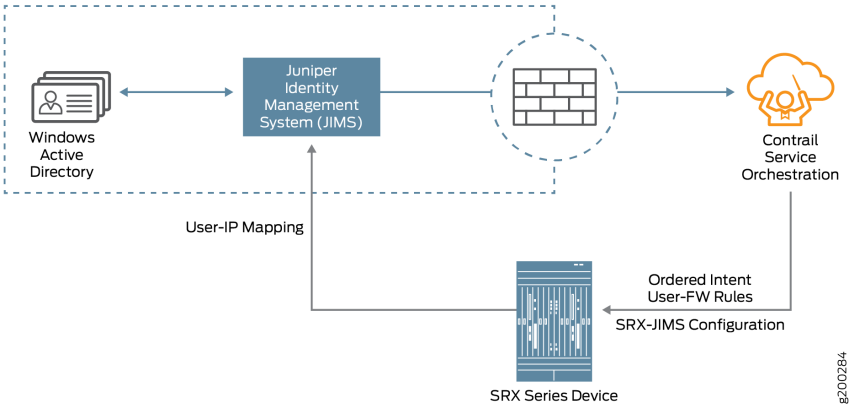
NOTE:

- 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 9 on page 626 illustrates the connectivity between, CSO, JIMS, and an SRX Series device.

Figure 9: 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 626.

- Configure the connection between JIMS and an SRX Series device. See "Configuring JIMS for an SRX Device" on page 628.

Related Documentation

- Juniper Identity Management Service Overview on page 623
- Configuring CSO and JIMS Connection on page 626
- Configuring JIMS for an SRX Device on page 628
- 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.

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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

- Juniper Identity Management Service Overview on page 623
- About the Identity Management Page on page 625
- Configuring JIMS for an SRX Device on page 628

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.

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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 302 on page 629.

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 302 on page 629 provides guidelines on using the fields on the **SRX-to-JIMS Configuration** panel.

Table 302: Fields on the SRX-to-JIMS Configuration Panel

Field	Description
Identity	
IP Address	Enter a valid IPv4 or IPv6 address of the primary JIMS server. SRX Series devices always query the primary JIMS to obtain the user identities.
Secondary Identity	Enable this option to use the secondary JIMS server as a fallback when the primary JIMS server fails. By default, this option is disabled.
Secondary IP Address	Enter a valid IPv4 or IPv6 address of the secondary JIMS server. 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.
Client Credentials	
Client ID	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.
Client Secret	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.

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Table 302: Fields on the SRX-to-JIMS Configuration Panel (continued)

Field	Description
Advanced Settings	
Authentication Entry Timeout	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.
Include IP Address(es)	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. Click **Add New Address** to create a new IP address group, see "Creating Addresses or Address Groups" on page 507.
Exclude IP Address(es)	The SRX Series device does not query JIMS for the user identity information for the excluded IP addresses present in the selected address group. Click **Add New Address** to create a new IP address group, see "Creating Addresses or Address Groups" on page 507.
Filter Domain(s)	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. Example: example.net

Related Documentation

- Juniper Identity Management Service Overview on page 623
- About the Identity Management Page on page 625
- Configuring CSO and JIMS Connection on page 626

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PART 3

Designer Tools

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- Resource Designer on page 651
- Network Service Designer introduction on page 671
- Creating Requests for Network Services on page 673
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CHAPTER 48

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 Cloud CPE solution 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 10 on page 634 shows a Configuration Designer and its workflow.

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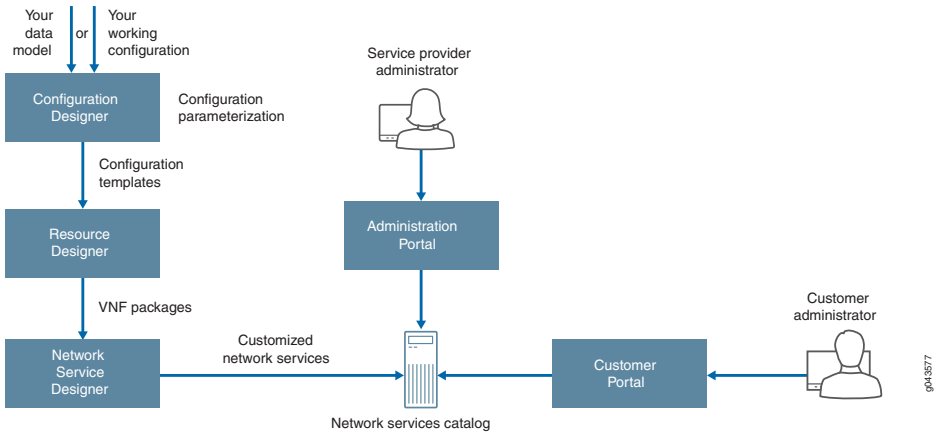
Figure 10: Configuration Designer Workflow



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-parmeterized 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.

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- On Day 2 they can update a configuration of existing instances. For example, they can configure their network to block social media.

Related Documentation

- Accessing the Configuration Designer on page 635
- Changing Your Password on page 636
- Using the Configuration Designer on page 635

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

- Configuration Designer Overview on page 633

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 633.
- Log into the Configuration Designer. See "Accessing the Configuration Designer" on page 635.

To create a configuration template:

1. Create a request for a configuration template. See "Creating Requests for Configuration Templates" on page 638.
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 639.
- 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 642.

3. Publish the configuration template to the Network Service Designer. See "Publishing Configuration Templates" on page 646.

Related Documentation

- Configuration Designer Overview on page 633.

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 303 on page 636.

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 303: Fields on the Changing Password Page

Field	Description
Current Password	Enter your existing password.

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Table 303: Fields on the Changing Password Page (continued)

Field	Description
New Password	Enter your new password. 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. NOTE: 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 the **Show Password** option to view the password.

Related Documentation

- Administration Portal Overview on page 4
- Configuration Designer Overview on page 633
- Resource Designer Overview on page 651
- Network Service Designer Overview on page 671

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 638.
- 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 642.
- Design a new configuration template using the YANG model. See "Designing Templates with a YANG Configuration" on page 639.

Field Descriptions

Table 304 on page 638 provides guidelines on using the fields on the Requests page for the Configuration Designer.

Table 304: Fields on the Requests Page for the Configuration Designer

Field	Description
Requests Page	
New Template	Click to request a new configuration template. The New Template page allows you to define the requirements for your configuration template.
Configuration Template Request	
Begin with config	Click to design a new configuration template using a predefined working configuration. Select this method if you have the Jinja2 configuration but need the Configuration Designer to generate a data model for your configuration template.
Begin with YANG	Click to design a configuration template using an existing data model. Select this method if you already have the Jinja2 (a template engine for Python) configuration and the data model for your configuration template.
Delete	Click to delete a configuration template request.

Related Documentation

- Configuration Designer Overview on page 633
- Using the Configuration Designer on page 635

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 305 on page 639.

3. Click **Create**.

   A new template request is created.

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Table 305: Fields on the New Template Page

Field	Description
Name	Specify a name for your configuration template. Only a string of alphanumeric characters, dashes, and spaces are accepted. Example: ucpe-SRX DPI config
Description	Enter a description for your configuration template. Make this description as clear and useful as possible for all administrators. Example: NFX JCP configuration to restore default route from LAN to WAN. This configuration is pushed to JCP after the service chain is deleted.
Output config format	Select a format for your configuration template: • CLI (Command-line interface) • XML (Extensible Markup Language) • 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.
Category	Specify the category for the configuration template. Categories allow you to group your templates and filter and search them easily. • **VNF**—Select this option when you create a configuration template for the virtualized network function. • **Device Template**—Select this option when you create a device template for a network device, such as a customer premises equipment (CPE) device. • **Other**—Select this option when you create a configuration template for a network function other than VNF or device template.
Vendor	Specify the vendor that you want the configuration template to support. Example: Juniper Networks
Device family	Specify the device family that you want the configuration template to support. Example: juniper-srx

Related Documentation

- Configuration Designer Overview on page 633
- Designing Templates with a YANG Configuration on page 639
- Designing Templates with a Configuration on page 642

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 638.

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 306 on page 641 for sample fields and their descriptions. Click **Validate**.

   A configuration template is generated using the values that you entered.

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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 646.

Table 306: 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 **True** to enable the default screens security profile for the destination zone or **False** to disable default screening. Example: False NOTE: You cannot configure this setting for a distributed deployment.
Enable Re-filter	Select **True** to enable a stateless firewall filter that protects the Routing Engine from denial-of-service (DoS) attacks or **False** to allow DoS attacks. Example: True

Table 306: Sample Fields on the Validate Template Page (continued)

Field	Description
Loopback Addr	Specify an IPv4 or IPv6 loopback address for the management interface of your virtual machine. Example: 192.0.2.25
Hostname	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. Example: vm-vsrx NOTE: For a distributed deployment, the vSRX application resides on the NFX250 device, and you cannot configure this setting.
Syslog Servers	Specify the FQDNs or IP addresses of one or more system log servers. Example: 192.0.2.55
Right Interface	Specify the identifier of the interface receiving data transmitted by the host. Example: GigabitEthernet3
Left Interface	Specify the identifier of the interface that transmits data to the host. Example: GigabitEthernet2
Allowed Prefix List	
Ping Prefix List	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. Example: 10.0.2.1/24
SNMP Prefix list	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. Example: 10.0.2.0/24
Space Servers	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. Example: 10.0.2.50

Related Documentation

- Configuration Designer Overview on page 633
- Designing Templates with a Configuration on page 642

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

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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 638.

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 307 on page 645 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.

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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 646.

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Table 307: Sample Fields on the Customize Variables Page

Field	Description
Detected Variables	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. You can edit the variable name. Example: left_interface
Yang Type	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: • **leaf node**—Contains a single value of a specific type • **leaf-list node**—Contains a sequence of leaf nodes • **container node**—Contains a grouping of related nodes containing only child nodes, which can be any of the six node types • **list node**—Contains a sequence of list entries, each of which is uniquely identified by one or more key leafs • **choice node**—Contains a set of alternatives, only one of which may exist at any one time • **case node**—Contains branches of the choice node
Data Type	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. • **String**—Human-readable string • **Boolean**—True or false • **Init8**— 8-bit signed integer • **Init16**—16-bit signed integer • **Init32**—32-bit signed integer • **Init64**—64-bit signed integer • **Uint8**—8-bit unsigned integer • **Uint16**—16-bit unsigned integer • **Uint32**—32-bit unsigned integer • **Uint64**—64-bit unsigned integer • **Enumeration**—Enumerated strings with associated numeric values • **Inet: ip-address**—192.0.2.101 • **Inet: ip-prefix**—192.0.2.0/24 • **Empty**—A leaf that does not have any value
Display Name	Specify the name of the variable as you want it to display.
Key	Specify the key to be associated with the variable. Keys are identifiers used in defining list entries in the Yang data hierarchy. They help distinguish one list entry from another.

Table 307: Sample Fields on the Customize Variables Page (continued)

Field	Description
Required	Specify if the variable is mandatory.
Default Value	Specify the default value for the variable.
Pattern	Specify the regular expression (regex pattern) if the data type of the variable is string. Example: ^[a-z][A-Z]
Information	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 **Information** column. You can also edit the enumeration list. Example: [“abc”,”def”]
Description	Enter a meaningful description for the variable. Example: Firewall policy information

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 on page 633
- Designing Templates with a YANG Configuration on page 639

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 639.

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- 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 642.

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 on page 633

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 308 on page 648 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 642.
- 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 639.
- Publish a configuration template. See "Publishing Configuration Templates" on page 646.
- Clone a configuration template. See "Cloning Configuration Templates" on page 649.
- Delete a configuration template. See "Deleting Configuration Template Designs" on page 649.

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Field Descriptions

Table 308 on page 648 provides guidelines on using the fields on the Designs page for the Configuration Designer.

Table 308: 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: • CLI (Command-line interface) • XML (Extensible Markup Language) • 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.
Category	View the category for the configuration template. • **VNF**—A configuration template for the virtualized network function. • **Device Template**—A device template for the network function and this cannot be published to the Resource Designer. • **Other**—A configuration template for the network function other than VNF or device template.
Diff-Config	Use to compare configuration difference between the two configuration files. • Yes—Diff.Config feature is enabled for the template. • No—Diff.Config feature is disabled for the template.
Status	View the configuration template status: • **In-Progress**—Configuration template request was created but the template hasn't been validated. • **Validated**—Configuration Designer validated the configuration template and it is ready to be published. • **Published**—Configuration Designer published the configuration template and it is available to the Resource Designer for use.
Description	View the configuration template description. Example: NFX Stage-1 configuration

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Related Documentation

- Configuration Designer Overview on page 633
- About the Requests Page for the Configuration Designer on page 637

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

- About the Designs Page for the Configuration Designer on page 647
- Designing Templates with a Configuration on page 642
- Designing Templates with a YANG Configuration on page 639

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.

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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

- About the Designs Page for the Configuration Designer on page 647

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CHAPTER 49

Resource Designer

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- Using the Resource Designer on page 653
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- Deleting VNF Packages on page 669

Resource Designer Overview

Configuration Designer, Resource Designer, and Network Service Designer are visual designer tools used by the Juniper Networks Cloud CPE solution 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

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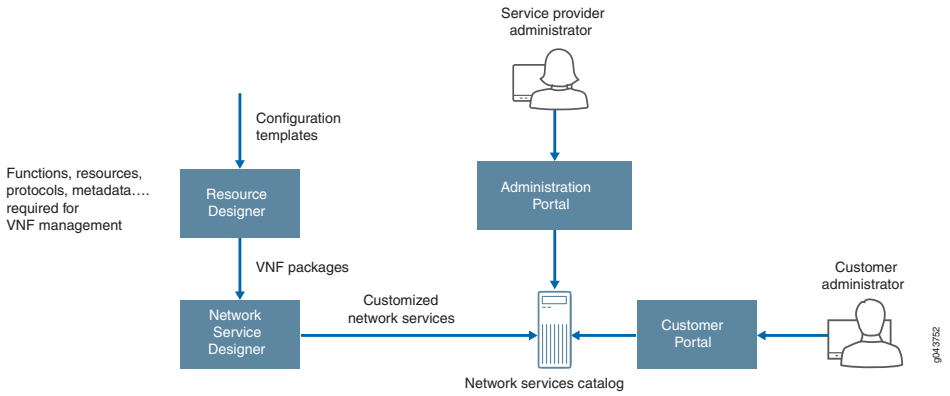
to manage their sites and services. Figure 11 on page 652 shows a Resource Designer workflow.

Figure 11: 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

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  - 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 on page 654
- Changing Your Password on page 636
- Using the Resource Designer on page 653

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 651.
- Log into the Resource Designer. See "Accessing the Resource Designer" on page 654.

To create a VNF package:

1. Create a request for a VNF package. See "Creating Requests for VNF Packages" on page 656.
2. Design a VNF package. See "Designing VNF Packages" on page 657.
3. Publish the VNF package to the Network Service Designer. See "Publishing VNF Packages" on page 665.

You can also perform the following tasks using the Resource Designer:

- Clone a VNF package. See "Cloning VNF Packages" on page 667.
- Import a VNF package. See "Importing VNF Packages" on page 668.
- Export a VNF package. See "Exporting VNF Packages" on page 668.

Related Documentation

- Resource Designer Overview on page 651
- Accessing the Resource Designer on page 654

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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

- Resource Designer Overview on page 651
- Using the Resource Designer on page 653

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 656.
- Design a new VNF package. See "Designing VNF Packages" on page 657.

Field Descriptions

Table 309 on page 654 provides guidelines on using the fields on the Requests page for the Resource Designer.

Table 309: Fields on the Requests Page for the Resource Designer

Field	Description
Requests Page	

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Table 309: Fields on the Requests Page for the Resource Designer (continued)

Field	Description
New Request	Click to request a new VNF package. The New Request page allows you to define the requirements for your VNF package.
VNF Package Request	
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

- Resource Designer Overview on page 651
- Using the Resource Designer on page 653

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 the Cloud CPE solution 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 the Cloud CPE solution 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

The Cloud CPE solution 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 310 on page 656 lists the VNFs that are currently supported by the Cloud CPE Solution.

Table 310: VNFs Supported by the Cloud CPE Solution

VNF Name	Network Functions Supported	Deployment Model Support	Element Management System Support
Juniper Networks vSRX	• Network Address Translation • Demonstration version of Deep Packet Inspection (DPI) • Firewall • Unified Threat Management (UTM)	• Centralized deployment • Distributed deployment supports firewall and UTM	EMS microservice
LxCIPtable (a free, third-party VNF based on Linux IP tables)	• NAT • Firewall	Centralized deployment	EMS microservice
Cisco Cloud Services Router 1000V Series (CSR-1000V)	Firewall	Centralized deployment	Junos Space Network Management Platform
Riverbed Steelhead	WAN optimization	Distributed deployment, NFX250 platform only	EMS microservice
Silver Peak VX	WAN optimization	Distributed deployment, NFX250 platform only	EMS microservice

Related Documentation

- Creating Requests for VNF Packages on page 656

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 311 on page 657.

3. Click **Create**.

   A new VNF package request is created. If you want to discard your changes, click **Cancel** instead.

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Table 311: 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
Vendor Logo	This field is auto-populated with the vendor logo for the selected vendor. You can also click **Select files** to upload logos for any new vendor that you add to the vendor list through an API.

Related Documentation

- Resource Designer Overview on page 651
- About the Requests Page for the Resource Designer on page 654
- Designing VNF Packages on page 657

Designing VNF Packages

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 656.

To design a VNF package, you need to perform the following:

- Creating Basic VNF Information on page 658
- Adding Flavor Parameters on page 659
- Adding Standard and Custom Functions on page 661
- Designing a Supported Function Chain on page 661
- Viewing the Summary of VNF Packages on page 663

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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 312 on page 658.

Table 312: Fields on the VNF Information Page

Field	Description
VNFD Name	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: • **Juniper Networks vSRX**—Supports both centralized and distributed deployments. • **LxCIPtable**—A free, third-party VNF based on Linux IP tables; supports only centralized deployments. • **CSR-1000V**—Cisco Cloud Services Router 1000V Series; supports only for centralized deployments. • **HAProxy**—An open source, reliable solution that offers high availability and proxy service for TCP applications.
VNF Manager	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: • Viptables • viptables_v2 • Space_14_2 • Space_DMS_CMS_2_0
Deployment Type	Select the deployment type. • **uCPE only**—Select this option for a distributed deployment. • **vCPE only**—Select this option for a centralized deployment.
Basic Config	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. Example: vSRX Space firewall config

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Table 312: Fields on the VNF Information Page (continued)

Field	Description
BootStrap Config	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. Example: default-domain
Networking Config	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. Example: default-domain
VNF Capability	Select one or more capabilities supported for the software release of the VNF. • **SRIOV-DATA**—Supports SRIOV and its data interfaces • **SRIOV-MGMT**—Supports SRIOV and its management interfaces • **CDROM-Bootstrapping**—Supports bootstrap configuration through CDROM ISO • **UserData-Bootstrapping**—Supports bootstrap configuration using CloudInit • **MGMT-VLAN-Tagged-Traffic**—Supports VLAN tagged traffic and its management interfaces • **DATA-VLAN-Tagged-Traffic**—Supports VLAN tagged traffic and its data interfaces • **Transparent-mode**—Supports insertion in transparent mode • **L3-mode**—Supports Layer 3 mode • **Direct-OAM-Reachability**—Enables service chaining of a third-party VNF

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 313 on page 660.

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 313: 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 **Upload Image** to upload VNF images for the centralized deployment through Administration Portal. See "Uploading a Device Image" on page 129. 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 **Add**. The Edit Bootstrap Script wizard appears.
Edit Bootstrap Script	Edit and save the script. If you want to discard your changes, click **Cancel** instead.
Script Type	Select the supported bootstrap script for the third-party VNF. Supported bootstrap script types are: • **bash** • **sh** • **python** • **perl** The default script type is bash.

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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 314 on page 662, 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 314: Assurance Parameters of the Network Function

Field	Description
Service Mode	Select the mode of network service that can be configured for the VNF. • **Transparent**—Used for services that do not modify the packet. Also known as *bump-in-the-wire* or *Layer 2 mode*. Example: Firewall, IDP, and so on. • **In-Network**—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. • **In-Network-NaT**—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. The default service mode is In-Network.
Bandwidth	Specify the data rate for the virtualized network function in megabytes per second (Mbps) or gigabytes per second (Gbps). Example: 185

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Table 314: Assurance Parameters of the Network Function (continued)

Field	Description
Latency	Specify the time a packet takes to traverse the virtualized network function in milliseconds (ms). Example: 5.8
Sessions	Specify the maximum number of sessions concurrently supported for the VNF. Example: 25,000
License cost	Specify the license cost for the virtualized network function in USD.

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

- Resource Designer Overview on page 651
- Creating Requests for VNF Packages on page 656
- Adding VNF Managers on page 664
- Publishing VNF Packages on page 665

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 315 on page 664.

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

Table 315: 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
Username	Specify the username that you configured for the VNF manager.
Password	Specify the password that you configured for the VNF manager. 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.
Plug In	Select the plug-in type. • **Built-In**—Built-in plug-in name. • **External Plugin**—Python plug-in package name.
Built-In	**PlugIn Name**—Specify the built-in plug-in name. Example: viptables

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Table 315: Add VNF Manager (continued)

Field	Description
External Plugin	• **PlugIn Name**—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 <Vendor><VNFM Name><Version>, and this can be installed through the PIP tool. • **Display Name**—Specify the display name for the VNF manager. • **Description**—Enter a description for your VNF manager. Make this description as clear and useful as possible for all administrators. • **Vendor**—Specify the vendor name that you want the external plug-in to support. • **EMS Name**—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. Example: Junos Space 15.1 and Versa Director 1.1.

Related Documentation

- About the Designs Page for the Resource Designer on page 666
- Designing VNF Packages on page 657

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 on page 651
- Creating Requests for VNF Packages on page 656
- About the Designs Page for the Resource Designer on page 666

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 316 on page 666 for field descriptions of the Designs page.
- Export a VNF package from the Resource Designer. See "Exporting VNF Packages" on page 668.
- Import a VNF package to the Resource Designer. See "Importing VNF Packages" on page 668.
- Clone a VNF Package. See "Cloning VNF Packages" on page 667.
- Modify the VNF package that you saved or published using the **Edit** option from the drop-down list. See "Designing VNF Packages" on page 657.
- Publish a VNF package. See "Publishing VNF Packages" on page 665.
- Delete a VNF package. See "Deleting VNF Packages" on page 669.

Field Descriptions

Table 316 on page 666 provides guidelines on using the fields on the Designs page for the Resource Designer.

Table 316: 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

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Table 316: Fields on the Designs Page for the Resource Designer (continued)

Field	Description
Status	View the VNF package status. • **Started** —An empty VNF package was created and the components need to be added. • **In-Progress** — A VNF package was created but the package is not validated. • **Validated**— Resource Designer validated the VNF package and it is ready to be published. • **Published**—Resource Designer published the VNF package and it is available from the Network Service Designer.

Related Documentation

- Resource Designer Overview on page 651
- About the Requests Page for the Resource Designer on page 654

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 on page 666
- Designing VNF Packages on page 657

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 on page 666
- Designing VNF Packages on page 657

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.

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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

- About the Designs Page for the Resource Designer on page 666
- Designing VNF Packages on page 657
- Importing VNF Packages on page 668

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 on page 651
- About the Designs Page for the Resource Designer on page 666

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CHAPTER 50

Network Service Designer introduction

- Network Service Designer Overview on page 671
- Accessing Network Service Designer on page 672

Network Service Designer Overview

Network Service Designer is a visual design tool to create and manage network services for the Juniper Networks Cloud CPE solution.

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 the Cloud CPE solution.

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 on page 673

- Accessing Network Service Designer on page 672

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 on page 671

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CHAPTER 51

Creating Requests for Network Services

- Network Services and Service Chains Overview on page 673
- Performance Overview on page 674
- About the Requests Page for the Network Service Designer on page 675
- Creating Requests for Network Services on page 676
- Creating a Functional Service Chain on page 678
- Configuring Performance Goals on page 678
- Viewing Requests for Network Services on page 680

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 12 on page 674.

  Using one VNF instance instead of multiple instances increases performance.

- Multiple instances of the same VNF, each providing certain functions. See Figure 13 on page 674.

  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 13 on page 674.

  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 12: Service Chain with One VNF Instance That Provides All Functions

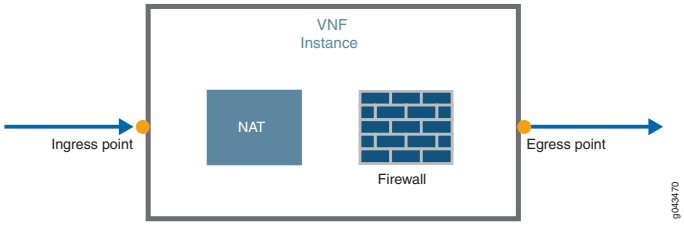
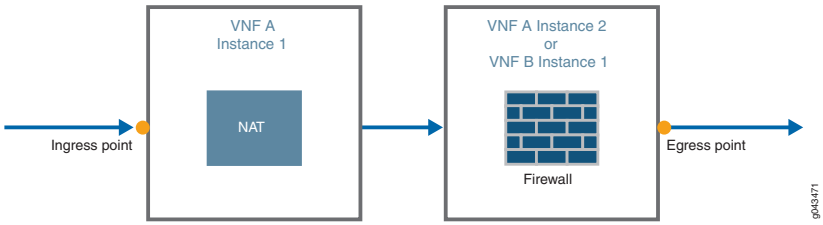


Figure 13: Service Chain with Either Multiple Instances of the Same VNF or Multiple VNFs



Related Documentation

- Performance Overview on page 674
- Designing Network Services on page 683
- Defining Ingress and Egress Points for a Service Chain on page 687

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.

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Related Documentation

- Configuring Performance Goals on page 678
- Monitoring Performance Goals on page 688
- VNF Overview on page 655
- Viewing Information About VNFs on page 683
- Designing Network Services on page 683

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 703.

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 676.
- Specify a sequence of network functions that you want in the network service. See "Creating a Functional Service Chain" on page 678.
- View open requests for network services. See "Viewing Requests for Network Services" on page 680.

Field Descriptions

Table 317 on page 675 provides guidelines on using the fields on the Requests page for the Network Service Designer.

Table 317: 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.

Table 317: Fields on the Requests Page for the Network Service Designer (continued)

Field	Description
Begin	Hover over a saved request and click **Begin** 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

- Network Service Designer Overview on page 671
- About the Designs Page for the Network Service Designer on page 703

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 318 on page 677.

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 318 on page 677.

6. Click **Next**.

   The Summary page appears that displays the details you entered for the request.

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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 318: Fields on the New Request Page

Field	Description
Request Information	
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 **Priority Request** check box.
Customer Name	(Optional) Specify a customer name. The Customer Name field accepts up to 60 characters, including letters, numbers, and symbols.
Description	(Optional) Specify a description for the service. The Description field accepts up to 500 characters, including letters, numbers, and symbols.
Requirements	(Optional) Specify the requirements for the request. The Requirements field accepts up to 1000 characters, including letters, numbers, and symbols.
Deployment Type	(Optional) Select a Deployment Type from the drop-down list. The available options are: • vCPE-Only • uCPE-Only The default option is vCPE-Only.
Attachments	(Optional) Click **Select Files**, navigate to the file you want to attach, and click **Open**. The file is uploaded to the Attachments (Optional) field.
Service Chain and Design Goals	
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 "Creating a Functional Service Chain" on page 678.
Goals	Configure the performance goals for a network service. You can define goals for the number of sessions, bandwidth, latency, and license cost. See "Configuring Performance Goals" on page 678.

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Table 318: Fields on the New Request Page (continued)

Field	Description
Summary	Review the details and make corrections if necessary, using the **Previous** and **Next** options to navigate through the pages.

Related Documentation

- Network Services and Service Chains Overview on page 673
- Performance Overview on page 674
- Designing Network Services on page 683
- Configuring Performance Goals on page 678
- Creating a Functional Service Chain on page 678

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 on page 676

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**.

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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 319 on page 679.

   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 319: Fields on the Performance Goal Page

Field	Description
Session	
Goal Value	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: • Session: 25,000–60,000 Min. of path • Bandwidth: 185–240 Mbps • Latency: 2–6 ms • License Cost: 100 USD
Acceptable Value	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. Example: • Session: 20,000 Min. of path • Bandwidth: 150 Mbps • Latency: 5 ms • License Cost: 99 USD
Must Value	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. Example: • Session: 15,000 Min. of path • Bandwidth: 100 Mbps • Latency: 4 ms • License Cost: 95 USD

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Table 319: Fields on the Performance Goal Page (continued)

Field	Description
Based on	View the method that is used by the Network Service Designer to evaluate how your design meets the goal. You cannot edit this field. Example: • Session: Min. of path If there are multiple VNFs in the service chain, then the VNF with the smallest bandwidth is chosen. • Bandwidth: Min. of path • Latency: Cumulative • License Cost: Cumulative
Unit	Specify the measurement unit of the goal. Example: • Bandwidth: Mbps, Gbps • Latency: ns, ms • License Cost: USD

Related Documentation

- Performance Overview on page 674
- Monitoring Performance Goals on page 688

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 on page 675

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CHAPTER 52

Creating Network Services

- About the Build Page for the Network Service Designer on page 681
- Viewing Information About VNFs on page 683
- Designing Network Services on page 683
- Connecting VNFs in a Service Chain on page 686
- Defining Ingress and Egress Points for a Service Chain on page 687
- Monitoring Performance Goals on page 688
- Configuring Network Services on page 689
- vSRX Configuration Settings on page 690
- LxCIPtable VNF Configuration Settings on page 697
- Cisco CSR-1000v VNF Configuration Settings on page 699
- Riverbed Steelhead VNF Configuration Settings on page 701

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 683.
- Design a service chain for both distributed and centralized deployment models. See "Designing Network Services" on page 683.
- Define the ingress and egress point for a service chain. See "Defining Ingress and Egress Points for a Service Chain" on page 687.
- Connect VNFs in a service chain. See "Connecting VNFs in a Service Chain" on page 686
- Configure the performance goals of a network service. See "Configuring Performance Goals" on page 678.
- Monitor the performance of a service. See "Monitoring Performance Goals" on page 688.

Field Descriptions

Table 320 on page 682 provides guidelines on using the fields on the Build page for the Network Service Designer.

Table 320: 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.
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.

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Related Documentation

- About the Designs Page for the Network Service Designer on page 703

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 on page 655
- Performance Overview on page 674

Designing Network Services

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 on page 684
- Designing a Network Service for a Distributed Deployment on page 685

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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.

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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

- Network Services and Service Chains Overview on page 673
- Performance Overview on page 674
- Defining Ingress and Egress Points for a Service Chain on page 687
- Connecting VNFs in a Service Chain on page 686
- Configuring Network Services on page 689

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.

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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 on page 673
- Designing Network Services on page 683

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 on page 673
- Designing Network Services on page 683
- Monitoring Performance Goals on page 688

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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

- Network Services and Service Chains Overview on page 673
- Performance Overview on page 674
- Designing Network Services on page 683
- Defining Ingress and Egress Points for a Service Chain on page 687

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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 Cloud CPE solution deployment script, other Contrail Service Orchestration 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

- vSRX Configuration Settings on page 690
- LxCIPtable VNF Configuration Settings on page 697
- Cisco CSR-1000v VNF Configuration Settings on page 699
- Riverbed Steelhead VNF Configuration Settings on page 701

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 321 on page 691 shows the settings you can configure for the virtual machine (VM) that contains the VNF.
- Table 322 on page 692 shows the firewall settings you can configure.

  NOTE: **Firewall is supported on both centralized deployment model and distributed deployment model.**

- Table 323 on page 694 shows the Network Address Translation (NAT) settings you can configure.

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NOTE: NAT is supported in distributed deployment model only.

- Table 324 on page 695 shows the unified threat management (UTM) settings you can configure.

NOTE: UTM is supported on both centralized deployment model and distributed deployment model.

Table 321: Fields for the vSRX Base Settings

Field	Description
Host Name	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. Example: vm-vsrx For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
Loopback Address	Specify an IPv4 loopback address for the management interface of the VM. Example: 192.0.2.25
DNS Servers	Specify the fully qualified domain names (FQDNs) or IP addresses of one or more DNS name servers. Example: 192.0.2.35
NTP Servers	Specify the FQDNs or IP addresses of one or more NTP servers. Example: 192.0.2.45
Syslog Servers	Specify the FQDNs or IP addresses of one or more system log servers. Example: 192.0.2.55
Enable Re-filter	Select **True** to enable a stateless firewall filter that protects the Routing Engine from denial-of-service (DoS) attacks or **False** to allow DoS attacks. Example: True
Enable Default Screens	For a cloud site, select **True** to enable the default screens security profile for the destination zone or **False** to disable default screening. Example: False You cannot configure this setting for an on-premise site.
Time Zone	Specify the time zone for the VM. Example: UTC

Table 321: Fields for the vSRX Base Settings (continued)

Field	Description
Right Interface	Specify the identifier of the VM interface that transmits data. Example: ge-0/0/1 For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
Left Interface	Specify the identifier of the VM interface that receives data. Example: ge-0/0/0 For an on-premise site, the vSRX application resides on the CPE device, and you cannot configure this setting.
SNMP Prefix List	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. Example: 10.0.2.0/24
Ping Prefix List	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. Example: 10.0.2.1/24
Space Servers	If you set the Enable Re-filter field to **True**, specify the IP addresses of the VMs that contain the Junos Space Virtual Appliances. Example: 10.0.2.50

Table 322: Fields for the vSRX Firewall Settings

Field	Description
Policy Name	Specify the name of the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols. Example: policy-1
Source Zone	Select the security zone from which packets originate. • **left**—Interface that transmits data to the host • **right**— Interface that receives data transmitted from the host 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 *context*. Example: left

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Table 322: Fields for the vSRX Firewall Settings (continued)

Field	Description
Destination Zone	Select the security zone to which packets are delivered. • **left**—Interface that transmits data to the host • **right**—Interface that receives data transmitted from the host 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 *context*. Example: right
Source Address	Specify the source IP address prefixes that the network service uses as match criteria for incoming traffic. To add source addresses: 1. Click the **Source Address** column. The source-address page appears. 2. Select **any** to match any source IP address of packets or **ipp** to match a specific prefix in the source IP address for which the application enforces the policy. 3. If you select **ipp**, specify a prefix. 4. Click **OK**. Example: 10.0.2.30
Destination Address	Specify the destination IP address prefixes that the network service uses as match criteria for outgoing traffic. To add a destination address: 1. Click the **Destination Address** column. The destination-address page appears. 2. Select **any** to match any source IP address of packets or **ipp** to match a specific prefix in the source IP address for which the application enforces the policy. 3. If you select **ipp**, specify a prefix. 4. Click **OK**. Example: 192.0.2.0/24
Action	Select **permit** to transmit packets that match the rule or **deny** to drop packets that match the rule. Example: permit

Table 322: Fields for the vSRX Firewall Settings (continued)

Field	Description
Application	Specify the applications to which the policy applies. The applications are based on protocols and ports. To specify applications: 1. Click the **Application** column. The application page appears. 2. In the allowed_apps field, select **any** to match any application or **app** to choose specific applications. If you select **app**, press and hold the Ctrl key and click the required applications from the drop-down list. • junos-tcp-any • junos-udp-any • junos-ftp • junos-http • junos-https • junos-icmp-all • junos-icmp-ping • junos-telnet • junos-tftp 3. Click **OK**. Example: • junos-tcp-any • junos-udp-any

Table 323: Fields for the vSRX NAT Settings

Field	Guidelines
NAT Source Name	Specify the source IP address of packets that the policy rules match. Example: 10.0.2.2/24
NAT Destination Name	Specify the destination IP address of packets that the policy rules match. Example: 10.0.2.3/24
NAT policy settings—For information about the following policy settings, see the firewall policy settings in Table 2. • Policy Name • Source Zone • Destination Zone • Source Address • Destination Address • Action • Application	

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Table 324: Fields for the vSRX UTM Settings

Field	Description
Antivirus	Select **True** to check for viruses in application layer traffic against a virus signature database. Select **False** to disable checking for viruses. Example: True
Antispam	Select **True** to block spam e-mails or **False** to allow spam e-mails. Example: True
Antispam Black List	Specify an address blacklist for local spam filtering. Blacklists contain e-mail addresses from which you do not want to receive messages. NOTE: When both the whitelist and blacklist are in use, the whitelist is checked first. If there is no match, then the blacklist is checked. Example: john@example.net
Antispam White List	Specify an address whitelist for local spam filtering. Whitelists contain e-mail addresses from which you want to receive messages. NOTE: When both the whitelist and blacklist are in use, the whitelist is checked first. If there is no match, then the blacklist is checked. Example: user@example.net
Antispam Action	Select the antispam action that you want the device to take when it detects spam: • **block**—Blocks the message • **tag-subject**—Tags the subject field with a preprogrammed string • **tag-header**—Tags the message header with a preprogrammed string Example: block
Content Filter	Select **True** to block different types of traffic based on the MIME type, file extension, protocol command, and embedded object type or **False** to permit these types of traffic. Example: True
Content Filter Extensions	Specify one or more file extensions to block over HTTP, FTP, SMTP, IMAP, and POP3 connections. Example: exe, pdf, js
Content Filter Mime	Specify the MIME types to be blocked or permitted over HTTP, FTP, SMTP, IMAP, and POP3 connections. Example: application, exe
Content Filter Protocol Commands	Specify commands for HTTP, FTP, SMTP, IMAP, and POP3 protocols to block traffic based on these commands. Example: put, mput

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Table 324: Fields for the vSRX UTM Settings (continued)

Field	Description
Content Filter Content Type	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: • Active X • Windows executable files (.exe) • HTTP cookie • Java applet • Zip files Example: activex, exe
Content Filter Apply To	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: • HTTP • FTP • POP3 • IMAP • SMTP Example: http, ftp
Web filter	Select **True** to prevent access to specific websites and embedded object types or **False** to permit access to all websites. Example: True
Web Filter Black List	Specify URLs to create a blacklist of websites to block. NOTE: A Web filtering profile can contain one whitelist or one blacklist with multiple user-defined categories, each with a permit or block action. Example: • www.example1.com • www.example2.com
Web Filter White List	Specify URLs to create a whitelist of websites that users can always access. 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 whitelist or blacklist based on its user-defined category. NOTE: A Web filtering profile can contain one whitelist or one blacklist with multiple user-defined categories, each with a permit or block action. Example: www.example3.net

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Table 324: 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. • Source Zone • Destination Zone • Source Address • Destination Address • Action • Application	

Related Documentation

- Configuring Network Services on page 689

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 325 on page 697 shows the base settings you can configure for the Linux container.
- Table 326 on page 698 shows the firewall settings you can configure.
- Table 327 on page 699 shows the Network Address Translation (NAT) settings you can configure.

Table 325: Fields for the LxCIP Base Settings

Field	Description
Loopback Address	Specify a loopback IP address. Example: 192.0.2.10
Operation	Select **add** to apply the policies to a specific route or **del** to prevent use of the policies on specific routes. Example: add

Table 325: Fields for the LxCIP Base Settings (continued)

Field	Description
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 326: Fields for the LxCIP Firewall Policy Settings

Field	Description
Firewall Policies	
Prevent SSH Brute	Select **True** to prevent SSH brute attacks or **False** to allow SSH brute attacks. Example: False
Prevent Ping Flood	Select **True** to prevent ping flood attacks or **False** to allow ping flood attacks. Example: False
Forwarding Rule Settings	
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
Operation	Select the operation, which applies to a chain of rules of the same type, from the drop-down list. The following options are available: • **append**—Append the rule to a rule chain. • **insert-before**—Insert the rule before a rule with the same name. • **delete**—Replace an existing rule with this name. Example: append
Source Address	Specify the source IP address prefix that the network service uses as a match criterion for outgoing traffic. Example: 192.0.2.20/24
Name	Specify the name for the rule. The field has no limit on the number of characters and accepts letters, numbers, and symbols. Example: vsrx-fw-policy

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Table 326: Fields for the LxCIP Firewall Policy Settings (continued)

Field	Description
Action	Select the action for the rule, which applies to all traffic that matches the specified criteria. • **accept**—Transmit packets that match the policy parameters. • **drop**—Drop packets that match the policy parameters. • **reject**—Reject packets that match the policy parameters. Example: accept
Service	Specify the service that you want the rule to match. Example: • http • smtp
Type	Select the type of packet that the rule matches. • **input**—Packets that the network service receives that are addressed to this VM • **forward**—Packets that the network service receives that are addressed to other VMs • **output**—Packets that the network service transmits The application creates a chain of all rules with a particular type. Example: input

Table 327: 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

- Configuring Network Services on page 689

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 328 on page 700 shows the base settings you can configure for the virtual machine (VM) that contains the VNF.
- Table 329 on page 700 shows the firewall settings you can configure.

Table 328: 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 329: 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

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Table 329: Fields for the CSR-1000v Firewall Settings (continued)

Field	Description
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: • http • https • telnet • ftp • tcp • udp • icmp Example: http, https
Right to Left Allowed Apps	Select the application from the drop-down list for which the policy is enforced for incoming packets. The following applications are available: • http • https • telnet • ftp • tcp • udp • icmp Example: ftp, udp

Related Documentation

- Configuring Network Services on page 689

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

- Configuring Network Services on page 689

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CHAPTER 53

Managing Network Services

- About the Designs Page for the Network Service Designer on page 703
- Publishing Network Service Designs on page 704
- Copying Network Service Designs on page 705
- Editing Network Service Designs on page 705
- Deleting Network Service Designs on page 706
- Viewing Network Service Designs on page 707

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 704
- Editing a network service design template. See "Editing Network Service Designs" on page 705
- Delete one or more network service designs. See "Deleting Network Service Designs" on page 706
- Copy one or more network service designs. See "Copying Network Service Designs" on page 705
- View complete details of a network service design. See "Viewing Network Service Designs" on page 707

Field Descriptions

Table 330 on page 704 provides guidelines on using the fields on the Designs page for the Network Service Designer.

Table 330: 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: • **Started**—Network Service Design template is created and the components need to be added. • **In-Progress**—Network Service Design template is created but the template has not been validated. • **Validated**—Network Service Design template is validated and it is ready to be published. • **Published**—Network Service Designer published the network service design template and it is available to the Customer Portal for use.

Related Documentation

- Network Service Designer Overview on page 671
- About the Requests Page for the Network Service Designer on page 675

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.

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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

- About the Designs Page for the Network Service Designer on page 703

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

- About the Designs Page for the Network Service Designer on page 703

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 Cloud CPE solution. 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

- About the Designs Page for the Network Service Designer on page 703

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.

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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

- About the Designs Page for the Network Service Designer on page 703

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

- About the Designs Page for the Network Service Designer on page 703

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PART 4

Service and Infrastructure Monitor

- Service and Infrastructure Monitor introduction on page 711
- Monitoring Activities in the Deployment on page 713

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CHAPTER 54

Service and Infrastructure Monitor introduction

- Service and Infrastructure Monitor Overview on page 711
- Accessing the Service and Infrastructure Monitor GUI on page 712

Service and Infrastructure Monitor Overview

Service and Infrastructure Monitor (SIM) operates with the third-party monitoring software Icinga to provide complete monitoring and troubleshooting of Contrail Service Orchestration.

When you install Contrail Service Orchestration, an Icinga agent is installed on servers and virtual machines (VMs), which enables Icinga to monitor data on:

- Physical servers
- VMs that host virtualized network functions (VNFs)
- VMs that host microservices

Service and Infrastructure Monitor collects events from microservices in Contrail Service Orchestration, and correlates the events to provide information about network service, their component VNFs, and the VMs that host the VNFs.

All data is presented through the Icinga GUI. You use the GUI to obtain both a quick visual display of Contrail Service Orchestration status and more detailed lists of event messages.

Colored squares, which may contain numbers, in the GUI provide a visual status of Contrail Service Orchestration network.

- A green square indicates the number of items that are working correctly.
- A yellow square indicates the number of items with potential problems to investigate.
- A red square indicates the number of items that are not working.
- A purple square indicates the number of items with a failed connection.

The following options in the left navigation pane of the Icinga GUI are customized for Contrail Service Orchestration:

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- Dashboard
- Network Services
- Infrastructure

Other features in the Icinga GUI are not customized and appear in the standard Icinga GUI.

Use this Service and Infrastructure Monitor documentation for information about using the customized options in the GUI. See the Icinga documentation for a general overview of the GUI and information about all non-customized features.

Related Documentation

- Monitoring Network Services on page 713
- Monitoring VNFs Used in Network Services and the VMs That Host the VNFs on page 714
- Monitoring Microservices on page 717
- Monitoring Microservices and Their Host VMs on page 718
- Monitoring Physical Servers on page 720

Accessing the Service and Infrastructure Monitor GUI

To access the GUI for Service and Infrastructure Monitor:

1. Using a web browser, access the URL for Service and Infrastructure Monitor:

   http://*central-IP-Address*:1947/icingaweb2

   central-IP-Address—IP address of the server or VM that hosts the microservices for the central point of presence (POP)

   For example:

   http://192.0.2.1:1947/icingaweb2

2. Log in with the username **icinga** and encrypted password.

Related Documentation

- Service and Infrastructure Monitor Overview on page 711

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CHAPTER 55

Monitoring Activities in the Deployment

- Monitoring Network Services on page 713
- Monitoring VNFs Used in Network Services and the VMs That Host the VNFs on page 714
- Monitoring Microservices on page 717
- Monitoring Microservices and Their Host VMs on page 718
- Monitoring Physical Servers on page 720

Monitoring Network Services

Service and Infrastructure Monitor displays information about network services running in the deployment. This information is related to the Network Service Overview on the dashboard, which displays information about component VNFs of network services and the VMs in which the VNFs reside. In this view, however, the focus is on the actual network service rather than its component VNFs and the VMs in which they reside.

To monitor network services:

1. In the left navigation pane, click **Network Services**.

   Service and Infrastructure Monitor displays an array of network services and monitoring parameters.

2. In the array, hover over an entry to see additional information for the entry.

3. Click a colored square to see detailed information for the entry.

Table 331 on page 713 shows the meaning of the monitoring parameters for network services.

Table 331: Parameters for Monitoring Network Services

Parameter	Meaning
Network Service	Name of the network service.

Table 331: Parameters for Monitoring Network Services (continued)

Parameter	Meaning
Network Service status	State of the network service and the time it entered that state. • Up—operational • Down—not operational
Num of Network Functions	Number of VNFs in the service chain.
Network Function	Number of network functions in a colored square that indicates the status of the instance. When you click the square you see: • An entry for each VNF in the service chain. • The status of the host in which the VNF resides. • The IP address of the host in which the VNF resides. • The name of the VNF. • The result from the last ping the Icinga agent sent to the host, including any loss of packets, and the round trip average (RTA) travel time.
Commands	Total number of commands issued to monitor the status of the network service since it became operational.
Command Status	Result of the commands issued to monitor the status of the network service. When you click the square you see: • A list of parameters for a specific network function and its host. • The state of the parameter and how long the parameter has been in that state. • Additional details about the state of the host.

Related Documentation

- Monitoring VNFs Used in Network Services and the VMs That Host the VNFs on page 714

Monitoring VNFs Used in Network Services and the VMs That Host the VNFs

On the dashboard, the Network Service Overview provides information about the VNFs used in network services and the VMs that host those VNFs. You can also view information about the component VNFs in a network service by clicking Monitor Network Services in the left navigation bar.

To view information about VNFs used in network services and the VMs that host the VNFs:

1. In the left navigation bar, click **Dashboard**.

   The dashboard appears, displaying several arrays of information.

2. (Optional) In the Network Services Overview array, hover over a colored square in the array to see the latest event message for a specific parameter and host.

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3. (Optional) In the Network Services Overview array, click a colored square to see detailed information for a specific parameter and host.

4. (Optional) In the Network Services Overview array, click an IP address to view all the event messages for a host.

5. (Optional) In the Network Services Overview array, click a parameter name to view event messages on all hosts for that parameter.

See Table 332 on page 715 for information about the monitoring parameters used for VNFs and the VMs that host them.

Table 332: Parameters for Monitoring VNFs and Their Host VMs

Parameter	Meaning
left_net_interface_input_pckt_rate	Rate of traffic entering the interface that transmits data to the host.
left_net_interface_output_pckt_rate	Rate of traffic leaving the interface that transmits data to the host.
left_net_interface_stats	State of the interface that transmits data to the network host. • Up—operational • Down—not operational
right_net_interface1_stats	State of the interface to which the host transmits data. • Up—operational • Down—not operational
right_net_interface_input_packet_rate	Rate of traffic entering the interface to which the host transmits data.
right_net_interface_output_packet_rate	Rate of traffic leaving the interface to which the host transmits data.
routing_engine_ctrlplane_memusage	Percentage of the Routing Engine's control plane memory that VM is using.
routing_engine_load_average	Mean percentage of available load capacity used by the Routing Engine's control plane.
routing_engine_system_cpu	Percentage of available CPU capacity used by the Routing Engine's control plane.
<VNF>_activesessions	Number of active sessions of the VNF compared to the maximum number of sessions allowed.
<VNF>_failedsessions	Number of sessions of the VNF that VNF Manager failed to activate.
<VNF>_performance_session	Number of sessions added (ramp-up rate) for the last 60 seconds. The value does not display the total number of sessions or the number of deleted sessions.
<VNF>_performance_spu	Services processing unit (SPU), percentage of CPU capacity that handles the data plane for the security service.

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Table 332: Parameters for Monitoring VNFs and Their Host VMs (continued)

Parameter	Meaning
check_flowd	Status of the forwarding process on the vSRX VNF. • Up—operational • Down—not operational
vsrx_activesessions	Number of active sessions of the vSRX VNF compared to the maximum number of sessions allowed.
vsrx_failedsessions	Number of sessions of the VNF that VNF Manager failed to activate.
vsrx_system_uptime	Amount of time since the vSRX VNF last became operational.
system_memory	Percentage of available RAM used by the vSRX VNF.
left_net_interface_status	State of the interface that transmits data to the network host. • Up—operational • Down—not operational
right_net_interface_status	State of the interface to which the host transmits data. • Up—operational • Down—not operational
right_net_interface_input_pckt_rate	Rate of traffic entering the interface to which the host transmits data.
right_net_interface_output_pckt_rate	Rate of traffic leaving the interface to which the host transmits data.
vsrx_nat_config	State of the vSRX NAT VNF. • Enabled—operational • Disabled—not operational
vsrx_firewall_config	State of the vSRX firewall VNF. • Enabled—operational • Disabled—not operational
vsrx_utm_config	State of the vSRX UTM VNF. • Enabled—operational • Disabled—not operational
vsrx_dpi_config	State of the DPI firewall VNF. • Enabled—operational • Disabled—not operational

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Table 332: Parameters for Monitoring VNFs and Their Host VMs (continued)

Parameter	Meaning
iptable_status	State of the LxCIPtable VNF. • Enabled—operational • Disabled—not operational
iptable_system_uptime	Amount of time since the LxCIPtable VNF last became operational
cisco_left_interface_status	State of the interface that transmits data to the network host for the CSR-1000V VNF. • Up—operational • Down—not operational
cisco_right_interface_status	State of the interface to which the host transmits data for the CSR-1000V VNF. • Up—operational • Down—not operational
cisco_left_input_packets	Rate of traffic entering the interface that transmits data to the host for the CSR-1000V VNF.
cisco_left_output_packets	Rate of traffic leaving the interface that transmits data to the host for the CSR-1000V VNF.
cisco_right_input_packets	Rate of traffic entering the interface to which the host transmits data for the CSR-1000V VNF.
cisco_right_output_packets	Rate of traffic leaving the interface to which the host transmits data for the CSR-1000V VNF.
cisco_system-uptime	Amount of time since the Cisco CSR-1000V VNF last became operational.
cisco_activesessions	Number of active sessions of the Cisco CSR-1000V VNF compared to the maximum number of sessions allowed.

Related Documentation

- Monitoring Network Services on page 713

Monitoring Microservices

Service and Infrastructure Monitor displays information about microservices running in each Cloud CPE solution implementation. This information is related to the CSP Microservervice Overview on the dashboard, which displays information about the VMs in which the microservices reside. In this view, however, the focus is on the actual microservice srather than the VMs in which they reside.

To monitor microservices:

1. In the left navigation pane, select **Infrastructure** > **CSP Microservices**.

Service and Infrastructure Monitor displays an array of CSP microservices and monitoring parameters.

2. (Optional) In the array, hover over an entry to see additional information for the entry.

3. (Optional) Click a colored square to see detailed information for the entry.

Table 333 on page 718 shows the monitoring parameters for microservices.

Table 333: Parameters for Monitoring Microservices

Parameter	Meaning
CSP Microservice	Name of the microservice.
Microservice status	State of the microservice and the time it entered that state. • Up—operational • Down—not operational
Number of Instances	Number of instances of the microservice.
Instance Status	Number of microservices in a colored square that indicates the status of the instance. When you click the square you see: • The status of the host in which the micorservice resides. • The IP address of the host in which the microservice resides. • The name of the microservice. • The result from the last ping the Icinga agent sent to the host, including any loss of packets, and the round trip average (RTA) travel time.
Monitor Commands	Total number of commands issued to monitor the status of the microservice since it became operational.
Command Status	Result of the commands issued to monitor the status of the microservice. When you click the square you see: • A list of parameters for a specific host. • The state of the parameter and how long the parameter has been in that state. • Additional details about the state of the host.

Related Documentation

- Monitoring Microservices and Their Host VMs on page 718

Monitoring Microservices and Their Host VMs

On the dashboard, the CSP Microservices Overview provides information about the VMs that host microservices. The focus of the CSP Microservices Overview is the VMs that host the microservices.

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To monitor microservices and their host VMs:

1. In the left navigation bar, click **Dashboard**.

   The dashboard appears, displaying several arrays of information.

2. (Optional) In the CSP Microservices Overview array, hover over a colored square in the array to see the latest event message for a specific parameter and host.

3. (Optional) In the CSP Microservices Overview array, click a colored square to see detailed information for a specific parameter and host.

4. (Optional) In the CSP Microservices Overview array, click an IP address to view all the event messages for a host.

5. (Optional) In the CSP Microservices Overview array, click a parameter name to view event messages on all hosts for that parameter.

See Table 334 on page 719 for information about the monitoring parameters used for VNFs and the VMs that host them.

Table 334: Parameters for Monitoring VNFs and Their Host VMs

Parameter	Meaning
check cpu usage	Percentage of unused CPU capacity
check disk IO	Status of host's input and output mechanisms for storage
check disk usage	Available storage on the VM that hosts the microservice
check elasticsearch	Number of processes associated with the database
check load average	Measure of load compared to specified values for warning and critical states
check memory usage	Percentage of RAM and swap memory used
check network usage	Percentage of network resources used
check nsdui	Availability of the Network Service Designer application
check open files	Number of open files compared to specified values for warning and critical states
check paging stats	Amount of data moved from RAM to swap memory compared to specified values for warning and critical states
check socket usage	Number of software connections compared to specified values for warning and critical states

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Table 334: Parameters for Monitoring VNFs and Their Host VMs (continued)

Parameter	Meaning
check_contrail_api	Number of Contrail API processes
check_contrail_config	Number of Contrail configuration processes
check_contrail_control	Number of Contrail control processes
check_contrail_database	Number of Contrail database processes
check_contrail_vrouter	Number of Contrail Vrouter processes
check_contrail_vrouter_agent	Number of Contrail Vrouter agent processes
check_contrail_web	Number of Contrail web core processes
check_ifmap_server	Number of Interface for Metadata Access Points (IF-MAP) processes
check_nova_api	Number of Nova API processes

Related Documentation

- Monitoring Microservices on page 717

Monitoring Physical Servers

Service and Infrastructure Monitor tracks the state of each physical server on which the Icinga agent is installed.

To monitor physical servers:

1. In the left navigation bar, click select **Infrastructure** > **CSP Bare Metal**.

   Service and Infrastructure Monitor displays an array of physical servers and monitoring parameters.

2. In the array, hover over an entry to see additional information for the entry.

3. Click a colored square to see detailed information for the entry.

See Table 335 on page 721 for information about the parameters.

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Table 335: Parameters for Monitoring Physical Servers

Parameters	Meaning
Group Status	State of the server cluster and the time when it entered that state. • Up—Operational • Down—Not operational
Number of Servers	Number of servers in the server cluster.
Server Status	Number of servers in a colored square that indicates the status of the servers. When you click the square you see: • An entry for each server in the cluster. • The status of the server. • The IP address of the server. • The hostname of the server. • The result from the last ping the Icinga agent sent to the server, including any loss of packets, and the round trip average (RTA) travel time.
Commands	Total number of commands issued to monitor the status of the server since it became operational.
Command Status	Result of the commands issued to monitor the status of the server. When you click the square you see: • A list of parameters for a specific server. • The state of the parameter and how long the parameter has been in that state. • Additional details about the state of the server.

Related Documentation

- Service and Infrastructure Monitor Overview on page 711

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