

Junos[®] Space

Connectivity Services Director Quick Start Guide

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Junos[®] Space Connectivity Services Director Quick Start Guide

5.0R1

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Table of Contents

About the Documentation | v

Documentation and Release Notes | v

Documentation Conventions | v

Documentation Feedback | viii

Requesting Technical Support | viii

Self-Help Online Tools and Resources | ix

Creating a Service Request with JTAC | ix

1

Installing and Upgrading Junos Space Connectivity Services Director

Connectivity Services Director Installation Overview | 11

Junos Space Network Management Platform Requirements for Connectivity Services Director | 11

Junos Space DMI Schema Requirements for Connectivity Services Director | 13

Installing and Uninstalling Connectivity Services Director | 15

Installing Connectivity Services Director | 17

Uninstalling Connectivity Services Director | 22

Upgrading Connectivity Services Director | 22

Upgrading from Connectivity Services Director Release 4.2 | 27

Upgrading from Connectivity Services Director Release 4.1 | 28

Upgrading from Connectivity Services Director Release 4.0 | 28

Upgrading from Connectivity Services Director Release 3.0 | 28

Upgrading from Connectivity Services Director Release 2.2 | 29

Upgrading from Connectivity Services Director Release 2.1 | 30

Upgrading from Connectivity Services Director Release 2.0 | 31

Upgrading from Network Activate Release 14.3R1, Transport Activate 14.3R1, OAM Insight 14.3R1, and Sync Design 14.3R1 | 31

Installing and Uninstalling Red Hat Package Manager for Connectivity Services Director | 35

Installing Red Hat Package Manager for Connectivity Services Director | 35

Uninstalling Red Hat Package Manager for Connectivity Services Director | 36

Uploading DMI Schemas | 37

Preparing Devices for Management by Connectivity Services Director | 39

Next Steps | 40

About the Documentation

IN THIS SECTION

- Documentation and Release Notes | v
- Documentation Conventions | v
- Documentation Feedback | viii
- Requesting Technical Support | viii

Use this guide to quickly set up a Junos Space Appliance in a single-node configuration, install Junos Space Connectivity Services Director (which also installs the Connectivity Services Director API), and bring your devices under Connectivity Services Director management.

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 vi 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 vi 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
<i>Italic text like this</i>	<ul style="list-style-type: none"> Introduces or emphasizes important new terms. Identifies guide names. Identifies RFC and Internet draft titles. 	<ul style="list-style-type: none"> A policy <i>term</i> is a named structure that defines match conditions and actions. <i>Junos OS CLI User Guide</i> RFC 1997, <i>BGP Communities Attribute</i>

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

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

GUI Conventions

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

Convention	Description	Examples
Bold text like this	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> 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:



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

Requesting Technical Support

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

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

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

Self-Help Online Tools and Resources

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

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

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

Creating a Service Request with JTAC

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

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

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

1

CHAPTER

Installing and Upgrading Junos Space Connectivity Services Director

Connectivity Services Director Installation Overview | **11**

Junos Space Network Management Platform Requirements for Connectivity Services
Director | **11**

Junos Space DMI Schema Requirements for Connectivity Services Director | **13**

Installing and Uninstalling Connectivity Services Director | **15**

Upgrading Connectivity Services Director | **22**

Installing and Uninstalling Red Hat Package Manager for Connectivity Services
Director | **35**

Uploading DMI Schemas | **37**

Preparing Devices for Management by Connectivity Services Director | **39**

Next Steps | **40**

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 IP 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.

Connectivity Services Director runs on Junos Space Network Management Platform.

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.

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 Virtual Appliance:

- [Upgrading Connectivity Services Director on page 22](#)
- [Installing Connectivity Services Director on page 17](#)
- [Uploading DMI Schemas on page 37](#)
- [Preparing Devices for Management by Connectivity Services Director on page 39](#)
- [Next Steps on page 40](#)

Junos Space Network Management Platform Requirements for Connectivity Services Director

Connectivity Services Director Release 5.0R1 is supported on Junos Space Network Management Platform Release 19.3R1.

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.

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 and the API as an application. The Junos Space Appliance has been tested with up to six appliances connected in a cluster (fabric) for its ability to manage up to 15,000 devices. The Junos Space architecture also achieves five-nines reliability.

The JA2500 appliance has a 2-U, rack-mountable chassis with dimensions 17.81 in. x 17.31 in. x 3.50 in. (45.20 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 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.

The Junos Space Virtual Appliance can be deployed on a VMware ESX server. The Junos Space Virtual Appliance requires a VMware ESX server 4.0 or later or VMware ESXi server 4.0, 5.0, 5.1, or 5.5 that can support a virtual machine with the following configuration:

- 64-bit quad processor with at least 2.66-GHz speed
- 32 GB RAM
- One RJ-45 10/100/1000 Network Interface Connector
- 133 GB hard disk

NOTE: In a scaled environment, which contains a large number of configuration service settings and devices, we recommend that at least 100 GB of hard disk space is made available for installing Connectivity Services Director on a VMWare ESX server, in addition to the 133 GB of hard disk space for basic Junos Space Platform configuration.

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](#).

The number of devices you plan to manage by using Connectivity Services Director determines which Junos Space Appliance you use. Contact Juniper Networks Technical Assistance Center (JTAC) to know

more about the Junos Space Appliance model that is suitable for your network. Connectivity Services Director is not supported on a Junos Space instance running on a Juniper Networks NSM3000 appliance.

Junos Space DMI Schema Requirements for Connectivity Services Director

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

We recommend that you use the JUNOS 19.3R1 schema for Connectivity Services Director Release 5.0R1.

NOTE: See [Setting a Default DMI Schema](#) for detailed steps to set a default schema.

After you obtain the DMI schema, you can update the schema on Junos Space Platform by following the steps given below:

1. On the Junos Space Network Management Platform user interface, select **Administration > DMI Schemas**.

The DMI Schemas page appears.

2. Click the **Update Schema** icon on the toolbar.

The **Update Schema** page appears.

NOTE: On the Update Schema page, Junos Space Platform displays the schemas that you already have installed and, based on the discovered devices, suggests new schemas. However, you can pick other available schemas and download them.

3. Select the **Archive (tgz)** option button to upload a compressed TAR file.

Alternatively, you can select the **SVN Repository** option button and provide the SVN URL and device family to obtain the schema directly from the SVN repository.

4. Click **Browse**.

The **File Upload** dialog box appears.

5. Select the compressed TAR file (extension **.tgz**) and click **Open**.

The **Update Schema** page reappears, displaying the compressed TAR file (extension **.tgz**) in the **Archived Schemas File** field.

6. Click **Upload**.

NOTE: Do not move away from the **Update Schema** page while the compressed TAR file (extension **.tgz**) is being uploaded to Junos Space Platform. The time taken for the upload process depends on the number of schemas in the file. The progress bar indicates the progress of the upload.

To update the DMI schema directly from the Juniper Networks DMI schema repository:

1. Select the **SVN Repository** option button.

If the access to the Juniper Networks Subversion repository is already configured, the URL of the repository is displayed in the **URL** field. If the access is not configured, a note indicating that access must be configured is displayed.

To configure access to the Juniper Networks Subversion repository:

- a. Click **Configure**.

The **SVN Access Configuration** dialog box appears.

- b. In the **SVN URL** field, enter the URL of the Juniper Networks Subversion repository (<https://xml.juniper.net/dmi/repository/trunk/>).
- c. In the **User Name** field, enter the user name to access the Juniper Networks Subversion repository.
- d. In the **Password** field, enter the password to access the Juniper Networks Subversion repository.
- e. In the **Confirm** field, reenter the password to access the Juniper Networks Subversion repository.
- f. (Optional) The **Proxy Server** field displays whether a proxy server is configured or not. If your organization requires that you use a proxy server to connect to the Internet, you must configure and enable the proxy server (under **Administration > Proxy Server**) before connecting to the Juniper Networks Subversion repository. For more information, see *Configuring Proxy Server Settings*.
- g. (Optional) Click **Test Connection**.

A message dialog box appears (after a few seconds or a few minutes depending on the connection) to indicate whether the connection is established successfully or not. Click **OK** to close the dialog box and return to the **SVN Access Configuration** dialog box.

- h. Click **Save** to save the settings that you configured.

You are taken to the Update Schema page and the URL that you configured is displayed in the **URL** field.

2. (Optional) From the **Device Family** drop-down list, select the device families for which you want to download the schemas.

NOTE: If you do not specify a device family, then available schemas from all families are listed.

3. Click **Connect**.

Junos Space Platform displays a message prompting you to wait while the list of schemas is retrieved. (This process might take a few seconds to a few minutes depending on the connection.)

For detailed steps to acquire and upload the schema files, see [Managing DMI Schemas Overview](#).

Installing and Uninstalling Connectivity Services Director

IN THIS SECTION

- [Installing Connectivity Services Director | 17](#)
- [Uninstalling Connectivity Services Director | 22](#)

Ensure that the following prerequisites are met before you install Connectivity Services Director:

- Upgrading Junos Space

Connectivity Services Director Release 5.0R1 is supported on Junos Space Network Management Platform Release 19.3R1. If your appliance is running the supported version of Junos Space, you can begin installation of Connectivity Services Director.

If your appliance is running a Junos Space release that is earlier than the supported release, you must first determine the currently installed Junos Space version and then upgrade Junos Space before installing Connectivity Services Director. For instructions on how to upgrade Junos Space Platform, refer [How Do I Upgrade Junos Space?](#).

To determine the installed Junos Space version:

1. Log in to Junos Space by using the default username and password for Junos Space: **super** and **juniper123**.
Junos Space opens the dashboard.
2. Click the add symbol (+) next to Administration to expand the Administration menu.
3. Click **Applications** to list all of the applications installed.
4. 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.

- Downloading the Connectivity Services Director Release 5.0R1 software image to the hard disk or to an SCP server. The SCP server in this context is a Linux server on which the Connectivity Services Director image is stored. You can download Connectivity Services Director software image from [Juniper Downloads](#).

You can either:

- Download the image to a remote server by using the temporary download link generated by the software download page. You can use the **wget <download-URL>** command from the remote server to download the image to the server
or
- Download the software image to a local directory.

- Configuring basic Junos Space settings

You can configure a Junos Space Appliance as a Junos Space node or as a specialized node used for fault monitoring and performance monitoring (FMPM). For detailed steps to configure a Junos Space Appliance as a Junos Space node, see [Configuring a Junos Space Appliance](#).

After you deploy a Junos Space Virtual Appliance on a VMware ESX or VMware ESXi server, you must enter basic network and machine information to make your Junos Space Virtual Appliance accessible

on the network. You must also increase the virtual machine (VM) drive size. For more information see, [Configuring the Basic Settings of a Junos Space Virtual Appliance](#).

NOTE: You cannot install Network Director or Edge Services Director on the same system as Connectivity Services Director. You must uninstall Network Director or Edge Services Director before you install Connectivity Services Director on your system.

NOTE: After you install Connectivity Services Director, Network Activate, Transport Activate, OAM Insight, and Sync Design are also installed and presented in the same look-and-feel as the Services Activation Director GUI. 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 E-Line, IP, and E-LAN; 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 5.0R1, 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.

The following topics provide step-by-step instructions to install and uninstall Connectivity Services Director:

Installing Connectivity Services Director

You can install Connectivity Services Director on Junos Space Network Management Platform by using one of the following methods:

- Installing Connectivity Services Director From Junos Space Store
- Installing Connectivity Services Director by Downloading the Application Image

Installing Connectivity Services Director From Junos Space Store:

Starting from Release 18.2R1, Junos Space Platform provides Junos Space store from where you can download and install or upgrade Connectivity Services Director in a single operation. On the Junos Space store page, you can view the versions of Connectivity Services Director that are compatible with the currently installed version of Junos Space Platform.

For more information, see [Installing and Upgrading Junos Space Applications from Junos Space Store](#).

Installing Connectivity Services Director by Downloading the Application Image:

Follow these steps to perform a fresh installation of Connectivity Services Director Release 5.0R1:

1. Ensure that you have Junos Space Platform Release 19.3R1 installed and configured.
2. Install Connectivity Services Director Release 5.0R1.

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

- a. Click the add symbol (+).

Administration > Applications > Add Application page appears.

- b. Click either **Upload via HTTP** or **Upload via SCP** and upload the image as follows:

To upload Connectivity Services Director software image by using HTTP:

- i. Click **Upload via HTTP**.

The **Upload Software via HTTP** page appears.

- ii. Click **Browse**.

You can either navigate to the local directory and select the Connectivity Services Director software image, or copy and paste the download URL in the **File name** field if the image is not already downloaded to the local directory.

The image file is downloaded when you click **Open**.

- iii. After the image file is downloaded, click **Upload** to load the image file in to Junos Space.
- iv. Click **OK** on the **Upload Software via HTTP** page.

To upload Connectivity Services Director software image by using SCP:

NOTE: To upload Connectivity Services Director application by using the SCP option, you must have access to a remote server. The software image is stored on the remote server. The credentials to access the server and the location of the image must be provided in the **Upload Software via SCP** page when prompted.

- i. Click **Upload via SCP**.
The **Upload Software via SCP** page appears.
- ii. Enter the access credentials and the location of the image on the remote server to upload the image to Junos Space:
 - **Username**—Enter the username.
 - **Password**—Enter the password.
 - **Confirm password**—Reenter the password.
 - **Machine IP**—Enter the IP address of the remote server on which the image is stored.
 - **Software File Path**—Enter the directory on the remote server where the Connectivity Services Director software image file is stored.
- iii. Click **Upload** to load the image file in to Junos Space.
- iv. Click **OK** to confirm.
- c. In the **Upload Application Job Information** page that appears:
 - Click the job ID to view the job status in the **Jobs > Job Management** page.
 - Alternatively, click **OK** to skip viewing job status and to take you back to the **Administration > Applications > Add Application** page.
- d. In the **Administration > Applications > Add Application** page, select **Connectivity Services Director** and click **Install**.
- e. In the **Application configuration window** page, click **OK** to confirm.
- f. In the **Application Management Job Information** page that appears,

- click the job ID to view the job status in the **Jobs > Job Management** page.
- or
- click **OK** to skip viewing job status and to take you back to the **Administration > Applications** page.

NOTE: You can monitor the progress of the installation from the **Jobs > Job Management** page.

NOTE: Download the DMI schemas for devices that require a newer version of the schema, and upload the schema to Junos Space.

- g. After the installation is complete, select **Connectivity Services Director** from the Applications list. Connectivity Services Director starts in your browser window.

NOTE: You must log out and log back in to your Junos Space Application for Connectivity Services Director application to appear in the Applications list.

- h. (Optional) 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.

NOTE: To display components of the Connectivity Services Director dashboard properly, install Adobe Flash Player on the machine from which you are accessing it.

- i. Perform the initial configuration of Connectivity Services Director.

See [“Preparing Devices for Management by Connectivity Services Director” on page 39](#).

3. Log in to Junos Space CLI and restart the JBoss server for the RFC 2544 benchmark testing, monitoring, and fault features to work properly in standalone and cluster setups.

To restart the JBoss server in a standalone setup:

- a. Log in to Junos Space CLI.

- b. Enter the **service jmp-watchdog stop**, **service jboss-dc stop**, and **service jboss stop** commands to stop the watchdog, domain controller, and JBoss services on the standalone node as shown in the following example:

```
[root@space-005056ac5802 ~]# service jmp-watchdog stop
[root@space-005056ac5802 ~]# service jboss-dc stop
stop domain controller
[root@space-005056ac5802 ~]# service jboss stop
found and stop jboss
service[root@space-005056ac5802 ~]#
```

- c. Enter the **service jmp-watchdog start** command to start the watchdog service as shown in the following example:

```
service[root@space-005056ac5802 ~]# service jmp-watchdog start
jmp-watchdog running
[root@space-005056ac5802 ~]#
```

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

JBoss server takes up to 20 minutes to start.

To restart the JBoss server in a cluster setup:

- Enter the **service jmp-watchdog stop**, and **service jboss stop** commands to stop the services on the secondary node.
- Enter the **service jmp-watchdog stop**, **service jboss-dc stop**, and **service jboss stop** commands to stop the services on the primary node (You can find the VIP hosted node on the **Administration > Fabric** page).
- Enter the **service jmp-watchdog start** command to start the services on the primary node.
- Enter the **service jmp-watchdog start** command to start the service on the secondary node.

JBoss Server takes up to 20 minutes to start.

Uninstalling Connectivity Services Director

Follow these instructions to uninstall Connectivity Services Director application:

1. Select the Connectivity Services Director Application from the **Administration > Applications** page.
2. Right click your selection and choose **Uninstall Application** from the list that appears.
The **Uninstall Application** page appears.
3. Select **Connectivity Services Director** and click **Uninstall**.
4. In the **Uninstallation information** page that appears,
 - click the job ID to view job status in the **Jobs > Job Management** page
or
 - click **OK** to skip viewing job status and to take you back to the **Administration > Applications** page.

The Connectivity Services Director application is uninstalled.

NOTE: Downgrading Connectivity Services Director to an earlier version is not supported.

Upgrading Connectivity Services Director

IN THIS SECTION

- Upgrading from Connectivity Services Director Release 4.2 | 27
- Upgrading from Connectivity Services Director Release 4.1 | 28
- Upgrading from Connectivity Services Director Release 4.0 | 28
- Upgrading from Connectivity Services Director Release 3.0 | 28
- Upgrading from Connectivity Services Director Release 2.2 | 29
- Upgrading from Connectivity Services Director Release 2.1 | 30
- Upgrading from Connectivity Services Director Release 2.0 | 31
- Upgrading from Network Activate Release 14.3R1, Transport Activate 14.3R1, OAM Insight 14.3R1, and Sync Design 14.3R1 | 31

Before you start the upgrade, ensure that you have:

- Disabled monitoring for all categories from the Monitoring tab of the Preferences page. For more details, see *Disabling Data Collection for Monitors* section in *Setting Up User and System Preferences*.
- 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 19.3R1 running on your appliance or virtual machine.

If your appliance is running a Junos Space release that is earlier than the supported release, you must first determine the currently installed Junos Space version and then upgrade Junos Space before installing Connectivity Services Director. For instructions on how to upgrade Junos Space Platform, refer [How Do I Upgrade Junos Space?](#).

To determine the installed Junos Space version:

1. Log in to Junos Space by using the default username and password for Junos Space: **super** and **juniper123**.
Junos Space opens the dashboard.
2. Click the add symbol (+) next to Administration to expand the Administration menu.
3. Click **Applications** to list all of the applications installed.
4. 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.

- Downloaded the Connectivity Services Director Release 5.0R1 software image to the hard disk or to an SCP server. The SCP server in this context is a Linux server on which the Connectivity Services Director image is stored. You can download Connectivity Services Director software image from <http://www.juniper.net/support/downloads/space.html>.

You can either:

- Copy the temporary download link generated by the software download page. You can use the **wget download-link** command from the remote server to download the image directly to the device, or
- Download the software image to a local directory.
- Configuring basic Junos Space settings

You can configure a Junos Space Appliance as a Junos Space node or as a specialized node used for fault monitoring and performance monitoring (FMPM). For detailed steps to configure a Junos Space Appliance as a Junos Space node, see [Configuring a Junos Space Appliance](#).

After you deploy a Junos Space Virtual Appliance on a VMware ESX or VMware ESXi server, you must enter basic network and machine information to make your Junos Space Virtual Appliance accessible on the network. You must also increase the virtual machine (VM) drive size. For more information see, [Configuring the Basic Settings of a Junos Space Virtual Appliance](#)

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

1. Select **Connectivity Services Director** and click **Upgrade Application** from the **Actions** list.

Alternatively, right click **Connectivity Services Director** and select **Upgrade Application**.

The **Administration > Applications > Upgrade Application** page appears.

2. Click either **Upload via HTTP** or **Upload via SCP** and upload the image as follows:

To upload Connectivity Services Director software image by using HTTP:

- a. Click **Upload via HTTP**.

The **Upload Software via HTTP** page appears.

- b. Click **Browse**.

You can either navigate to the local directory and select the Connectivity Services Director software image, or copy and paste the download URL in the **File name** field if the image is not already downloaded to the local directory.

The image file starts downloading when you click **Open**.

- c. After the image file is downloaded, click **Upload** to load the image file to Junos Space.
- d. Click **OK** on the **Upload Software via HTTP** page that appears.

To upload Connectivity Services Director software image by using SCP:

NOTE: To upload Connectivity Services Director application by using the SCP option, you must have access to a remote server. The software image is stored on the remote server. The credentials to access the server and the location of the image must be provided in the **Upload Software via SCP** page when prompted.

- a. Click **Upload via SCP**.

The **Upload Software via SCP** page appears.

- b. Enter the access credentials and the location of the image on the remote server to upload the image to Junos Space:

- **Username:** Enter the username.
 - **Password:** Enter the password.
 - **Confirm password:** Reenter the password.
 - **Machine IP:** Enter the IP address of the remote server on which the image is stored.
 - **Software File Path:** Enter the directory on the remote Server where the Connectivity Services Director software image is stored.
- c. Click **Upload** to load the image file in to Junos Space.
- d. Click **OK** to confirm.
3. In the **Upload Application Job Information** page that appears:
- Click the job ID to view the job status in the **Jobs > Job Management** page.
 - Alternatively, click **OK** to skip viewing job status and to take you back to the **Administration > Applications > Add Application** page.
4. In the **Administration > Applications > Upgrade Application** page, select **Connectivity Services Director** and click **Upgrade**.
5. In the **Upgrade Configuration** page, click **OK** to confirm the upgrade.
6. In the **Upgrade Application Job Information** page that appears,
- click the job ID to view the job status in the **Jobs > Job Management** page.
- or
- click **OK** to skip viewing job status and to take you back to the **Administration > Applications** page.
- NOTE:** You can monitor the progress of upgrade from the **Jobs > Job Management** page.
- NOTE:** Download the DMI schemas for devices that require a newer version of the schema, and upload the schema to Junos Space.
7. After the upgrade is complete, select the upgraded version of **Connectivity Services Director** application from the Applications list.

Connectivity Services Director starts in your browser window.

NOTE: You must log out and log back in to your Junos Space Application for the upgraded version of the Connectivity Services Director application to appear in the Applications list.

8. Log in to Junos Space CLI and 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. Log in to Junos Space CLI.
- b. Enter the **service jmp-watchdog stop**, **service jboss-dc stop**, and **service jboss stop** commands to stop the watchdog, domain controller, and JBoss services on the standalone node as shown in the following example:

```
[root@space-005056ac5802 ~]# service jmp-watchdog stop
[root@space-005056ac5802 ~]# service jboss-dc stop
stop domain controller
[root@space-005056ac5802 ~]# service jboss stop
found and stop jboss
service[root@space-005056ac5802 ~]#
```

- c. Enter the **service jmp-watchdog start** command to start the watchdog service as shown in the following example:

```
service[root@space-005056ac5802 ~]# service jmp-watchdog start
jmp-watchdog running
[root@space-005056ac5802 ~]#
```

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

JBoss server takes up to 20 minutes to start.

To restart the JBoss server in a cluster setup:

- a. Enter the **service jmp-watchdog stop**, and **service jboss stop** commands to stop the services on the secondary node.
- b. Enter the **service jmp-watchdog stop**, **service jboss-dc stop**, and **service jboss stop** commands to stop the services on the primary node (You can find the VIP hosted node on the **Administration > Fabric** page).
- c. Enter the **service jmp-watchdog start** command to start the services on the primary node.
- d. Enter the **service jmp-watchdog start** command to start the service on the secondary node.

JBoss Server takes up to 20 minutes to start.

The following topics describe how to upgrade from previous versions of Connectivity Services Director to Release 5.0R1:

Upgrading from Connectivity Services Director Release 4.2

You can upgrade Connectivity Services Director from Release 4.2R1 to Release 5.0R1 by following the steps given below.

1. Upgrade Junos Space Platform to Release 19.3R1. See [Upgrading to Junos Space Network Management Platform Release 19.3R1](#) for instructions on upgrading Junos Space Platform Release 19.3R1.
2. Upgrade Connectivity Services Director to Release 5.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
3. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups.

NOTE: Enable monitoring for all categories from the Monitoring tab of the Preferences page.

Upgrading from Connectivity Services Director Release 4.1

You can upgrade Connectivity Services Director from Release 4.1R1 to Release 5.0R1 by following the steps given below.

1. Upgrade Junos Space Platform to Release 19.3R1. See [Upgrading to Junos Space Network Management Platform Release 19.3R1](#) for instructions on upgrading Junos Space Platform Release 19.3R1.
2. Upgrade Connectivity Services Director to Release 5.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
3. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups.

NOTE: Enable monitoring for all categories from the Monitoring tab of the Preferences page.

Upgrading from Connectivity Services Director Release 4.0

You can upgrade Connectivity Services Director from Release 4.0R1 to Release 5.0R1 by following the steps given below.

1. Upgrade Junos Space Platform to Release 19.3R1. See [Upgrading to Junos Space Network Management Platform Release 19.3R1](#) for instructions on upgrading Junos Space Platform Release 19.3R1.
2. Upgrade Connectivity Services Director to Release 5.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
3. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups.

NOTE: Enable monitoring for all categories from the Monitoring tab of the Preferences page.

Upgrading from Connectivity Services Director Release 3.0

You can upgrade Connectivity Services Director from Release 3.0R1 to Release 5.0R1 by following the steps given below.

1. Upgrade Junos Space Platform to Release 18.3R1 or 18.4R1. See [Upgrading to Junos Space Network Management Platform Release 18.3R1](#) or [Upgrading to Junos Space Network Management Platform Release 18.4R1](#) for instructions on upgrading to Junos Space Platform Release 18.3R1 and 18.4R1 respectively.
2. Upgrade Connectivity Services Director to Release 4.0R1 or 4.1R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
3. Upgrade Junos Space Platform to Release 19.3R1. See [Upgrading to Junos Space Network Management Platform Release 19.3R1](#) for instructions on upgrading Junos Space Platform Release 19.3R1.
4. Upgrade Connectivity Services Director to Release 5.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
5. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups.

NOTE: Enable monitoring for all categories from the Monitoring tab of the Preferences page.

Upgrading from Connectivity Services Director Release 2.2

You can upgrade Connectivity Services Director from Release 2.2R1 to Release 5.0R1 by following the steps given below.

1. Upgrade Junos Space Platform to Release 18.3R1. See [Upgrading to Junos Space Network Management Platform Release 18.3R1](#) for instructions on upgrading to Junos Space Platform Release 18.3R1.
2. Upgrade Connectivity Services Director from Release 2.2R1 to Release 4.0R1. For more information, see [Installing and Uninstalling Connectivity Services Director](#).
3. Upgrade Junos Space Platform to Release 19.3R1. See [Upgrading to Junos Space Network Management Platform Release 19.3R1](#) for instructions on upgrading Junos Space Platform Release 19.3R1.
4. Upgrade Connectivity Services Director from Release 4.0R1 to Release 5.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
5. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups.

NOTE: Enable monitoring for all categories from the Monitoring tab of the Preferences page.

Upgrading from Connectivity Services Director Release 2.1

You can upgrade Connectivity Services Director from Release 2.1R1 to Release 5.0R1 by following the steps given below.

1. Upgrade Junos Space Platform to Release 18.2R1. See [Upgrading to Junos Space Network Management Platform Release 18.2R1](#) for instructions on upgrading to Junos Space Platform Release 18.2R1.
2. Upgrade Connectivity Services Director to Release 3.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
3. Upgrade Junos Space Platform to Release 18.3R1 or 18.4R1. See [Upgrading to Junos Space Network Management Platform Release 18.3R1](#) or [Upgrading to Junos Space Network Management Platform Release 18.4R1](#) for instructions on upgrading to Junos Space Platform Release 18.3R1 and 18.4R1 respectively.
4. Upgrade Connectivity Services Director to Release 4.0R1 or 4.1R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
5. Upgrade Junos Space Platform to Release 19.3R1. See [Upgrading to Junos Space Network Management Platform Release 19.3R1](#) for instructions on upgrading Junos Space Platform Release 19.3R1.
6. Upgrade Connectivity Services Director to Release 5.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
7. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups.

NOTE: Enable monitoring for all categories from the Monitoring tab of the Preferences page.

Upgrading from Connectivity Services Director Release 2.0

You can upgrade Connectivity Services Director from Release 2.0R1 to Release 5.0R1 by following the steps given below.

1. Upgrade Junos Space Platform to Release 17.2R1. See [Upgrading to Junos Space Network Management Platform Release 17.2R1](#) for instructions on upgrading to Junos Space Platform Release 17.2R1.
2. Upgrade Connectivity Services Director to Release 2.0R1 or 2.2R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
3. Upgrade Junos Space Platform to Release 18.3R1. See [Upgrading to Junos Space Network Management Platform Release 18.3R1](#) for instructions on upgrading to Junos Space Platform Release 18.3R1.
4. Upgrade Connectivity Services Director to Release 4.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
5. Upgrade Junos Space Platform to Release 19.3R1. See [Upgrading to Junos Space Network Management Platform Release 19.3R1](#) for instructions on upgrading Junos Space Platform Release 19.3R1.
6. Upgrade Connectivity Services Director to Release 5.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
7. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups.

NOTE: Enable monitoring for all categories from the Monitoring tab of the Preferences page.

Upgrading from Network Activate Release 14.3R1, Transport Activate 14.3R1, OAM Insight 14.3R1, and Sync Design 14.3R1

You cannot directly upgrade to Connectivity Services Director Release 5.0R1 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 2.0R6, and then upgrade to Connectivity Services Director Release 5.0R1.

To 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 5.0R1:

1. Back up the Junos Space Platform database. For more details, see [Backing Up and Restoring the Database Overview](#).
2. Upgrade Junos Space Platform to Release 15.1R1.
3. Reboot Junos Space Platform from the Maintenance Mode Options page.
4. Uninstall Red Hat Package Manager.

If you are running a version of Junos Space Platform earlier than Release 15.2R2, uninstall Red Hat Package Manager.

You can uninstall the Red Hat Package Manager manually, or you can run the *uninstall_rpm.sh* script to uninstall the Red Hat Package Manager.

For information about uninstalling Red Hat Package Manager manually, see [“Installing and Uninstalling Red Hat Package Manager for Connectivity Services Director” on page 35](#).

For more information about the Red Hat installation script, contact the Juniper Networks Technical Assistance Center.

5. Upgrade Junos Space Platform to Release 15.2R2.

NOTE: You must not reboot Junos Space Platform from the Maintenance Mode Options page.

6. Install Red Hat Package Manager.

You can install the Red Hat Package Manager manually, or you can run the *install_rpm.sh* script to install the Red Hat Package Manager.

For more information about installing the Red Hat Package Manager manually, see [“Installing and Uninstalling Red Hat Package Manager for Connectivity Services Director” on page 35](#).

For more information about the Red Hat installation script, contact the Juniper Networks Technical Assistance Center.

7. Reboot Junos Space Platform from the Maintenance Mode Options page.

8. Install the Junos Space Platform hot patch release 15.2R2 v11.

To install Junos Space Platform hot patch release 15.2R2 v11:

- a. Download the 15.2R2-hotpatch-v11.tgz patch to your local computer from the <https://www.juniper.net/support/downloads/?p=space#sw> location.
- b. Log in to the Junos Space active VIP node as the admin user.
- c. Transfer the patch to the Junos Space node by using Secure Copy Protocol (SCP). Save the file in a temporary location, such as /tmp/patch or /home/admin.
- d. Navigate to the location on the node where you stored the patch.

- e. Extract the patch by using the following command:

```
tar xzf 15.2R2-hotpatch-v11.tgz
```

- f. Change to the extracted patch directory.

```
cd 15.2R2-hotpatch-v11
```

- g. Type the following command and press Enter to install the patch:

```
sh patchme.sh
```

- h. You are prompted to enter your password. Enter your CLI password.
The JBoss server is rebooted automatically.

9. Upgrade to Connectivity Services Director Release 2.0R6.

10. Upgrade Junos Space Platform to Release 16.1. See [Upgrading to Junos Space Network Management Platform Release 16.1R1](#) for instructions on installing Junos Space Platform Release 16.1R1.

11. Upgrade to Junos Space Platform to Release 17.1. See [Upgrading Junos Space Network Management Platform](#) for instructions on installing Junos Space Platform Release 17.1R1.

12. Upgrade Connectivity Services Director to Release 2.1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).

13. If you are using Junos Space Platform Release 17.1, upgrade Junos Space Platform to Release 17.2, 18.1, 18.2 or 18.3. See [Upgrading to Junos Space Network Management Platform Release 17.2R1](#) or [Upgrading to Junos Space Network Management Platform Release 18.1R1](#) or [Upgrading to Junos Space Network Management Platform Release 18.2R1](#) or [Upgrading to Junos Space Network Management Platform Release 18.3R1](#).

[Platform Release 18.3R1](#) for instructions on upgrading Junos Space Platform Release 17.2R1, 18.1R1, 18.2R1, or 18.3R1 respectively.

14. Upgrade Connectivity Services Director to Release 2.2. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
15. Upgrade Junos Space Platform to Release 19.3R1. See [Upgrading to Junos Space Network Management Platform Release 19.3R1](#) for instructions on upgrading Junos Space Platform Release 19.3R1.
16. Upgrade Connectivity Services Director to Release 5.0R1. For more information, see [“Installing and Uninstalling Connectivity Services Director” on page 15](#).
17. Uninstall other applications (such as Junos Space QoS Design or Junos Space Transport Activate) as needed before you uninstall Network Activate.
18. Uninstall NetworkAppsApi.
19. Uninstall Network Activate.
20. Restart the JBoss server for the monitoring and fault features to work properly in standalone and cluster setups.

NOTE: Enable monitoring for all categories from the Monitoring tab of the Preferences page.

NOTE: QoS Design cannot be installed on the same system as Connectivity Services Director. After you uninstall 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 the applications are uninstalled, ensure that you restart the JBoss server for the Connectivity Services Director application to work.

RELATED DOCUMENTATION

| [Installing and Uninstalling Connectivity Services Director](#) | 15

Installing and Uninstalling Red Hat Package Manager for Connectivity Services Director

IN THIS SECTION

- [Installing Red Hat Package Manager for Connectivity Services Director | 35](#)
- [Uninstalling Red Hat Package Manager for Connectivity Services Director | 36](#)

Red Hat Package Manager (RPM) for Connectivity Services Director can be installed or uninstalled by running install scripts. With RPM, you can install, upgrade, and uninstall software and also keep track of existing RPM agents on your device. To install a package or to upgrade to a new package, you must uninstall existing RPM agents on your device. When you uninstall an agent, the local services that are monitored on the device will change to the *Stale* state until a new agent has been installed.

The topics given below provide step by step instructions to install and uninstall Red Hat Package Manager for Connectivity Services Director.

Installing Red Hat Package Manager for Connectivity Services Director

To install Red Hat Package Manager for Connectivity Services Director:

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

1. Log in to the Junos Space CLI on the VIP node and access the shell.
2. Run the `/usr/bin/extract_image.sh -i /var/cache/jboss/jmp/Connectivity-Services-Director.1.0R2.6/Connectivity-Services-Director.1.0R2.6.img -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 Red Hat Package Manager that you previously uninstalled from the Connectivity Services Director software image.

The Red Hat Package Manager is extracted to the `/home/admin/Connectivity-Services-Director.1.0R2.6` directory.

3. Run the `rpm -ivh --force jmp-csd-1.0-367423.x86_64.rpm` command to install the Connectivity Services Director Red Hat Package Manager. A sample output follows.

```
[root@host ~]# 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_conntrack_ftp
present
    modprobe ip_conntrack_tftp present
    File exists so just check for the strings
    string present - so just replace the value
```

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

Uninstalling Red Hat Package Manager for Connectivity Services Director

To uninstall the Red Hat Package Manager for Connectivity Services Director:

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

1. 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.

2. Type **6** (if the node is a hardware appliance) or **7** (if the node is a virtual appliance) to open a debug (command) prompt.

3. Type the password for the **admin** user when prompted, and press Enter.

You are taken to the shell.

4. Run the **rpm -qa|grep jmp-csd** command to determine Connectivity Services Director Red Hat Package Manager to uninstall. A sample output is as follows:

```
[root@host ~]# rpm -qa|grep jmp-csd
jmp-csd-1.0-367423
```

5. Run the **rpm -e --nodeps rpm-name** command to uninstall the Red Hat Package Manager, where *rpm-name* is the name of the Red Hat Package Manager obtained in the preceding step.
6. Run the **rpm -qa|grep jmp-csd** command to confirm that the Red Hat Package Manager was uninstalled successfully. The command produces no output if the Red Hat Package Manager was uninstalled successfully.
7. Exit the shell and log out of the Junos Space VIP node.

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. A newer schema describes the new features provided in 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.

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 5.0R1.

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

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—Indicates whether the schema is 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 **Actions** 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**.

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 uses 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
```

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 need to perform to use all the features of Connectivity Services Director. We suggest that you explore:

- 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.