



Junos[®] Space

Connectivity Services Director Quick Start Guide

Release
2.0



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Junos® Space Connectivity Services Director Quick Start Guide
2.0

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Connectivity Services Director Installation Overview

Junos Space Connectivity Services Director is a robust and holistic application that facilitates automated design and provisioning of Layer 2 VPN and Layer 3 VPN services, configuration and provisioning of RSVP-signaled label-switched path (LSP) services, configuration of quality-of-service (QoS) profiles, validation and monitoring of service performance, and management of timing or clock synchronization using Precision Time Protocol (PTP). Connectivity Services Director enables unified management of the ACX Series routers, M Series routers, MX Series routers, PTX Series routers, and TCA Series Timing Appliances in your network. It provides for full network life cycle management by simplifying the discovery, configuration, visualization, monitoring, and administration of large networks containing physical and virtual devices.

This application is built to run on Junos Space Network Management Platform—an open, secure and scalable software platform that allows customers, partners and developers to build and deploy simple, smart applications to manage and analyze network element data and optimize network infrastructure and operations management.

This Quick Start Guide describes how you can quickly set up a Junos Space Appliance in a single-node configuration, install Connectivity Services Director (which also installs the Connectivity Services Director API), and bring your devices under Connectivity Services Director management.

You can install Connectivity Services Director in one of the following hardware configurations:

- A Juniper Networks JA2500 Junos Space Hardware Appliance—The JA2500 appliance is a dedicated hardware device that provides the computing power and specific requirements to run Connectivity Services Director as an application. The

The JA2500 appliance has a 2-U, rack-mountable chassis with dimensions 17.81 in. x 17.31 in. x 3.5 in. (45.2 cm x 44 cm x 8.89 cm). The JA2500 appliance ships with a single AC power supply module; an additional power supply module can be installed in the power supply slot in the rear panel of the appliance. The JA2500 appliance can also be powered on by using one or two DC power supply modules. The appliance has six 1-TB hard drives arranged in a RAID 10 configuration. Two externally accessible cooling fans provide the required airflow and cooling for the appliance.

For details about the JA2500 appliance and instructions for installation, see [Installing Juniper Networks Junos Space JA2500 Appliance](#).

- Junos Space Virtual Appliance—The Junos Space Virtual Appliance consists of preconfigured Junos Space Network Management Platform software with a built-in operating system and application stack that is easy to deploy, manage, and maintain. A Junos Space Virtual Appliance includes the same software and provides all the functionality available in a Junos Space physical appliance. However, you must deploy the virtual appliance on the VMware ESX or ESXi server, which provides a CPU, hard disk, RAM, and a network controller, but requires installation of an operating system and applications to become fully functional.

For information about installing Junos Space appliances in a fabric configuration and installing Junos Space Virtual Appliance on a VMware ESX or ESXi server, see [Junos Space Virtual Appliance](#).

Follow all safety warnings and precautions as specified in [General Safety Guidelines and Warnings](#).

The following sections describe the basic steps to install and configure Connectivity Services Director on a Junos Space JA2500 Appliance:

- [Configuring Basic Junos Space Settings on page 2](#)
- [Upgrading Junos Space on page 5](#)
- [Installing Connectivity Services Director on page 8](#)
- [Upgrading Connectivity Services Director on page 11](#)
- [Uploading DMI Schemas on page 20](#)
- [Preparing Devices for Management by Connectivity Services Director on page 21](#)
- [Discovering Devices on page 22](#)
- [Next Steps on page 27](#)

[Configuring Basic Junos Space Settings](#)

The basic configuration procedure for setting up the hardware appliance to run as a single Junos Space node is summarized here. For complete configuration steps, see [Configuring a Junos Space Appliance](#) or [Configuring the Basic Settings of a Junos Space Virtual Appliance](#).

You need two IP addresses on the same subnet to complete the configuration. The first IP address is for the eth0 interface on the appliance; the second IP address is for accessing Junos Space by using the Web GUI.

1. At the serial console login prompt, type the default username (**admin**) and press Enter.
2. Type the default password (**abc123**) and press Enter.
You are prompted to change your password.
3. To change the default password, do the following:
 - a. Type the default password and press Enter.
 - b. Type a new password and press Enter.
 - c. Retype the new password and press Enter.

If the password is changed successfully, the message **passwd: all authentication tokens updated successfully** is displayed.

**NOTE:**

- All passwords are case-sensitive.
- A valid password must contain at least eight characters, of which at least three are of the following four character classes: uppercase letters, lowercase letters, numbers (0 through 9), and special characters and must not contain a single uppercase letter at the beginning or only a single number at the end.

For example, Abcdwip9, Qc9rdiwt, and bRfjvin9 are invalid passwords, but AAbcdwip99, Qc9rdiwtQ, and bRfjvin99 are valid passwords.

- Alternatively, instead of using a string of characters, you can choose a passphrase that contains between 16 through 40 characters, and includes at least three dictionary words separated by at least one special character. For example, big#three;fork (contains 14 characters) and circlefaceglass (no special characters) are invalid while @big#three;fork& and circle;face;glass are valid.

4. Enter the new password to log in to the appliance.
5. Type **s** to proceed with the configuration of the appliance as a Junos Space node with full Junos Space Network Management Platform functionality. Every Junos Space installation requires at least one Junos Space node.
6. Select IPv4 or IPv6 as the option for IP addresses and specify the following details:
 - a. Enter a new IP address for the interface eth0; for example, 10.10.20.15.
 - b. Enter a subnet mask for the interface eth0.



NOTE: If you are configuring the appliance as part of a cluster (fabric), then all nodes in that fabric must be in the same subnet.

For more information about the Junos Space fabric, see the *Fabric Management* chapter in the *Junos Space Network Management Platform User Guide* (available at http://www.juniper.net/techpubs/en_US/release-independent/junos-space/index.html).

- c. Enter the IP address for the default gateway; for example: 10.10.20.1.



NOTE: For detailed steps on configuring network settings, see [Configuring a Junos Space Appliance as a Junos Space Node](#).

7. Enter the DNS name server address for the interface eth0; for example, 192.168.15.168.
8. Enter **n** as the response to the prompt: **Configure a separate interface for device management? [y/n]**.

9. Enter **n** as the response to the prompt: **Will this Junos Space system be added to an existing cluster? [y/n]**.
10. Enter the IP address for the Web server. This IP address must be in the same subnet as the IP address for the interface eth0, but a separate address; for example, 10.10.20.18.
11. Add an NTP server to synchronize the node with an external NTP source; for example, you can specify ntp.example.com as the external NTP server.
12. Enter the display name (logical node name) for this node; for example, tp-junosspace-01.
13. Enter the password for the appliance when it is in maintenance mode. The maintenance mode administrator must specify this password to access maintenance mode and shut down all nodes.
14. Reenter the password to confirm it. The system displays the settings summary.

Settings Summary:

```
> IP Change: eth0 is 10.10.20.15 / 255.255.255.0
> Default Gateway = 10.10.20.1 on eth0
> DNS add: 192.168.15.168
> Create as first node or standalone
> NTP add: ntp.example.com
> Web IP address is 10.10.20.18
> Node display name is "tp-junosspace-01"
> Password for Junos Space maintenance mode is set.
```

```
A> Apply settings
C> Change settings
Q> Quit and set up later
R> Redraw Menu
```

Choice (ACOR):

15. Review the summary. If the settings are correct, enter **A** to apply the settings. The system initializes and the initialization messages appear before the system displays the Junos Space Appliance settings menu.

Choice [ACQR]: A

```
.
.
.
```

Last login: Wed Feb 6 18:16:25 on ttyS0

Welcome to the Junos Space network settings utility.

Initializing, please wait

Junos Space Settings Menu

```
1> Change Password
2> Set DNS Servers
```

```
3> Change Time Options
4> Retrieve Logs
5> Security
6> (Debug) run shell
```

```
Q> Quit
R> Redraw Menu
```

```
Choice [1-6,QR]:
```

16. Type **Q** to quit the session. The configuration of the JA2500 Appliance is now complete.

Upgrading Junos Space

Connectivity Services Director Release 2.0 is supported on Junos Space Network Management Platform Release 15.2R1. If your appliance is running the supported version of Junos Space, you can skip this procedure and begin installation of Connectivity Services Director.

If your appliance is running a Junos Space release that is earlier than the supported release, you need to upgrade Junos Space before installing Connectivity Services Director. To determine the Junos Space release version and to upgrade Junos Space, follow these steps:

1. Determine the installed Junos Space version:
 - a. Log in to Junos Space by using the default username and password for Junos Space: **super** and **juniper123**.
Junos Space opens the dashboard.
 - b. Click the plus symbol (+) next to Administration to expand the Administration menu.
 - c. Click **Applications** to list all of the applications installed.
 - d. Note the version of the Network Management Platform or the Network Application Platform. (Some earlier versions of the Network Management Platform were named Network Application Platform.) If the currently installed release is a supported one, you can skip the rest of this procedure; if not, you must upgrade the Network Management Platform to a supported release.
2. Determine how many releases you need to install to bring the software up to minimum requirements.
Junos Space supports upgrades from the last two versions. For example, Junos Space Release 15.1 supports upgrading from Release 14.1 or 13.3. Upgrades from releases still earlier require multiple steps.
3. Open a new browser page, log in to the Juniper customer support portal, and download the required Junos Space version to either the hard disk or to an SCP server. The Junos Space software images are located at <http://www.juniper.net/support/downloads/?p=space>.

4. Return to your Junos Space session after the download completes.
5. Upgrade Junos Space Network Management Platform to a supported release.

Complete installation steps are provided at [How Do I Upgrade Junos Space?](#).



NOTE: If Connectivity Services Director (CSD) Release 1.0R2.6 is installed on Junos Space Platform 15.1R1 and you try to upgrade to Junos Space Platform Release 15.2R1, the upgrade fails. This issue occurs because of a conflict between two RPM files.

Workaround:

1. Before upgrading Junos Space Platform, do the following:



NOTE: If your Junos Space setup contains more than one node, you must perform these steps for all nodes in the fabric.

- a. Connect to the Junos Space VIP node (by using SSH) and log in (as the admin user) to access the Junos Space CLI.
The Junos Space Settings Menu appears.
 - b. Type 6 (if the node is a hardware appliance) or 7 (if the node is a virtual appliance) to open a debug (command) prompt.
You are prompted to enter your password.
 - c. Type the password for the admin user and press Enter.
You are taken to the shell.
 - d. Run the `rpm -qa|grep jmp-csd` command to determine the CSD RPM to uninstall. A sample output is as follows:


```
[root@host ~]# rpm -qa|grep jmp-csd
jmp-csd-1.0-367423
```
 - e. Run the `rpm -e --nodeps rpm-name` command to uninstall the RPM, where *rpm-name* is the name of the RPM obtained in the preceding step.
 - f. Run the `rpm -qa|grep jmp-csd` command to confirm that the RPM was uninstalled successfully. The command produces no output if the RPM was uninstalled successfully.
 - g. Exit the shell and log out of the Junos Space VIP node.
2. Upgrade Junos Space Platform from Release 15.1R1 to Release 15.1R2.
 3. After Junos Space Platform is upgraded successfully, reinstall the CSD RPM that you previously uninstalled:



NOTE: If your Junos Space setup contains more than one node, you must perform these steps for all nodes in the fabric.

- a. Log in to the Junos Space CLI on the VIP node and access the shell.

- b. Run the `/usr/bin/extract_image.sh -i /var/cache/jboss/jmp/Connectivity-Services-Director.1.0R2.6/Connectivity-Services-Director.1.0R2.6img -s /etc/pki/jmp-softwareManager/certs/JunosSpaceSoftwareCA_v1.pem -t /etc/pki/jmp-softwareManager/certs/JunosSpaceTrusted_CAs.pem -d /home/admin/` command to extract the CSD RPM that you previously uninstalled from the CSD software image.

The RPM is extracted to the `/home/admin/Connectivity-Services-Director.1.0R2.6` directory.

- c. Run the `rpm -ivh --force jmp-csd-1.0-367423.x86_64.rpm` command to install the CSD RPM. A sample output follows.

```
[root@space-0050569e39b6 ~]# rpm -ivh --force
jmp-csd-1.0-367423.x86_64.rpm
  Preparing...
##### [100%]
  1: jmp-csd
##### [100%]
  File exists so just check for the strings      modprobe
ip_contrack_ftp present
  modprobe ip_contrack_tftp present
  File exists so just check for the strings
  string present - so just replace the value
```

- d. Exit the shell and log out of the Junos Space VIP node.
4. Reboot Junos Space Platform to finish the upgrade.

Installing Connectivity Services Director

The software image for Connectivity Services Director Release 2.0 enables you to install the Connectivity Services Director GUI. Also, Network Activate, Transport Activate, OAM Insight, and Sync Design are installed and presented in the same look-and-feel as the Services Activation Director GUI, after you install Connectivity Services Director. The Representational State Transfer (REST) APIs for Connectivity Services Director are installed along with the GUI.

When you install Connectivity Services Director, the single application package installs the capabilities for configuring network services, such as point-to-point, Layer 3 VPN, and VPLS; configuring MPLS and RSVP label-switched path (LSP) services; configuring Precision Time Protocol (PTP) and synchronous Ethernet services; configuring the Operations, Administration, and Maintenance (OAM) functionality; and configuring CoS profiles. For Connectivity Services Director Release 2.0, you can also access the Services Activation Director GUI to launch workspaces to configure functionalities that are not available in the Connectivity Services Director GUI. You need not separately install the different applications, such as Network Activate or Transport Activate, based on your deployment needs and device models to be managed, on a JA2500 Junos Space Appliance or a Junos Space Virtual Appliance that satisfies the hardware requirements.

Before you begin:

- Connectivity Services Director is supported on a JA2500 Junos Space Appliance or a Junos Space Virtual Appliance that meets the hardware requirements specified in the Junos Space documentation. The Junos Space Appliance that suits your requirement depends on the number of devices you plan to manage by using the network management application.
- If Connectivity Services Director Release 1.0 or 1.1 is installed on the Junos Space Appliance, then you must uninstall it and restart the JBoss server before installing Connectivity Services Director Release 2.0.
- You cannot install Network Director or Edge Services Director on the same system as Connectivity Services Director. Uninstall Network Director or Edge Services Director before you install Connectivity Services Director on your system.
- Download Connectivity Services Director Release 2.0 software image to the hard disk or to an SCP server. Open a new browser page, log in to the Juniper software downloads page and download the required Connectivity Services Director version to either the hard disk or to an SCP server. The Connectivity Services Director software images are located at the [Junos Space and Junos Space Connectivity Services Director Download](#) page.
- When you back up the database of a Junos Space Appliance by using the Junos Space Network Application Platform database backup and restore facility, all the data maintained by the Junos Space Platform and installed Junos Space applications on the appliance is backed up. If your appliance contains a Junos Space application, such as Service Now, that you do not want to use in your network after upgrading to a different version of Junos Space Platform, you must ensure that you uninstall such applications before you perform a backup. This condition occurs because all the backed up data is restored when you use the restore utility to reapply the data after an upgrade operation. As a result, if your device was previously installed with a Junos Space application that you have not reinstalled after upgrading Junos Space Platform, restoring the backed up data causes undefined behavior because the backup in such a scenario also contains data of applications that you have not reinstalled.

To perform a fresh installation of Connectivity Services Director Release 2.0:

1. Install Junos Space Network Management Platform Release 15.2R2.



NOTE: If your device is running a Junos Space Platform Release earlier than Release 15.2R2, you must first upgrade to Release 15.2R2.

2. Install Connectivity Services Director Release 2.0.



NOTE: The JBoss server restarts automatically.

To install Connectivity Services Director from the Administration > Applications page of Junos Space:

1. Click the plus symbol (+) on the top left of the page.
2. Click either **Upload via HTTP** or **Upload via SCP** and upload the image as follows:

To upload Connectivity Services Director by using HTTP:

- a. Click **Upload via HTTP** to open the dialog box.
- b. Navigate to the local location where the Connectivity Services Director or the Connectivity Services Director API image is stored.
- c. Select the image file and click **Open** to load the path.
- d. Click **Upload** to load the image file into Junos Space.

To upload Connectivity Services Director by using SCP:

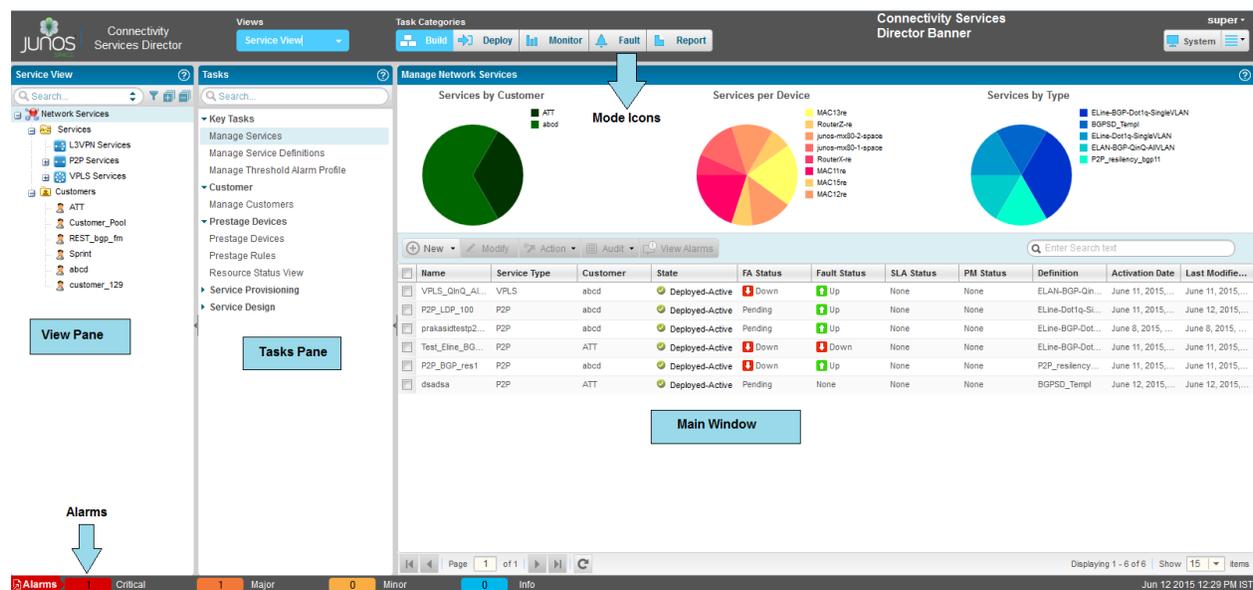
- a. Click **Upload via SCP** to open the Upload dialog box.
 - b. Enter the secure copy credentials to upload the image from a remote server to Junos Space.
 - Enter the username.
 - Enter the password and reenter the password in the Confirm Password field.
 - Enter the host IP address.
 - Enter the local path name of the Connectivity Services Director application file.
 - c. Click **Upload** to load the image file into Junos Space.
3. Click **OK** to skip viewing the job results.
 4. Select **Connectivity Services Director** and click **Install**.
 5. Click **OK** in the Application Configuration window dialog box.

You can check the Job Status page to view the progress of the installation job. Once the installation completes, Connectivity Services Director appears on the Applications inventory page. The new application also appears in the Application Chooser (at the upper-left corner).

6. Download the DMI schemas for devices that require a later schema, and upload the schema to the Junos Space.
7. To work with Connectivity Services Director, select **Connectivity Services Director** from the Applications list in the upper left corner above the Tasks tree.

Connectivity Services Director starts in your browser window and opens the default view as shown in [Figure 1 on page 11](#).

Figure 1: Connectivity Services Director Interface



8. Bookmark this page in your browser for future use.

You can use the bookmarked URL to log in to Connectivity Services Director without logging in to Junos Space first.

9. Do the following depending on your networking requirements:

- Perform the initial configuration of Connectivity Services Director. See [“Preparing Devices for Management by Connectivity Services Director”](#) on page 21.

Upgrading Connectivity Services Director

You can upgrade Connectivity Services Director from Release 1.0R2 to Connectivity Services Director Release 2.0R1.

Before you begin:

- Junos Space Platform Release 15.2R2 must be running before you begin to install Connectivity Services Director Release 2.0.
- Connectivity Services Director is supported on a JA2500 Junos Space Appliance or a Junos Space Virtual Appliance that meets the hardware requirements specified in the Junos Space documentation. The Junos Space Appliance that suits your requirement depends on the number of devices you plan to manage by using the network management application.
- You cannot install Network Director or Edge Services Director on the same system as Connectivity Services Director. Uninstall Network Director or Edge Services Director before you install Connectivity Services Director on your system.
- When you back up the database of a Junos Space Appliance by using the Junos Space Network Application Platform database backup and restore facility, all the data

maintained by the Junos Space Platform and installed Junos Space applications on the appliance is backed up. If your appliance contains a Junos Space application, such as Service Now, that you do not want to use in your network after upgrading to a different version of Junos Space Platform, you must ensure that you uninstall such applications before you perform a backup. This condition occurs because all the backed up data is restored when you use the restore utility to reapply the data after an upgrade operation. As a result, if your device was previously installed with a Junos Space application that you have not reinstalled after upgrading Junos Space Platform, restoring the backed up data causes undefined behavior because the backup in such a scenario also contains data of applications that you have not reinstalled.

Before you start the upgrade, ensure that you have:

- Disabled monitoring for all categories in the Monitoring tab of the Preferences page. For more details, see [Disabling Data Collection for Monitors](#).
- Taken a back up your database using the Junos Space backup feature. For more details, see [Backing Up and Restoring the Database Overview](#).
- Junos Space Release 15.2R2 is running on your appliance. If your appliance is running an unsupported release of Junos Space, you must upgrade Junos Space before installing Connectivity Services Director. For step-by-step instructions on upgrading Junos Space, see [Upgrading Junos Space](#).
- Downloaded the Connectivity Services Director Release 2.0R1 software image to the hard disk or to an SCP server. The Connectivity Services Director software images are located at <http://www.juniper.net/support/downloads/space.html> .



NOTE: If Connectivity Services Director Release 1.0R2.6 is installed on Junos Space Platform 15.1R1 and you try to upgrade to Junos Space Platform Release 15.2R2, the upgrade fails. This issue occurs because of a conflict between two RPM files.

Workaround:

1. Before upgrading Junos Space Platform, do the following:



NOTE: If your Junos Space setup contains more than one node, you must perform these steps for all nodes in the fabric.

- a. Connect to the Junos Space VIP node (by using SSH) and log in (as the admin user) to access the Junos Space CLI.
The Junos Space Settings Menu appears.
- b. Type 6 (if the node is a hardware appliance) or 7 (if the node is a virtual appliance) to open a debug (command) prompt.
You are prompted to enter your password.
- c. Type the password for the admin user and press Enter.
You are taken to the shell.
- d. Run the `rpm -qa|grep jmp-csd` command to determine the Connectivity Services Director RPM to uninstall. A sample output is as follows:


```
[root@host ~]# rpm -qa|grep jmp-csd
jmp-csd-1.0-367423
```
- e. Run the `rpm -e --nodeps rpm-name` command to uninstall the RPM, where *rpm-name* is the name of the RPM obtained in the preceding step.
- f. Run the `rpm -qa|grep jmp-csd` command to confirm that the RPM was uninstalled successfully. The command produces no output if the RPM was uninstalled successfully.
- g. Exit the shell and log out of the Junos Space VIP node.

2. Upgrade Junos Space Platform from Release 15.1R1 to Release 15.2R2.
3. After Junos Space Platform is upgraded successfully, reinstall the Connectivity Services Director RPM that you previously uninstalled:



NOTE: If your Junos Space setup contains more than one node, you must perform these steps for all nodes in the fabric.

- a. Log in to the Junos Space CLI on the VIP node and access the shell.

- b. Run the `/usr/bin/extract_image.sh -i /var/cache/jboss/jmp/Connectivity-Services-Director.1.0R2.6/Connectivity-Services-Director.1.0R2.6img -s /etc/pki/jmp-softwareManager/certs/JunosSpaceSoftwareCA_v1.pem -t /etc/pki/jmp-softwareManager/certs/JunosSpaceTrusted_CAs.pem -d /home/admin/` command to extract the Connectivity Services Director RPM that you previously uninstalled from the Connectivity Services Director software image.

The RPM is extracted to the `/home/admin/Connectivity-Services-Director.1.0R2.6` directory.

- c. Run the `rpm -ivh --force jmp-csd-1.0-367423.x86_64.rpm` command to install the Connectivity Services Director RPM. A sample output follows.

```
[root@space-0050569e39b6 ~]# rpm -ivh --force
jmp-csd-1.0-367423.x86_64.rpm
  Preparing...
##### [100%]
  1: jmp-csd
##### [100%]
  File exists so just check for the strings      modprobe
ip_contrack_ftp present
  modprobe ip_contrack_tftp present
  File exists so just check for the strings
  string present - so just replace the value
```

- d. Exit the shell and log out of the Junos Space VIP node.

4. Reboot Junos Space Platform to finish the upgrade.
-

A prescribed order is always required for the upgrade of Connectivity Services Director. Use the following table to determine the order required for your upgrade:

Type of Upgrade or Installation	Required Order of Installation
Upgrade from Connectivity Services Director Release 1.0R1 or 1.0R2 to Release 2.0	

Type of Upgrade or Installation	Required Order of Installation
	<p>Before you start the upgrade, ensure that you have:</p> <ul style="list-style-type: none"> • Disabled monitoring for all categories in the Monitoring tab of the Preferences page. For more details, see Disabling Data Collection for Monitors. • Taken a back up your database using the Junos Space backup feature. For more details, see Backing Up and Restoring the Database Overview. • Junos Space Release 15.2R2 running on your appliance. If your appliance is running an unsupported release of Junos Space, you must upgrade Junos Space before installing Connectivity Services Director. • Downloaded the Connectivity Services Director Release 2.0 software image to the hard disk or to an SCP server. The Connectivity Services Director software images are located at http://www.juniper.net/support/downloads/space.html. <ol style="list-style-type: none"> 1. Ensure that Junos Space Network Management Platform Release 15.2R2 is running. 2. Install Connectivity Services Director Release 2.0R1. 3. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups: <ul style="list-style-type: none"> To restart the JBoss server in a standalone setup: <ol style="list-style-type: none"> a. Stop the watchdog, domain controller, and JBoss services on the standalone node. <pre>service jmp-watchdog stop service jboss-dc stop service jboss stop</pre> b. Start the watchdog service. <pre>service jmp-watchdog start</pre> <p>NOTE: Starting the watchdog service restarts the JBoss and domain controller services as well.</p> <p>It takes approximately 20 minutes for the JBoss server to come up after the restart.</p> To restart the JBoss server in a cluster setup: <ol style="list-style-type: none"> a. Stop the services on the secondary node. <pre>service jmp-watchdog stop service jboss stop</pre> b. Stop the services on the master node (You can find the VIP hosted node Space > Fabric). <pre>service jmp-watchdog stop service jboss-dc stop service jboss stop</pre> c. Start the services on the master node. <pre>service jmp-watchdog start</pre> d. Start the service on the secondary node. <pre>service jmp-watchdog start</pre> <p>It takes approximately 20 minutes for the JBoss server to come up after the restart.</p>

Type of Upgrade or Installation	Required Order of Installation
Upgrade from Network Activate Release 14.3R1, Transport Activate 14.3R1, OAM Insight 14.3R1 and Sync Design 14.3R1 to Connectivity Services Director Release 2.0	<p>NOTE: You cannot directly upgrade to Connectivity Services Director Release 2.0 from the applications in Services Activation Director Release 14.3R1 or 14.3R2, such as Network Activate, NetworkAppsApi, Transport Activate, OAM Insight, QoS Design, and Sync Design. You must first upgrade from Services Activation Director Release 14.3R1 or 14.3R2 to Connectivity Services Director Release 1.0R2, and then upgrade to Connectivity Services Director Release 2.0.</p> <p>If you are running a version of Network Activate, Transport Activate, OAM Insight, or Sync Design earlier than 14.3R1, you must first upgrade to 14.3R1 or later before you can upgrade to Connectivity Services Director 1.0R2.</p> <ol style="list-style-type: none"> 1. Back up the Junos Space Network Management Platform database. 2. Upgrade Junos Space Platform to Release 15.1R1. 3. Install Connectivity Services Director 1.0R2. 4. Uninstall other applications (such as Junos Space QoS Design or Junos Space Transport Activate) as needed before you uninstall Network Activate. 5. Uninstall Network Activate and NetworkAppsApi. 6. Restart the JBoss server. <p>NOTE: QoS Design cannot be installed on the same system as Connectivity Services Director. After the uninstallation of the legacy applications, such as Network Activate 14.3R1, Transport Activate 14.3R1, Sync Design 14.3R1, or OAM Insight 14.3R1, wait until the applications are removed from the Applications page of the Junos Space Platform application. After all the applications are uninstalled, restart the JBoss server. Connectivity Services Director does not work correctly if the JBoss server is not rebooted.</p> <ol style="list-style-type: none"> 7. Upgrade Junos Space Network Management Platform to Release 15.2R2. 8. Upgrade Connectivity Services Director to Release 2.0R1. 9. Restart the JBoss server

To upgrade Connectivity Services Director from the **Administration > Applications** display of Junos Space:

1. Select Connectivity Services Director from the list of installed applications and click **Upgrade Application** from the Actions menu.
2. In the Upgrade Application page, click either **Upload via HTTP** or **Upload via SCP** and navigate to the location where you stored the Connectivity Services Director image.

To upload Connectivity Services Director by using *HTTP*:

- a. Click **Upload via HTTP** to open the dialog box.
- b. Navigate to the local location where the Connectivity Services Director image is stored.

- c. Select the image file and click **Open** to load the path.
- d. Click **Upload** to load the image file into Junos Space.

To upload Connectivity Services Director by using *SCP*:

- a. Click **Upload via SCP** to open the Upload dialog box.
 - b. Enter the Secure Copy credentials to upload the Connectivity Services Director image from a remote server to Junos Space.
 - Enter the username.
 - Enter the password and reenter the password in the Confirm Password field.
 - Enter the host IP address.
 - Enter the local path name of the Connectivity Services Director application file.
 - c. Click **Upload** to load the image file into Junos Space.
3. Click **OK** to skip viewing the job results.
 4. Select Connectivity Services Director and click **Upgrade**.

You can check the Job Status page to see the progress of the upgrade job. Once the upgrade completes, Connectivity Services Director appears on the Applications inventory page. The new or upgraded application also appears in the Application Chooser (at the upper-left corner).

5. After you upgrade Connectivity Services Director, you must restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups:

To restart the JBoss server in a standalone setup:

- a. Stop the watchdog, domain controller, and JBoss services on the standalone node.

```
service jmp-watchdog stop
```

```
service jboss-dc stop
```

```
service jboss stop
```

- b. Start the watchdog service.

```
service jmp-watchdog start
```



NOTE: Starting the watchdog service restarts the JBoss and domain controller services as well.

It takes approximately 20 minutes for the JBoss server to come up after the restart.

To restart the JBoss server in a cluster setup:

- a. Stop the services on the secondary node.

```
service jmp-watchdog stop
```

```
service jboss stop
```

- b. Stop the services on the master node (You can find the VIP hosted node Space > Fabric).

```
service jmp-watchdog stop
```

```
service jboss-dc stop
```

```
service jboss stop
```

- c. Start the services on the master node.

```
service jmp-watchdog start
```

- d. Start the service on the secondary node.

```
service jmp-watchdog start
```

It takes approximately 20 minutes for the JBoss server to come up after the restart.

6. Download the DMI schemas for devices that require a later schema, and upload the schema to the Junos Space.
7. To work on Connectivity Services Director, select **Connectivity Services Director** from the Applications list in the upper left corner above the Tasks tree.

Connectivity Services Director starts in the browser window. The default view is the Dashboard View. Use the View selector on the top banner to navigate to the other views—Location View, Device View, Topology View, Custom Group View, or the Service View.

8. Bookmark this page in your browser for future use.

You can use the bookmarked URL to log in to Connectivity Services Director without logging in to Junos Space first.

Uploading DMI Schemas

Each device type is described by a unique data model (DM) that contains all the configuration data for it. The DMI schema lists all the possible fields and attributes for a type of device. The later schemas describe the new features of recent device releases. It is important that you load all your device schemas into Junos Space Network Management Platform; otherwise only a default schema will be applied when you try to edit a device configuration by using the device configuration edit action in the Devices workspace.

In most installations, Junos Space automatically matches DMI schemas to device families. But there might be certain situations where your network uses a device for which Junos Space does not have the latest or supported schema available. In such instances, you must obtain and upload the requisite schema and set it as the default DMI schema for that device family. Set a default DMI schema for each device family to enable Junos Space to apply the appropriate schema to a device family.

If you cannot find the schema equivalent, use the latest schema from the main release or contact the Juniper Support. We recommend that you use the JUNOS 14.2R2.8 schema for Connectivity Services Director Release 2.0.

If you cannot find an appropriate schema for your device model, contact Juniper Support.

To install or update a DMI schema on Junos Space:

1. From the Network Application Platform, navigate to **Administration > Manage DMI Schemas > Update Schema**.

The Update Schema page appears.

To add or update a DMI schema, you must have the **.tgz** archive files containing the schema on the machine running the Junos Space GUI. There are several ways of acquiring such files. You can:

- Download files from Juniper's SVN Repository.
- Obtain files from Juniper Support staff.
- Create your own files.

For detailed steps on acquiring and uploading the schema files, see Junos Space Documentation or [Managing DMI Schemas Overview](#).

2. After uploading the schema, select the schema and click **Install**.

The Manage DMI Schemas inventory landing page appears, displaying the newly installed schema. The Manage DMI Schemas page displays data in a table that has the following columns:

- Device Family
- OS Version

- Device Series
- State—Whether default or not. An empty cell in this column means that the DMI schema in that row is not the default.

In the thumbnail view, this information is displayed on each thumbnail.

3. In the tabular view, select the row that contains the appropriate combination of device family, OS version, and device series, and mouse over the **Actions** drawer to select **Set Default Schema**.

In the thumbnail view, select the appropriate thumbnail and perform the same action.

The Set Default DMI Schema dialog box opens, displaying the DMI schema name, device family, and OS version.

4. Click **Set Default**.

If any other schema was previously the default, in the tabular view, the cell in the State column appears empty, and the word *Default* appears in the State column for the selected schema. In the thumbnail view, the default status is indicated by an orange-colored asterisk on the icon for a DMI schema, and the word *Default* below the OS version.

Preparing Devices for Management by Connectivity Services Director

To discover and manage devices, Connectivity Services Director requires the following minimum device configuration as a prerequisite for installation on a device. Ensure that the device:

- Has a static management IP address. The address can be in-band or out-of-band, but must be reachable from the Junos Space server.
- Is enabled for SSH v2. Issue the **set system services ssh protocol-version v2** command to enable SSH v2 on M, MX, and PTX Series routers.
- Has a user ID with the superuser class configured. Junos Space, and Connectivity Services Director use this user ID to authenticate the SSH connection with the device.
- Is enabled for SNMP with the appropriate read-only V1, V2, and V3 credentials created. You do not need to configure SNMP trap receivers; Connectivity Services Director configures traps as a deployment task.

In addition, the following protocol ports must be open for Connectivity Services Director communication:

- Port 22 for SSH connections. If you have changed the SSH port to a port other than port 22 on your Network Management Platform, you must change the SSH ports on your managed devices to the port that the Network Management Platform is using.
- Port 10162 for SNMP traps. Connectivity Services Director receives traps from managed devices on this port. (After you install Connectivity Services Director, use Connectivity Services Director to configure SNMP on your devices to send traps to Connectivity Services Director on this port.)

- Port 162 for service-level SNMP traps. Connectivity Services Director uses OpenNMS for SNMP trap collection and correlation.
- Port 21 (TCP) and port 69 (UDP) for uploading the software image and configuration file to the FTP server.

You can verify whether a port is open by logging in to the Junos Space CLI and using the **nmap** command. For example, to determine whether port 8889 is open on a controller, issue this command:

```
root@space# nmap <IP address of controller> -p 8889
```

Discovering Devices

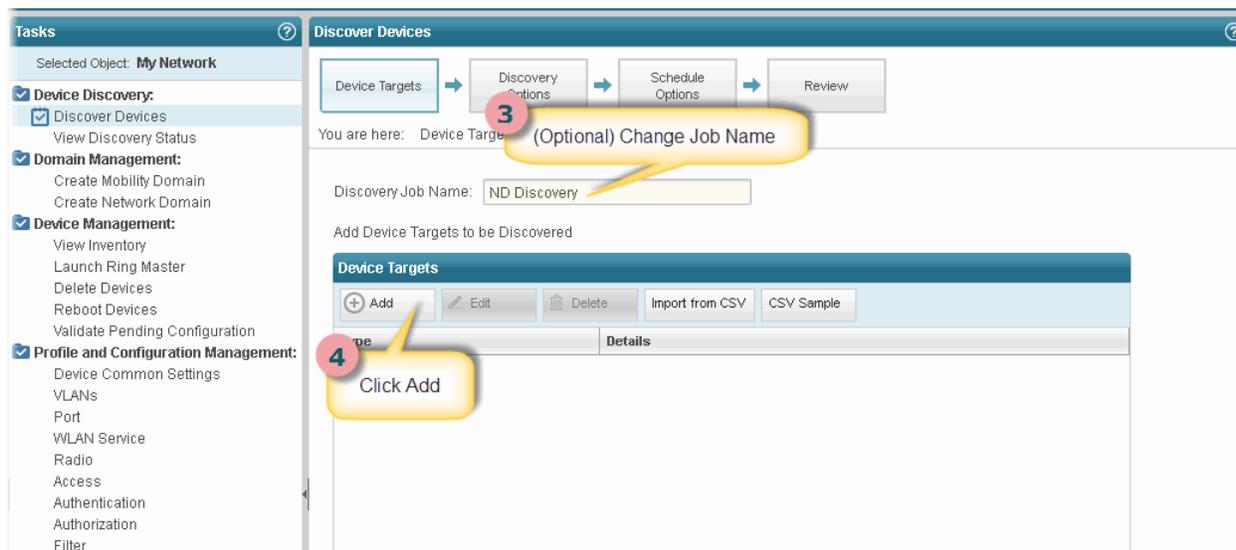
When you start Connectivity Services Director for the first time, the system does not have any devices. The first step is to build your network. Even with large networks, Connectivity Services Director has made this step relatively easy and straightforward. You will add devices to Connectivity Services Director and the database by using a process called *device discovery*. Once a device is discovered, it shows in the interface and Connectivity Services Director begins to monitor the device.

Connectivity Services Director provides a wizard for device discovery. The following example shows the path for device discovery through the wizard. For an alternate path, you can get a step-by-step instruction from the help system.

In this example, we provide an IP address range, and Connectivity Services Director populates the database with all supported devices within that range.

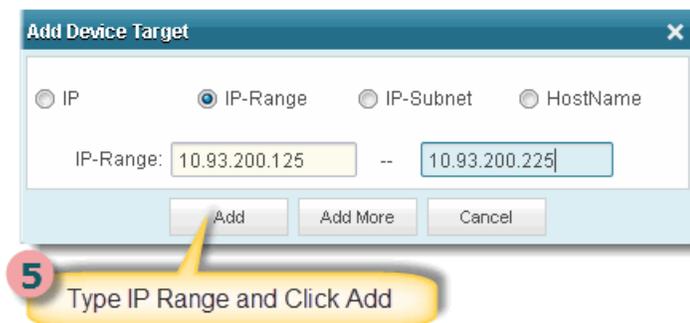
1. While in the **Build** mode, select **Location View**, **Device View**, or **Custom Group View** from the View selector.
2. To discover physical devices, click **Discover Devices** in the Tasks pane. Each mode has a Tasks Pane that displays the actions you can take while in that mode and that particular network view.
3. (Optional) Type a name for the discovery job. The default name is ND Discovery.
4. Click **Add** in the Device Targets window. You can add a single device IP address, a range of IP addresses, an IP subnet, or a hostname. In this example, we select an IP address range.

Figure 2: Start Discover Devices Wizard



5. Provide the initial or the lowest IP address value and the ending or highest IP address value for the range and click **Add**. You can have up to 1024 devices in a range. After you click Add, the address range is listed in the Device Targets window.

Figure 3: Specify the IP Range



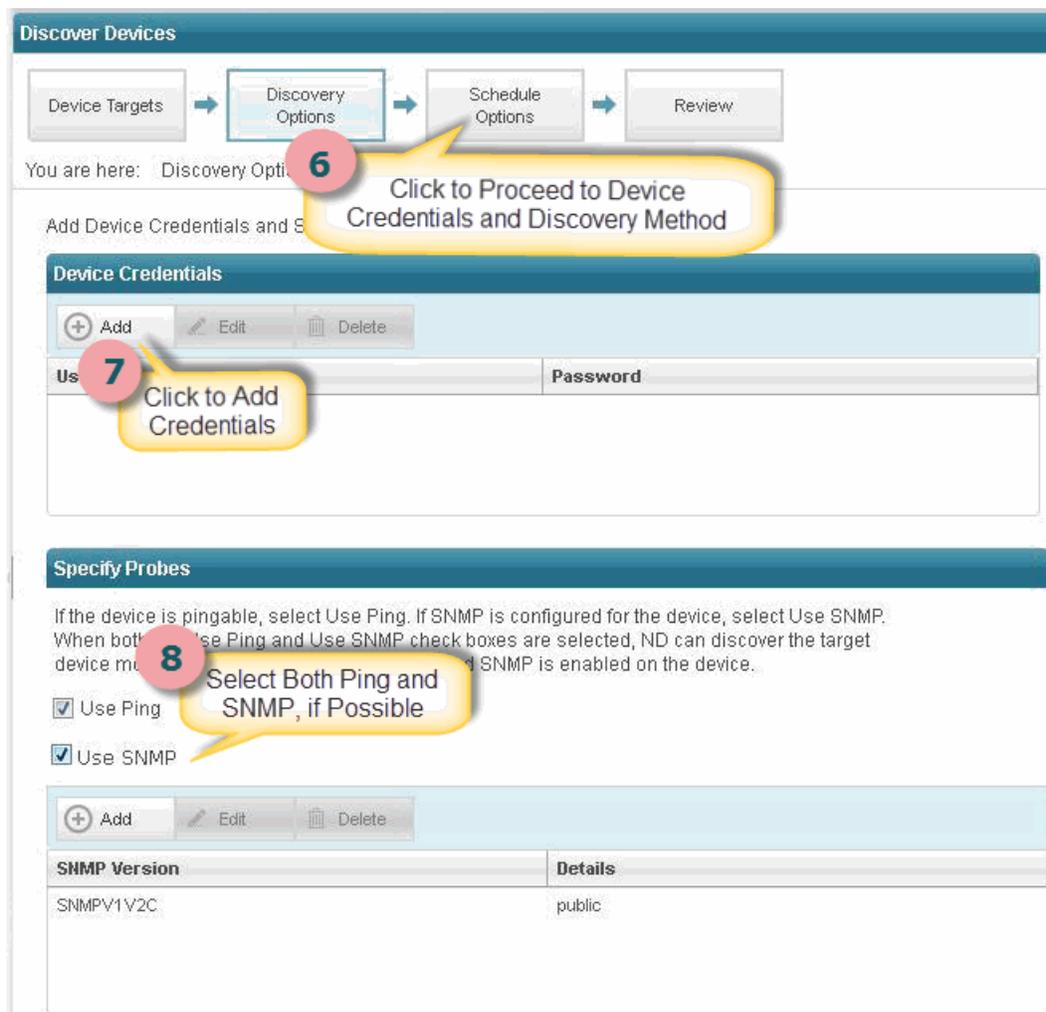
6. Click **Next** or click **Discovery Options** to proceed to specify the device credentials and method of discovery.
7. Click **Add** in the Device Credentials window and enter the username and password assigned for administrative access.
8. Select **Ping**, **SNMP**, or both as the method of device discovery. Selecting both is the preferred method if the device is configured for SNMP.

If you select SNMP, the Add SNMP Settings dialog box is displayed. In this example, because we run SNMP version 2, we need to provide the community string. Click **Add** to save the setting.



NOTE: You cannot choose a method for device discovery for virtual Connectivity Services Discovery.

Figure 4: Provide Device Credentials and Discovery Method



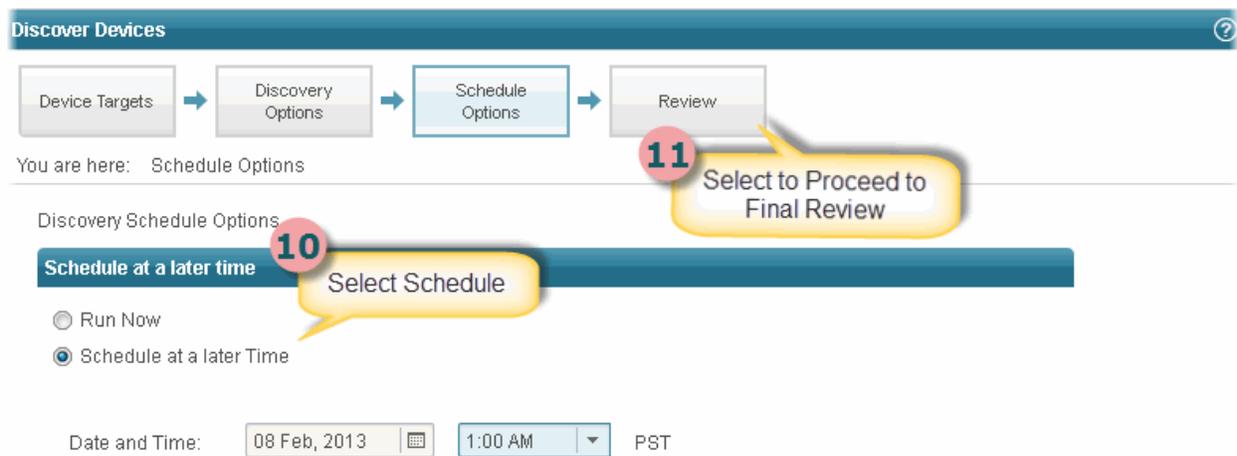
9. Click **Next** or **Schedule Options** to proceed to schedule the time when discovery is run.



NOTE: Scheduling options are not available for virtual Connectivity Services Discovery.

10. Indicate whether to run the device discovery now or set up a schedule to minimize network traffic. In this example, we set the schedule to run during off hours.

Figure 5: Review Discovery Settings



11. Click **Review** to review the settings before you exit the wizard.

12. Click **Finish** to complete the discovery setup and to save the settings.

Discover Devices

Device Targets → Discovery Options → Schedule Options → Review

You are here: Review

11 Click to Proceed to Final Review

Device Targets

Discovery Job Name: ND Discovery

Type	Details
IP-Range	10.93.200.125 - 10.93.200.225

Discovery Options

UserName	Password
superuser	*****

Use Ping Use SNMP

SNMP Version	Details
SNMPV1V2C	public

Discovery Schedule Options

Scheduled Time: 20 Feb, 2013 1:00 AM

Back Next Finish Cancel

12 Click Finish to Save the Settings and Exit

13. Click **View Discovery Status** to view all scheduled and completed jobs. After a job completes, you can click **Show Details** to view further information on any unexpected results.

Figure 6: View Discovery Results

Device Discovery Jobs

Show Details Cancel Job View Results

Job Name	Percent	Status	Summary	Scheduled Start Time	End Time	User
ND Discovery-458772	100 %	SUCCESS	Number of scanned IP: 101 Number of Already Managed: 0 Number of Discovery success... Number of Skipped: 0 Number of Add Device failed: ... Number of Device Managed: 101	Feb 20 2013 07:00:01 ...	Feb 20, 2013 07:...	super

13 View Results

Next Steps

After your devices are up and synchronized, much of the function in Connectivity Services Director is automatically enabled. However, there are a few additional tasks that you will need to perform to use all the features of Connectivity Services Director. We suggest that you explore:

- Set up a Location View

Location View is one of seven different views, or perspectives, in your network. In Location View, you can manage devices based on a site. Here you define the buildings, floors, wiring closets, and outdoor areas. You can upload floor maps for easy reference and assign devices to a specific spot.

To set up a Location View:

1. Click **Build** in the Connectivity Services Director banner.
2. Select **Location View** in the View pane to the far left of the screen.
3. Click **Setup Locations** in the Tasks pane to start setting up your location, buildings, floors, racks, wiring closets, and outdoor areas.

- Enable Trap Forwarding and Alarms for Fault Management

A key component of Connectivity Services Director is the feature to diagnose problems with precision and ease. Connectivity Services Director correlates multiple traps from the same device to a single alarm.

You must complete device discovery and the devices must be up before you can enable trap forwarding. Traps are not enabled by default; you need to enable them after device discovery.

1. Use **Set SNMP Trap Configuration** in the Tasks pane of Deploy mode to configure your device to send SNMP traps to Connectivity Services Director.
2. Review the list of alarms in Preferences, located in the Connectivity Services Director banner. All alarms are enabled by default, but you might want to disable those alarms that are not pertinent to your installation. You can also change the severity of an alarm by using Preferences.

- Set up users

After you install Connectivity Services Director, there is only one username defined: *super* with the default password, *juniper123*.

You have the ability to set up users with different Connectivity Services Director privileges. New Connectivity Services Director users are set up in Junos Space and follow the roles and privileges as defined in Junos Space. For a complete discussion on how to properly set up users, see [Understanding Connectivity Services Director User Administration](#).

- Learn what you can do with Connectivity Services Director

There are two ways you can become familiar with the functions and features of Connectivity Services Director:

- Read *Junos Space Connectivity Services Director Release Notes*. These release notes highlight the primary features of Connectivity Services Director.
- Use the extensive help system that guides you through Connectivity Services Director. Clicking the main Help icon provides a top-down view into the help system; clicking a Help icon on a pane or window provides context-sensitive information. Use the help system to familiarize yourself with Connectivity Services Director and the different modes and panes in the interface.

Getting Started with Connectivity Services Director

Based on your network deployment needs and configuration settings, you might require different service types, such as point-to-point, Layer 3 VPN, VPLS, or RSVP LSP services, to be applied on devices in your topology. It is essential to discover or add the devices that you want to be administered using Connectivity Services Director to the application database, before you can enable and define services. Also, the devices must be configured with the basic and mandatory device settings, such as routing instances, routing protocols, interfaces, and administrative groups, before they are imported or discovered for additional modifications, such as configuration of services, using the network management application.

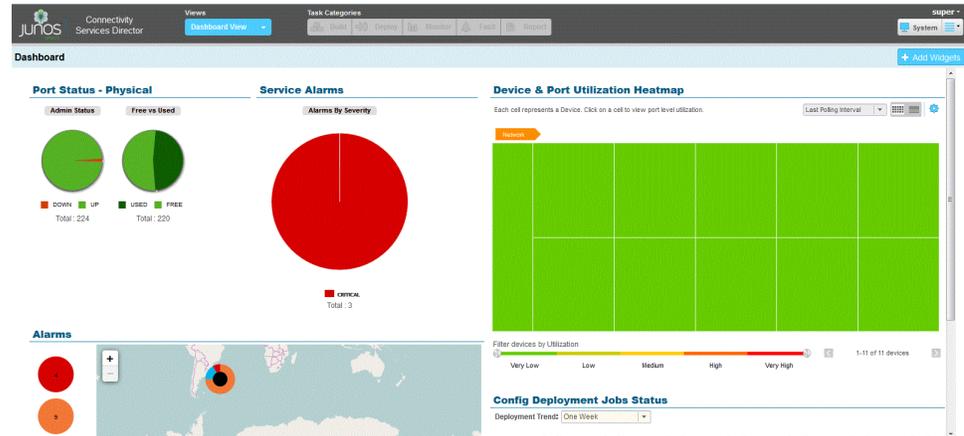
When you install Connectivity Services Director, the single application package installs the capabilities for configuring network services, such as point-to-point, Layer 3 VPN, and VPLS, configuring MPLS and RSVP label-switched path (LSP) services, configuring Precision Time Protocol (PTP) and synchronous Ethernet services, configuring the OAM (Operations, Administration and Maintenance) functionality, and configuring class of service (CoS) profiles. To install Connectivity Services Director, see the "Installation Instructions for Connectivity Services Director, Release 2.0" section in the *Junos Space Connectivity Services Director Release Notes, Release 2.0*.

For the Connectivity Services Director Release 2.0, you can also access the Services Activation Director GUI interface to launch workspaces to configure functionalities. To access the Services Activation Director GUI, see *Accessing the Services Activation Director GUI*.

You need not separately install the different applications, such as Network Activate or Transport Activate, based on your deployment needs and device models to be managed, on a Junos Space JA1500 Appliance, Junos Space JA2500 Appliance, or a Junos Space Virtual Appliance that satisfied the hardware requirements. A consistent, uniform, consolidated, and streamlined user interface and elegant experience is introduced by using the Service View component in the Connectivity Services Director GUI. Besides offering a cohesive and user-friendly experience and interface for configuring point-to-point, Layer 3 VPN, VPLS, and RSVP LSP services, Network Activate, Transport Activate, Sync Design, and OAM Insight are available in the older GUI format in the same image package. The functionalities of QoS Design are available in Connectivity Services Director as CoS profiles, which you can reference in point-to-point, VPLS, and Layer 3

VPN services. QoS Design and Network Director cannot be installed on the same system as Connectivity Services Director.

Figure 7: Dashboard Page



The following workflow describes the tasks that you need to perform after the installation of the application to enable effective and streamlined management, provisioning, and troubleshooting of devices and services configured using Connectivity Services Director.

1. Discover devices using Connectivity Services Director GUI or the Junos Space Platform workspace. See *Discovering Devices in a Physical Network* for instructions on discovering devices from Build mode of Connectivity Services Director. See *Discovering Devices in the Junos Space Network Application Platform User Guide* for instructions on discovering devices using the Junos Space Platform workspace.



NOTE: Before you can add a device using device discovery, the following conditions must be met

- SSH v2 is enabled on the device. To enable SSH v2 on a device, issue the following CLI command:

```
set system services ssh protocol-version v2
```
- The NETCONF protocol over SSH is enabled on the device. To enable the NETCONF protocol over SSH on a device, issue the following CLI command:

```
set system services netconf ssh
```
- The device is configured with a static management IP address that is reachable from the Junos Space server. The IP address can be in-band or out-of-band.
- A user with full administrative privileges is created on the device for the Junos Space administrator.
- If you plan to use SNMP to probe devices as part of device discovery, ensure that SNMP is enabled on the device with appropriate read-only V1/V2C/V3 credentials.

2. Discover the roles of devices and assign network-provider edge (N-PE) roles as necessary. To prestage devices and assign device roles, see *Discovering Device Roles* and *Excluding Devices from N-PE Role Assignment*.
3. Create service templates. Templates provide a powerful mechanism to configure advanced service-related options that are not exposed via the service order creation workflow. Templates are attached to a service definition. To work with service templates, see *Service Templates Workflow* and *Applying a Service Template to a Service Definition*.
4. Review the predefined service definitions that are available by default, and determine whether you want to create a new customized service definition. A service definition specifies the attributes that are common among a group of service orders that have similar service requirements. To work with service definitions, see *Predefined Service Definitions*, *Creating a Point-to-Point Ethernet Service Definition*, *Creating a Multipoint-to-Multipoint VPLS Service Definition*, *Creating a Point-to-Multipoint VPLS Service Definition*, *Creating a Full Mesh Layer 3 VPN Service Definition*, and *Creating a Hub-and-Spoke (One Interface) Layer 3 VPN Service Definition*.
5. Create customers that denote the users to be associated with service orders. New customers must be identified to the system before you can provision and activate a service order for them. To create customers, see *Adding a New Customer*.

6. Create class-of-service profiles to prioritize the traffic flow and define policies for handling received packets to avoid network congestion and traffic disruption. See *Creating and Managing Wired CoS Profiles*.
7. Create service orders for the types of protocols that your network environment requires for optimal and cohesive management of large numbers of devices. A service order is an instance of the service definition that completes the definition for a specific customer's use. To work with service orders, see *Creating a Service Order*.
8. Deploy service orders to propagate the service configuration to the corresponding devices. To transfer service order configurations to devices and apply the settings on the devices, see *Deploying Services Configuration to Devices* and *Managing Service Configuration Deployment Jobs*.
9. Perform audit operations, such as functional and configuration audit, to examine the status of interfaces, LDP sessions, neighbor links, and endpoints of point-to-point services. You can also identify whether the service configuration on the device has been changed out of band. In addition, you can use op scripts to perform any function available through the remote procedure calls (RPCs) supported by either the Junos XML management protocol or the Junos XML API. See *Performing a Functional Audit*, *Performing a Configuration Audit*, and *Troubleshooting N-PE Devices Before Provisioning a Service* for further information.
10. Monitor the health (working condition), operating efficiency, traffic-handling capacity, and performance status of the managed devices and configured services. Several monitors or widgets are displayed to enable you to track, diagnose, and rectify problems and discrepancies associated with services configured on devices. To evaluate and diagnose the services, traffic-flow, and device states, see *Service Monitoring Capabilities in Connectivity Services Director*.
11. View information about the health of your network and changing conditions of your equipment. Use Fault mode to find problems with equipment, pinpoint security attacks, or to analyze trends and categories of errors. For example, if you find that a particular device or a service has recorded a large number of critical or major alarms, you can then navigate to the appropriate device settings page or service order page to correct and modify the attributes or diagnose the problems that might be generating the alarms. To view alarms and events, see *Understanding Fault Mode in Connectivity Services Director*.

Connectivity Services Director REST API Overview

The Juniper Networks Connectivity Services Director APIs are based on the Representational State Transfer (REST) standards. REST defines a set of principles for defining Web services, including how a system's resource states are transferred over HTTP. Clients can be written in any language that sends HTTP requests.

You use standard HTTP methods to access the Connectivity Services Director APIs. For example, HTTP GET is used by a client application to retrieve a resource, get data from a Web server or to execute a query. Common HTTP methods for REST are:

- GET – Retrieve a resource from the server.
- POST – Update a resource on the server.
- PUT – Create a resource state on the server.
- DELETE – Remove a resource state on the server.

The following media types are supported:

- For APIs that employ the GET method—Accept is used because only a Response is the involved operation here. The Accept type determines the type of the Response obtained, which can be either in XML or in JSON format.
- For APIs that employ the POST method—Content-type needs to be used, which determines the type of the input payload or request that is sent.
- For APIs that employ the PUT method—Content-type needs to be used, which determines the type of the input payload or request that is sent.
- For APIs that employ the DELETE method—Accept needs to be use because only a Response is the involved operation here

The Accept type determines the type of the response obtained, which can be either in XML or in JSON format. For example, for the Add Customer API, the Content and Accept types for XML are as follows:

XML

Content-Type—application/vnd.net.juniper.space.customer-management.customers+xml

Accept—application/vnd.net.juniper.space.customer-management.customers-status+xml

Retrieved resources are displayed in human-readable format. Connectivity Services Director APIs return data in XML or JavaScript Object Notation (JSON).

The following RESTful Web Services are exposed under the Junos Space Connectivity Services Director root URI:

- Customers
- Provider edge (PE) devices
- Prestage devices and management of multihomed groups
- Resource pools
- Service definitions for point-to-point (P2P), VPLS, and Layer 3 VPN (L3VPN) services
- Service orders for P2P, VPLS, and L3VPN services
- Service operations for P2P, VPLS, and L3VPN services
- Service templates for P2P, VPLS, and L3VPN services
- Bulk operations for P2P services
- Functional and configuration audit
- QoS profiles for services

- CFM profiles for services
- Performance management (PM) statistics
- Service definitions and service orders for LSP services
- OAM services for LFM, CFM, and SLA iterators
- Services for RFC 2544-based benchmarking tests
- Timing services for synchronous Ethernet and PTP

URI: /api/juniper/space

Connectivity Services Director RESTful Web Services provide programmatic access to the resources that are defined in Junos Space Connectivity Services Director. Connectivity Services Director RESTful Web Services follow the same standards and conventions as the Junos Space Network Application Platform RESTful Web Services. The Connectivity Services Director RESTful Web Services are exposed under the Juniper Networks Junos Space RESTful Web Services root URI (/api). Connectivity Services Director-related RESTful Web Services are exposed under the /api/juniper/space URI.

**Example resource
returned in XML format**

```
<Data xmlns="services.schema.networkapi.jmp.juniper.net">
  <Customers>
    <Customer>
      <Common>
        <Name>Customer_005</Name>
      </Common>
      <AccountNo>40132324005</AccountNo>
      <ContactName>customer005</ContactName>
      <ContactEmail>customer005@example.com</ContactEmail>
    </Customer>
  </Customers>
</Data>
```

**Example resource
returned in JSON
format**

```
{ "Data" : { "Customers" : { "Customer" : { "AccountNo" : 40132324005,
  "Common" : { "Name" : "Customer_005" },
  "ContactEmail" : "customer005@example.com",
  "ContactName" : "customer005"
} } } }
```

Format and Conventions of RESTful Web Services

The media type for the Connectivity Services Director application must have the following format:

application/vendor.space.service.type+syntax;version=version number or

vendor.space.service.type+syntax;version=version number

For example, *application/vnd.net.juniper.space.monitoring.alarmscount+json;version=1*

[Table 1 on page 34](#) describes these parameters.

Table 1: Media parameters

Parameter	Description
vendor	Vendor of the media type. Media types defined by Juniper Networks use vnd.net.juniper. Third-parties must use their own vendor string when they define their own Web services in their applications that are deployed on Junos Space.
service	Name of the Junos Space-specific service. Service names are all lowercase alphanumeric tokens with hyphen separators; for example, device-management, incident-management.
type	Type of resource. Types are all lowercase alphanumeric tokens with hyphen separators; for example, device, incident.
syntax	Representation of the resource, for example xml..
version	Version of the API; versions begin with the numeral 1.

REST standards are well-described in books and on the Internet. It is not the intent of this guide to discuss the RESTful architecture. This document deals with the REST APIs exposed by Connectivity Services Director.

For information about Junos Space SDK, refer to [Junos Space SDK](#) .

Payload and Response Types Supported in XML and JSON Formats

The payload or request can be in both the XML format and JSON format, although this reference guide illustrates only the XML type input or payload in the sample APIs. An API is available for converting any given XML payload into a JSON payload. See "[Conversion of XML Format to JSON Format](#)" on page 34, for detailed information on converting the XML format into a JSON format. Responses to the API request calls can be in both the XML format and JSON format, although this reference guide describes only the XML type responses in the samples.

Conversion of XML Format to JSON Format

For the ease of the users, an additional API has been provided for converting the XML inputs to JSON format. If the XML inputs pertaining to the NetworkAppsAPI are given as input, then the corresponding JSON format output can be obtained from this API.

URI	api/space/nsas/xml-json/convert">
HTTP Method	GET
Consumes	application/xml
Content-Type	application/json
Produces	Collects all the configured E-LINE LDP service orders.

Input (Converting the AddCustomer XML-Input to JSON-Input)

Sample XML Input

```
<Data xmlns="services.schema.networkapi.jmp.juniper.net">
<Data xmlns="services.schema.networkapi.jmp.juniper.net">
<Customers>
<Customer>
<Common>
<Name>Customer_005</Name>
</Common>
<AccountNo>40132324005</AccountNo>
<ContactName>customer005</ContactName>
<ContactEmail>customer005@example.com</ContactEmail>
</Customer>
</Customers>
</Data>
```

Output (JSON Format of the Preceding Input)**Sample XML Output**

```
<Data xmlns="services.schema.networkapi.jmp.juniper.net">
{"Data":{"Customers":{"Customer":{"Common":{"Name":"Customer_005"},
"AccountNo":40132324005,"ContactName":"customer005",
"ContactEmail":"customer005@example.com"}}}}
```



NOTE: We recommend that you read this guide in conjunction with the [Network Director API Reference](#) for information about the REST APIs that you can configure for some of the functionalities available in views other than Service view of Connectivity Services Director. These APIs also define the fault and alarm notification APIs.

