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Cisco Nexus 7000 Series NX-OS Software Upgrade and Downgrade Guide, Release 4.1

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This document provides information to upgrade or downgrade the Cisco NX-OS software.

This guide includes the following sections:

- [About Software Images, page 2](#)
- [About In-Service Software Upgrades on Devices with Dual Supervisor Modules, page 2](#)
- [Virtualization Support, page 4](#)
- [Prerequisites for Upgrading the Cisco NX-OS Software, page 4](#)
- [Upgrading Cisco NX-OS Software, page 6](#)
- [Downgrading from a Higher Release, page 14](#)
- [Example Outputs from Cisco NX-OS Software Upgrades, page 15](#)
- [Obtaining Documentation and Submitting a Service Request, page 25](#)



Tip

For information about the commands in this document, see the *Cisco Nexus 7000 Series NX-OS Fundamentals Command Reference, Release 4.1*.



Caution

All command-line interface (CLI) session examples provided in this document are intended only for reference. The actual session output differs based the configuration of the device.



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About Software Images

Each device is shipped with the Cisco NX-OS software. The Cisco NX-OS software consists of two images—the kickstart image and the system image.

The software image install procedure is dependent on the following factors:

- Software images—The kickstart and system image files reside in directories or folders that you can access from the Cisco NX-OS software prompt.
- Image version—Each image file has a version.
- Flash disks on the device—The bootflash: resides on the supervisor module and the CompactFlash disk is inserted into the slot0:, usb1, or usb2: device.
- Supervisor modules—There are single or dual supervisor modules.

**Note**

On devices with dual supervisor modules, both supervisor modules must have connections on the console ports to maintain connectivity when switchovers occur during upgrades and downgrades. See the *Cisco Nexus 7000 Series Hardware Installation and Reference Guide*.

About In-Service Software Upgrades on Devices with Dual Supervisor Modules

The Cisco NX-OS software supports in-service software upgrades (ISSUs) on devices with dual supervisor modules. An ISSU can update the software images on your device without disrupting data traffic. Only control traffic is disrupted. If an ISSU will cause a disruption of data traffic, the Cisco NX-OS software warns you before proceeding so that you can stop the upgrade and reschedule it to a time that minimizes the impact on your network.

An ISSU updates the following images:

- Kickstart image
- System image
- Supervisor module BIOS
- Data module image
- Data module BIOS
- Connectivity management processor (CMP) image
- CMP BIOS

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Figure 1 shows the ISSU process.

Figure 1 ISSU Process

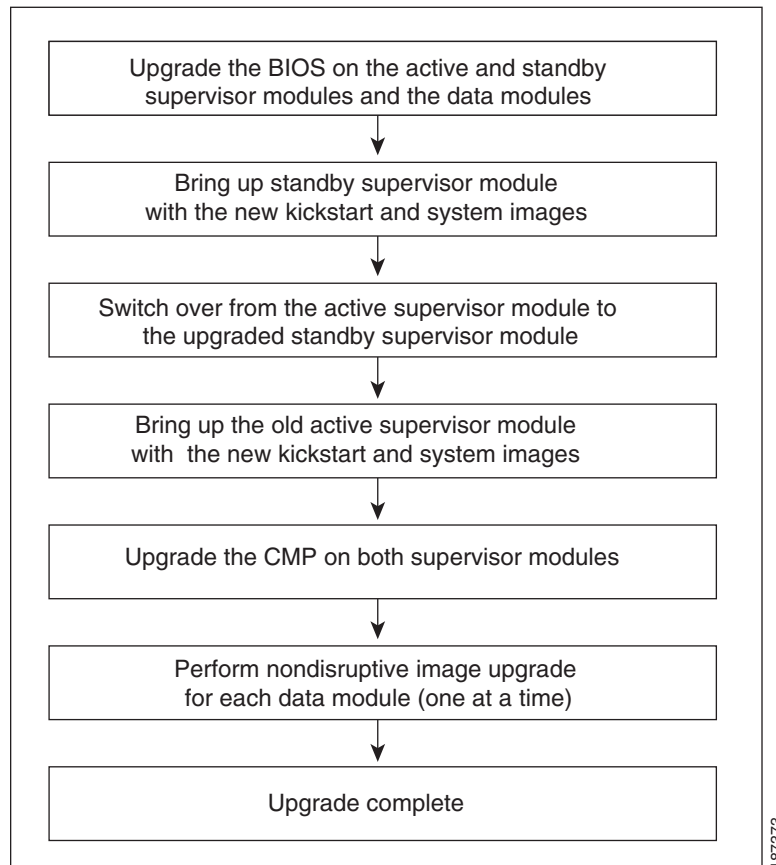
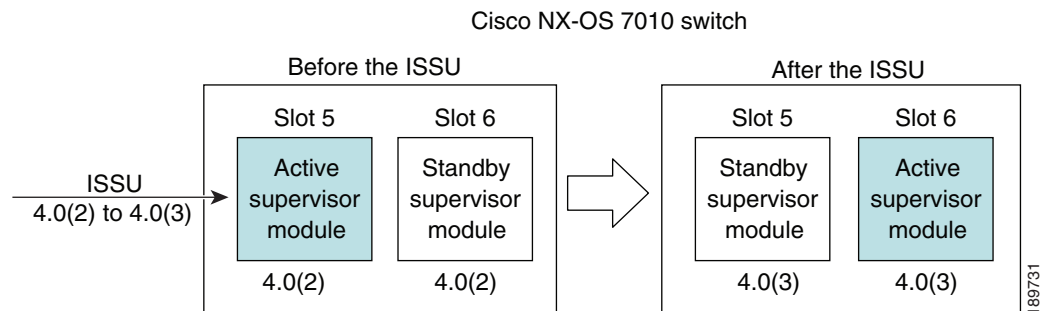


Figure 2 provides an example of the supervisor module status before and after an ISSU switchover.

Figure 2 Example of an ISSU Supervisor Module Switchover



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Virtualization Support

When you upgrade the Cisco NX-OS software, you upgrade the software for all virtual device contexts (VDCs) on the physical device. You cannot upgrade the Cisco NX-OS software for an individual VDC.

Prerequisites for Upgrading the Cisco NX-OS Software

Upgrading the Cisco NX-OS software has the following prerequisite:

- Save, commit, or discard any active configuration sessions before upgrading or downgrading the Cisco NX-OS software image on your device. On a device with dual supervisors, the active supervisor module cannot switchover to the standby supervisor module during the Cisco NX-OS software upgrade if you have an active configuration session. On a device with a single supervisor module, the Cisco NX-OS software deletes the active configuration session without warning when you reload the device.

Use the **show configuration session summary** command to verify that you have no active configuration sessions.

For more information on configuration sessions, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide, Release 4.1*.

- Cisco NX-OS Release 4.1 software is compatible with the following Cisco NX-OS software releases:
 - Release 4.0(3)
 - Release 4.0(4)
 - Release 4.0(4E1)

You must upgrade all Cisco NX-OS devices in the network to a compatible release if those devices communicate with any devices running Cisco NX-OS Release 4.1 software.

Cisco NX-OS Software Upgrade Guidelines

Before attempting to migrate to any software image version, follow these guidelines:

- Scheduling

Schedule the upgrade when your network is stable and steady. Ensure that everyone who has access to the device or the network is not configuring the device or the network during this time. You cannot configure a device during an upgrade.
- Space

Verify that sufficient space is available in the location where you are copying the images. This location includes the active and standby supervisor module bootflash: (internal to the device).

 - Standby supervisor module bootflash: file system.
 - Internal bootflash: has approximately 200 MB of free space available.
- Hardware

Avoid power interruption during any install procedure, which can corrupt the software image.

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- Connectivity to remote servers
 - Configure the IPv4 address or IPv6 address for the 10/100/1000 BASE-T Ethernet port connection (interface mgmt0).
 - Ensure the device has a route to the remote server. The device and the remote server must be in the same subnetwork if you do not have a router to route traffic between subnets.
- Images
 - Ensure that the specified system and kickstart images are compatible with each other.
 - If the kickstart image is not specified, the device uses the current running kickstart image.
 - If you specify a different system image, ensure that it is compatible with the running kickstart image.
 - Retrieve images in one of two ways:
 - Locally—Images are locally available on the switch.
 - Remotely—Images are in a remote location and you specify the destination using the remote server parameters and the file name to be used locally.
- Terminology

Table 1 summarizes terms used in the **install all** command output for checking compatibility.

Table 1 *install all Command Output Terminology*

| Term | Definition | |
|--------------|---|--|
| bootable | The modules ability to boot or not boot based on image compatibility. | |
| impact | The type of software upgrade mechanism—disruptive or nondisruptive. | |
| install-type | reset | Resets the module. |
| | sw-reset | Resets the module immediately after switchover. |
| | rolling | Upgrades each module in sequence. |
| | copy-only | Updates the software for BIOS, loader, or bootrom. |

- Commands to use
 - Verify connectivity to the remote server using the **ping** command.
 - Ensure that the required space is available for the image files to be copied using the **dir** command.
 - We recommend the one-step **install all** command to upgrade your software. This command upgrades all modules in any Cisco NX-OS device.
 - Run only one installation on a device at a time.
 - Do not issue another command while running the installation.
 - Do the installation on the active supervisor module, not the standby supervisor module.



Note If the I/O modules are not compatible with the software image you install on the supervisor module, some traffic disruption may occur in those modules, depending on your configuration. The **install all** command output identifies these commands. You can choose to proceed with the upgrade or end at this point.

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- Cisco TrustSec connected devices

Do not simultaneously upgrade or downgrade the images on devices connected with Cisco TrustSec. Allow the upgrade or downgrade to complete on one device before upgrading or downgrading the other device.

Upgrading Cisco NX-OS Software

Only users with the network-admin role can upgrade the Cisco NX-OS software image and only from the default VDC.

The upgrade procedure that you use depends on whether your device has a single supervisor module or has dual supervisor modules. To determine the number of supervisor modules on your device, use the **show hardware** and **show redundancy** commands.



Note

You can download the Cisco NX-OS software images to the bootflash:, slot0:, usb1:, or usb2: disks on your device. The examples in the procedures use bootflash:.

This section includes the following topics:

- [Upgrading a Device with Dual Supervisors, page 6](#)
- [Upgrading a Device with a Single Supervisor, page 11](#)

Upgrading a Device with Dual Supervisors

The **install all** command supports in-service software upgrade (ISSU) on devices that have dual supervisor modules and performs the following actions:

- Determines whether the upgrade will be disruptive and asks if you wish to continue.
- Copies the kickstart and system images to the standby supervisor module.
- Sets the KICKSTART and SYSTEM boot variables.
- Reloads the standby supervisor module with the new Cisco NX-OS software.
- Reloads the active supervisor module with the new Cisco NX-OS software, which causes a switchover to the newly upgraded standby supervisor module.

This section includes the following topics:

- [Benefits of Using the install all Command, page 6](#)
- [ISSU Failure Conditions, page 7](#)
- [Upgrade Procedure Summary, page 8](#)
- [Detailed Upgrade Procedure, page 8](#)

Benefits of Using the install all Command

The **install all** command provides the following benefits:

- You can upgrade the entire device using just one command.
- You can receive descriptive information on the intended changes to your system before you continue with the installation.

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- You have the option to cancel the command. Once the effects of the command are presented, you can continue or cancel when you see this question (the default is **no**):

```
Do you want to continue (y/n) [n] :y
```
- You can upgrade the entire device using the least disruptive procedure.
- You can see the progress of this command on the console, Telnet, and SSH screens:
 - After a switchover process, you can see the progress from both the supervisor modules.
 - Before a switchover process, you can only see the progress from the active supervisor module.
- The **install all** command automatically checks the image integrity. This includes the running kickstart and system images.
- The **install all** command performs a platform validity check to verify that a wrong image is not used—for example, to check if an MDS 9500 Series image is used inadvertently to upgrade an MDS 9200 Series switch.
- The **Ctrl-c** escape sequence gracefully ends the **install all** command. The command sequence completes the update step in progress and returns to the device prompt. (Other upgrade steps cannot be ended using **Ctrl-c**.)
- After issuing the **install all** command, if any step in the sequence fails, the command completes the step in progress and ends.

For example, if an I/O module fails to be updated for any reason (for example, due to an unstable network state), then the command sequence disruptively updates that module and ends. In such cases, you can verify the problem on the affected switching module and upgrade the other I/O modules.

ISSU Failure Conditions

The following situations cause the installation to fail to complete:

- If the standby supervisor module bootflash: file system does not have sufficient space to accept the updated image.
- If the specified system and kickstart images are not compatible.
- If the network or device is configured while the upgrade is in progress.
- If the **install all** command is issued on the standby supervisor module.
- If the **install all** command does not reference the default bootflash: in a dual supervisor module configuration.
- If a module is removed while the upgrade is in progress.
- If the device has any power disruption while the upgrade is in progress.
- If the entire path for the remote server location is not specified accurately.
- If images are incompatible after an upgrade. For example, an I/O module image may be incompatible with the system image, or a kickstart image may be incompatible with a system image. This is also identified by the **show install all impact** command in the compatibility check section of the output (under the Bootable column).

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Upgrade Procedure Summary

The following summary procedure describes how to upgrade a device that has dual supervisor modules to the latest Cisco NX-OS software:

-
- Step 1** Log in to the console port on both of the active and standby supervisor modules.
 - Step 2** Log in to Cisco.com and download the latest Cisco NX-OS kickstart and system images to a server.
 - Step 3** Download the Cisco NX-OS kickstart and system images from the server to your device using the **copy** command.
 - Step 4** Save the device configuration using the **copy running-config startup-config vdc-all** command.
 - Step 5** Enter the **install all** command at the active supervisor command prompt to upgrade the Cisco NX-OS software on your device.



Note A supervisor module switchover occurs during the software installation.

Detailed Upgrade Procedure

To upgrade to the latest Cisco NX-OS software on a device with dual supervisors, follow these steps:

-
- Step 1** Log in to the device on the console port connection on both of the active and standby supervisor modules.
 - Step 2** Log in to Cisco.com to access the links provided in this document. To log in to Cisco.com, go to the URL <http://www.cisco.com/> and click **Log In** at the top of the page. Enter your Cisco username and password.



Note Unregistered Cisco.com users cannot access the links provided in this document.

- Step 3** Access the Software Download Center using this URL:
<http://www.cisco.com/public/sw-center/index.shtml>
- Step 4** Navigate to the download site for your device.
You see links to the download images for your device.
- Step 5** Select and download the kickstart and system software files to a server.
- Step 6** Ensure that the required space is available for the image file(s) to be copied.

```
switch# dir bootflash:
 49152      Apr 16 14:43:39 2008  lost+found/
 80850712   Apr 04 15:57:44 2008  n7000-s1-dk9.4.0.1.bin
 22593024   Apr 04 15:52:56 2008  n7000-s1-kickstart.4.0.1.bin
```

```
Usage for bootflash://sup-local
103492888 bytes used
800604904 bytes free
904097792 bytes total
```

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Tip We recommend that you have the kickstart and system image files for at least one previous release of the Cisco NX-OS software on the device to use if the new image files do not load successfully.

Step 7 If you need more space on the active supervisor module, delete unnecessary files to make space available.

```
switch# delete bootflash:n7000-s1-kickstart.4.0.1.bin
switch# delete bootflash:n7000-s1-dk9.4.0.1.bin
```

Step 8 Verify that there is space available on the standby supervisor module.

```
switch# dir bootflash://sup-standby/
 49152      Apr 16 14:43:39 2008  lost+found/
80850712    Apr 04 15:57:44 2008  n7000-s1-dk9.4.0.1.bin
22593024    Apr 04 15:52:56 2008  n7000-s1-kickstart.4.0.1.bin

Usage for bootflash://sup-standby
103492888 bytes used
800604904 bytes free
904097792 bytes total
```

Step 9 If you need more space on the standby supervisor module, delete any unnecessary files to make space available.

```
switch# delete bootflash://sup-standby/n7000-s1-kickstart.4.0.1.bin
switch# delete bootflash://sup-standby/n7000-s1-dk9.4.0.1.bin
```

Step 10 Copy the NX-OS kickstart and system images to the active supervisor module using a transfer protocol. You can use **ftp:**, **tftp:**, **scp:**, or **sftp:**. The examples in this procedure use **scp:**.



Note When you download an image file, change to your FTP environment IP address or DNS name and the path where the files are located.

```
switch# copy scp://user@scpserver.cisco.com/downloads/n7000-s1-kickstart.4.0.1a.bin
bootflash:n7000-s1-kickstart.4.0.1a.bin
switch# copy scp://user@scpserver.cisco.com/downloads/n7000-s1-dk9.4.0.1a.bin
bootflash:n7000-s1-dk9.4.0.1a.bin
```

Step 11 Read the release notes for the related image file. See the [Cisco NX-OS Software release notes](#).

Step 12 Save the running configuration to the start configuration.

```
switch# copy running-config startup-config vdc-all
```

Step 13 Perform the upgrade using the **install all** command at the command prompt on the active supervisor module.

```
switch# install all kickstart bootflash:n7000-s1-kickstart.4.0.1a.bin system
bootflash:n7000-s1-dk9.4.0.1a.bin
```

For example output from a nondisruptive upgrade, see the [“Example Nondisruptive Upgrade of an Device with Dual Supervisors”](#) section on page 15.

For example output from a disruptive upgrade, see the [“Example Disruptive Upgrade of an Device with Dual Supervisors”](#) section on page 20.

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Note If the upgrade is disruptive, you can either resolve the issues that cause the disruption and repeat this step, or you can continue with the disruptive upgrade.

Step 14 After the installation operation completes, log in and verify that the device is running the required software version using the **show version** command.

```
switch# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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license. Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or the GNU
Lesser General Public License (LGPL) Version 2.1. A copy of each
such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php

Software
  BIOS:          version 3.15.0
  loader:        version N/A
  kickstart:     version 4.0(1a) [gdb]
  system:        version 4.0(1a) [gdb]
  BIOS compile time: 03/04/08
  kickstart image file is: bootflash:/n7000-s1-kickstart.4.0.1a.bin
  kickstart compile time: 3/6/2008 2:00:00 [04/02/2008 09:49:07]
  system image file is:  bootflash:/n7000-s1-dk9.4.0.1a.bin
  system compile time: 3/6/2008 2:00:00 [04/02/2008 10:28:32]

Hardware
  cisco Nexus7000 C7010 (10 Slot) Chassis ("Supervisor module-1X")
  Intel(R) Xeon(R) CPU          with 2063436 kB of memory.
  Processor Board ID JAB10380101

  Device name: switch
  bootflash: 1023120 kB
  slot0: 0 kB (expansion flash)

Kernel uptime is 2 day(s), 17 hour(s), 26 minute(s), 1 second(s)

Last reset at 121426 usecs after Sun Apr 13 20:38:08 2008

Reason: Reset Requested by CLI command reload
System version: 4.0(1a)
Service:
...
```

Step 15 Reload both CMPs. For information about configuring and upgrading the CMP, see the *Cisco Nexus 7000 Series Connectivity Management Processor Configuration Guide*.

```
switch# reload cmp module 5
switch# reload cmp module 6
```

Step 16 (Optional) Install licenses (if necessary) to ensure that the required features are available on the device. See the *Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.1*.

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Upgrading a Device with a Single Supervisor

This section includes the following topics:

- [Upgrade Procedure Summary, page 11](#)
- [Detailed Upgrade Procedure, page 11](#)

Upgrade Procedure Summary

The following summary procedure describes how to upgrade a device that has a single supervisor module to the latest Cisco NX-OS software:

-
- Step 1** Log in to the console port on the supervisor modules.
- Step 2** Log in to Cisco.com and download the latest Cisco NX-OS kickstart and system images.
- Step 3** Download the Cisco NX-OS kickstart and system images to your device using the **copy** command.
- Step 4** Update the KICKSTART and SYSTEM boot variables and module images using the **install all** command.
- Step 5** Save the device configuration using the **copy running-config startup-config vdc-all** command.
- Step 6** Enter the **reload** command at the active supervisor command prompt to upgrade the Cisco NX-OS software on your device.



Caution Reloading the device disrupts traffic on the device.

Detailed Upgrade Procedure



Caution Upgrading a device with a single supervisor module disrupts traffic flow through the device.

To upgrade to the latest Cisco NX-OS software on a device with a single supervisor, follow these steps:

-
- Step 1** Log in to the device on the console port connection.
- Step 2** Log in to Cisco.com to access the links provided in this document. To log in to Cisco.com, go to the URL <http://www.cisco.com/> and click **Log In** at the top of the page. Enter your Cisco username and password.



Note Unregistered Cisco.com users cannot access the links provided in this document.

- Step 3** Access the Software Download Center using this URL:
<http://www.cisco.com/public/sw-center/index.shtml>
- Step 4** Navigate to the download site for your device.
You see links to the download images for your device.
- Step 5** Select and download the kickstart and system software files to a server.

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Step 6 Ensure that the required space is available in the bootflash: directory for the image file(s) to be copied.

```
switch# dir bootflash:
 49152      Apr 16 14:43:39 2008  lost+found/
 80850712   Apr 04 15:57:44 2008  n7000-s1-dk9.4.0.1.bin
 22593024   Apr 04 15:52:56 2008  n7000-s1-kickstart.4.0.1.bin

Usage for bootflash://sup-local
 103492888 bytes used
 800604904 bytes free
 904097792 bytes total
```



Tip We recommend that you have the kickstart and system image files for at least one previous release of the Cisco NX-OS software on the device to use if the new image files do not load successfully.

Step 7 If you need more space on the active supervisor module bootflash, delete unnecessary files to make space available.

```
switch# delete bootflash:n7000-s1-kickstart.4.0.1a.bin
switch# delete bootflash:n7000-s1-dk9.4.0.1a.bin
```

Step 8 Copy the NX-OS kickstart and system images to the active supervisor module bootflash using a transfer protocol. You can use **ftp:**, **tftp:**, **scp:**, or **sftp:**. The examples in this procedure use **scp:**.



Note When you download an image file, change to your FTP environment IP address or DNS name and the path where the files are located.

```
switch# copy scp://user@scpserver.cisco.com/downloads/n7000-s1-kickstart.4.0.1a.bin
bootflash:n7000-s1-kickstart.4.0.1a.bin
switch# copy scp://user@scpserver.cisco.com/downloads/n7000-s1-dk9.4.0.1a.bin
bootflash:n7000-s1-dk9.4.0.1a.bin
```

Step 9 Read the release notes for the related image file. See the [Cisco NX-OS Software release notes](#).

Step 10 Update the boot variables and module images on your device.

```
switch# install all kickstart bootflash:n7000-s1-kickstart.4.0.1a.bin
system bootflash:n7000-s1-dk9.4.0.1a.bin
```

Step 11 Save the running configuration to the start configuration.

```
switch(config)# copy running-config startup-config vdc-all
```

Step 12 Perform the upgrade using the **reload** command.

```
switch(config)# reload
```

For example output from the **reload** command, see the [“Example Upgrade of a Device with a Single Supervisor”](#) section on page 23.

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- Step 13** After the device completes the reload operation, log in and verify that the device is running the required software version.

```

switch# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2008, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under
license. Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or the GNU
Lesser General Public License (LGPL) Version 2.1. A copy of each
such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php

Software
  BIOS:          version 3.15.0
  loader:        version N/A
  kickstart:     version 4.0(1a) [gdb]
  system:        version 4.0(1a) [gdb]
  BIOS compile time:      03/04/08
  kickstart image file is: bootflash:/n7000-s1-kickstart.4.0.1a.bin
  kickstart compile time: 3/6/2008 2:00:00 [04/02/2008 09:49:07]
  system image file is:   bootflash:/n7000-s1-dk9.4.0.1a.bin
  system compile time:   3/6/2008 2:00:00 [04/02/2008 10:28:32]

Hardware
  cisco Nexus7000 C7010 (10 Slot) Chassis ("Supervisor module-1X")
  Intel(R) Xeon(R) CPU          with 2063436 kB of memory.
  Processor Board ID JAB10380101

  Device name: switch
  bootflash:   1023120 kB
  slot0:       0 kB (expansion flash)

Kernel uptime is 2 day(s), 17 hour(s), 26 minute(s), 1 second(s)

Last reset at 121426 usecs after Sun Apr 13 20:38:08 2008

  Reason: Reset Requested by CLI command reload
  System version: 4.0(1a)
  Service:
  ...

```

- Step 14** Reload the CMP. For information about configuring and upgrading the CMP, see the *Cisco Nexus 7000 Series Connectivity Management Processor Configuration Guide*.

```
switch# reload cmp module 6
```

- Step 15** (Optional) Install licenses to ensure that the required features are available on the device. See the *Cisco Nexus 7000 Series NX-OS Licensing Guide, Release 4.1*.

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Downgrading from a Higher Release

Only users with the network-admin role can downgrade the Cisco NX-OS software image and only from the default virtual device context (VDC).



Caution

When you downgrade to an earlier release, you will lose the configuration for features not supported in the earlier release. For example, if you downgrade your device from Cisco NX-OS Release 4.1(2) to an earlier release, you will lose any Public Key Interchange (PKI) configuration you have on the device.

To downgrade your device to an earlier release of the Cisco NX-OS software, follow these steps:

Step 1 Log in to the device on the console port connection.

Step 2 Verify that the system image files for the downgrade are present on the active supervisor module bootflash:

```
switch# dir bootflash:
          49152      Apr 16 14:43:39 2008  lost+found/
          80850712   Apr 04 15:57:44 2008  n7000-s1-dk9.4.0.1.bin
          22593024   Apr 04 15:52:56 2008  n7000-s1-kickstart.4.0.1.bin
```

```
Usage for bootflash://sup-local
103492888 bytes used
800604904 bytes free
904097792 bytes total
```

Step 3 If the software image file is not present, log in to Cisco.com to access the links provided in this document. To log in to Cisco.com, go to the URL <http://www.cisco.com/> and click **Log In** at the top of the page. Enter your Cisco username and password. You can obtain the software image file from the Cisco.com software download center at the following URL:

<http://www.cisco.com/public/sw-center/index.shtml>



Note

If you need more space on the active or standby supervisor module bootflash:, use the **delete** command to remove unnecessary files.

```
switch# copy scp://user@scpserver.cisco.com//downloads/n7000-s1-kickstart.4.0.1.bin
bootflash:n7000-s1-kickstart.4.0.1.bin
switch# copy scp://user@scpserver.cisco.com//downloads/n7000-s1-dk9.4.0.1.bin
bootflash:n7000-s1-dk9.4.0.1.bin
```

Step 4 Determine if you need to disable any features not supported by the older release using the **show incompatibility system image-filename** command.

```
switch# show incompatibility system bootflash:n7000-s1-dk9.4.0.1.bin
The following configurations on active are incompatible with the system image
1) Service : eth_port_channel , Capability : CAP_FEATURE_AUTO_CREATED_PORT_CHANNEL
Description : active mode port channels, auto create enabled ports or auto created
port-channels are present
Capability requirement : STRICT
Disable command : 1.Convert Active mode port channels to On mode port channels (no channel
mode active).
2.Disable autcreate on interfaces (no channel-group auto).
3.Convert autcreated port channels to be persistent (port-channel 1 persistent).
```

Step 5 Disable any features that are incompatible with the downgrade system image.

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- Step 6** Save the running configuration to the start configuration
 switch# **copy running-config startup-config vdc-all**
- Step 7** Upgrade the NX-OS software as described in the “Upgrading a Device with Dual Supervisors” section on page 6 or the “Upgrading a Device with a Single Supervisor” section on page 11.

Example Outputs from Cisco NX-OS Software Upgrades

This section includes the following topics:

- [Example Nondisruptive Upgrade of an Device with Dual Supervisors, page 15](#)
- [Example Disruptive Upgrade of an Device with Dual Supervisors, page 20](#)
- [Example Upgrade of a Device with a Single Supervisor, page 23](#)



Note

The output of the **install all** command depends on the software image, especially the upgrade required (Upg-Required) field information in the upgrade table.

Example Nondisruptive Upgrade of an Device with Dual Supervisors

The following console session output shows a nondisruptive execution of the **install all** command on a device with dual supervisor modules:

```
switch# install all kickstart bootflash:n7000-s1-kickstart.4.0.1a.bin system
bootflash:n7000-s1-dk9.4.0.1a.bin
Verifying image bootflash:/n7000-s1-kickstart.4.0.1a.bin for boot variable "kickstart".
[#####] 100% -- SUCCESS

Verifying image bootflash:/n7000-s1-dk9.4.0.1a.bin for boot variable "system".
[#####] 100% -- SUCCESS

Verifying image type.
[#####] 100% -- SUCCESS

Extracting "lcln7k" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "bios" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "kickstart" version from image bootflash:/n7000-s1-kickstart.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "cmp" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "cmp-bios" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS
```

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Compatibility check is done:

| Module | bootable | Impact | Install-type | Reason |
|--------|----------|----------------|--------------|--------|
| 1 | yes | non-disruptive | rolling | |
| 2 | yes | non-disruptive | rolling | |
| 3 | yes | non-disruptive | rolling | |
| 5 | yes | non-disruptive | reset | |
| 6 | yes | non-disruptive | reset | |
| 7 | yes | non-disruptive | rolling | |
| 10 | yes | non-disruptive | rolling | |

Images will be upgraded according to following table:

| Module | Image | Running-Version(pri:alt) | New-Version | Upg-Required |
|--------|-----------|--------------------------------------|-------------------|--------------|
| 1 | lc1n7k | 4.0(1au) | 4.0(1a) | yes |
| 1 | bios | v1.10.5(02/27/08): v1.10.5(02/27/08) | v1.10.5(02/27/08) | no |
| 2 | lc1n7k | 4.0(1au) | 4.0(1a) | yes |
| 2 | bios | v1.10.5(02/27/08): v1.10.5(02/27/08) | v1.10.5(02/27/08) | no |
| 3 | lc1n7k | 4.0(1au) | 4.0(1a) | yes |
| 3 | bios | v1.10.5(02/27/08): v1.10.5(02/27/08) | v1.10.5(02/27/08) | no |
| 5 | system | 4.0(1au) | 4.0(1a) | yes |
| 5 | kickstart | 4.0(1au) | 4.0(1a) | yes |
| 5 | bios | v3.16.0(03/17/08): v3.16.0(03/17/08) | v3.15.0(03/04/08) | no |
| 5 | cmp | 4.0(1a) | 4.0(1a) | no |
| 5 | cmp-bios | 02.01.01 | 02.01.01 | no |
| 6 | system | 4.0(1au) | 4.0(1a) | yes |
| 6 | kickstart | 4.0(1au) | 4.0(1a) | yes |
| 6 | bios | v3.16.0(03/17/08): v3.16.0(03/17/08) | v3.15.0(03/04/08) | no |
| 6 | cmp | 4.0(1a) | 4.0(1a) | no |
| 6 | cmp-bios | 02.01.01 | 02.01.01 | no |
| 7 | lc1n7k | 4.0(1au) | 4.0(1a) | yes |
| 7 | bios | v1.10.5(02/27/08): v1.10.5(02/27/08) | v1.10.5(02/27/08) | no |
| 10 | lc1n7k | 4.0(1au) | 4.0(1a) | yes |
| 10 | bios | v1.10.5(02/27/08): v1.10.5(02/27/08) | v1.10.5(02/27/08) | no |

Do you want to continue with the installation (y/n)? [n] y

Install is in progress, please wait.

Syncing image bootflash:/n7000-s1-kickstart.4.0.1a.bin to standby.

[#####] 100% -- SUCCESS

Syncing image bootflash:/n7000-s1-dk9.4.0.1a.bin to standby.

[#####] 100% -- SUCCESS

Setting boot variables.

[#####] 100% -- SUCCESS

Performing configuration copy.

[#####] 100% -- SUCCESS

2008 Apr 17 08:04:57.822 switch %\$ VDC-1 %\$ %PLATFORM-2-MOD_REMOVE: Module 6 removed (Serial numberJAB114902HH)

Module 6: Waiting for module online.

-- SUCCESS

2008 Apr 17 08:09:26.811 switch %\$ VDC-1 %\$ %CARDCLIENT-2-SSE: MOD:6 SUP ONLINE

Notifying services about the switchover.

[#####] 100% -- SUCCESS

"Switching over onto standby".

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```
Raw time read from Hardware Clock: Y=2008 M=4 D=17 08:11:23
writing reset reason 7, SAP(93): Swover due to install
```

```
NX7 SUP Ver 3.16.0
Serial Port Parameters from CMOS
PMCON_1: 0x200
PMCON_2: 0x0
PMCON_3: 0x3a
PM1_STS: 0x101
Performing Memory Detection and Testing
Testing 1 DRAM Patterns
Total mem found : 4096 MB
Memory test complete.
NumCpus = 2.
Status 61: PCI DEVICES Enumeration Started
Status 62: PCI DEVICES Enumeration Ended
Status 9F: Dispatching Drivers
Status 9E: IOFPGA Found
Status 9A: Booting From Primary ROM
Status 98: Found Cisco IDE
Status 98: Found Cisco IDE
Status 98: Found Cisco IDE
Status 90: Loading Boot Loader
```

```
Reset Reason Registers: 0x1 0x0
```

```
Filesystem type is ext2fs, partition type 0x83
```

```
GNU GRUB version 0.97
```

```
Autobooting bootflash:/n7000-s1-kickstart.4.0.1a.bin bootflash:/n7000-s1-dk9.4.0.1a.bin...
Filesystem type is ext2fs, partition type 0x83
Booting kickstart image: bootflash:/n7000-s1-kickstart.4.0.1a.bin....
.....Image verification OK
```

```
Starting kernel...
INIT: version 2.85 booting
Checking all filesystems..r.r.r.. done.
/bootflash//n7000-s1-dk9.4.0.1a.bin read done
Setting kernel variables: sysctlnet.ipv4.ip_forward = 0
net.ipv4.ip_default_ttl = 64
net.ipv4.ip_no_pmtu_disc = 1
.
Setting the System Clock using the Hardware Clock as reference...System Clock set. Local time: Thu Apr 17
08:13:43 UTC 2008
Loading system software
Uncompressing system image: bootflash:/n7000-s1-dk9.4.0.1a.bin
```

```
Loading plugin 0: core_plugin...
INIT: Entering runlevel: 3
Exporting directories for NFS kernel daemon...done.
Starting NFS kernel daemon:rpc.nfsd.
rpc.mountddone.
```

```
User Access Verification
switch login: 2008 Apr 17 08:15:19.818 switch %$ VDC-1 %$ %IDEHSD-2-UMOUNT: slot0 offline
2008 Apr 17 08:15:20.004 switch %$ VDC-1 %$ %IDEHSD-2-MOUNT: slot0 online
2008 Apr 17 08:15:30.976 switch %$ VDC-1 %$ %IDEHSD-2-MOUNT: logflash online
```

```
User Access Verification
switch login: admin
Password: <password>
Cisco Nexus Operating System (NX-OS) Software
```

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```
TAC support: http://www.cisco.com/tac
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such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php
switch(standby)#
```



Note

A supervisor module switchover has occurred and the active supervisor module is now the standby supervisor module.

The following example console session output from the standby supervisor module shows that the standby supervisor module switches over to become the active supervisor module.

```
switch(standby)#
NX7 SUP Ver 3.16.0
Serial Port Parameters from CMOS
PMCON_1: 0x200
PMCON_2: 0x0
PMCON_3: 0x3a
PM1_STS: 0x101
Performing Memory Detection and Testing
Testing 1 DRAM Patterns
Total mem found : 4096 MB
Memory test complete.
NumCpus = 2.
Status 61: PCI DEVICES Enumeration Started
Status 62: PCI DEVICES Enumeration Ended
Status 9F: Dispatching Drivers
Status 9E: IOFPGA Found
Status 9A: Booting From Primary ROM
Status 98: Found Cisco IDE
Status 98: Found Cisco IDE
Status 98: Found Cisco IDE
Status 90: Loading Boot Loader

Reset Reason Registers: 0x0 0x8

Filesystem type is ext2fs, partition type 0x83

GNU GRUB version 0.97

Autobooting bootflash:/n7000-s1-kickstart.4.0.1a.bin bootflash:/n7000-s1-dk
9.4.0.1a.bin...
Filesystem type is ext2fs, partition type 0x83
Booting kickstart image: bootflash:/n7000-s1-kickstart.4.0.1a.bin...
.....Image verification OK

Starting kernel...
INIT: version 2.85 booting
Checking all filesystems..r.r.r.. done.
/bootflash//n7000-s1-dk9.4.0.1a.bin read done
Setting kernel variables: sysctlnet.ipv4.ip_forward = 0
net.ipv4.ip_default_ttl = 64
net.ipv4.ip_no_pmtu_disc = 1
.
Setting the System Clock using the Hardware Clock as reference...System Clock set. Local time: Thu Apr
1708:07:14 UTC 2008
```

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```

Loading system software
Uncompressing system image: bootflash:/n7000-s1-dk9.4.0.1a.bin

Loading plugin 0: core_plugin...
INIT: Entering runlevel: 3
Exporting directories for NFS kernel daemon...done.
Starting NFS kernel daemon:rpc.nfsd.
rpc.mountddone.

System is coming up ... Please w
Continuing with installation, please wait
2008 Apr 17 08:08:51.904 switch %$ VDC-1 %$ %IDEHSD-2-UMOUNT: slot0 offline
2008 Apr 17 08:08:51.941 switch %$ VDC-1 %$ %IDEHSD-2-MOUNT: slot0 online
2008 Apr 17 08:08:52.970 switch %$ VDC-1 %$ %IDEHSD-2-MOUNT: logflash online

Module 6: Waiting for module online.
-- SUCCESS
2008 Apr 17 08:11:21.710 switch %$ VDC-1 %$ %SYSMGR-2-HASWITCHOVER_PRE_START: This supervisor is becoming
active (pre-start phase).
2008 Apr 17 08:11:21.711 switch %$ VDC-1 %$ %SYSMGR-2-HASWITCHOVER_START: This supervisor is becoming active.
2008 Apr 17 08:11:27.202 switch %$ VDC-1 %$ %SYSMGR-2-SWITCHOVER_OVER: Switchover completed.

Module 1: Non-disruptive upgrading.
[#####] 100% -- SUCCESS

Module 2: Non-disruptive upgrading.
[#####] 100% -- SUCCESS

Module 3: Non-disruptive upgrading.
[#####] 100% -- SUCCESS

Module 7: Non-disruptive upgrading.
[#####] 100% -- SUCCESS

Module 10: Non-disruptive upgrading.
[#####] 100% -- SUCCESS

Recommended action::
"Please reload CMP(s) manually to have it run in the newer version.".

Install has been successful.

User Access Verification
switch login: admin
Password: <password>
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
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http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php
switch#

```

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Example Disruptive Upgrade of an Device with Dual Supervisors

The following console session output shows a disruptive execution of the **install all** command on a device with dual supervisor modules:

```
switch# install all kickstart bootflash:n7000-s1-kickstart.4.0.1a.bin system
bootflash:n7000-s1-dk9.4.0.1a.bin

Verifying image bootflash:/n7000-s1-kickstart.4.0.1a.bin for boot variable "kickstart".
[#####] 100% -- SUCCESS

Verifying image bootflash:/n7000-s1-dk9.4.0.1a.bin for boot variable "system".
[#####] 100% -- SUCCESS

Verifying image type.
[#####] 100% -- SUCCESS

Extracting "lc1n7k" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "bios" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "kickstart" version from image bootflash:/n7000-s1-kickstart.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "cmp" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS

Extracting "cmp-bios" version from image bootflash:/n7000-s1-dk9.4.0.1a.bin.
[#####] 100% -- SUCCESS
```

Compatibility check is done:

| Module | bootable | Impact | Install-type | Reason |
|--------|----------|------------|--------------|--------------------|
| 1 | yes | disruptive | reset | Incompatible image |
| 3 | yes | disruptive | reset | Incompatible image |
| 5 | yes | disruptive | reset | Incompatible image |
| 6 | yes | disruptive | reset | Incompatible image |
| 10 | yes | disruptive | reset | Incompatible image |

Images will be upgraded according to following table:

| Module | Image | Running-Version(pri:alt) | New-Version | Upg-Required |
|--------|-----------|---------------------------------------|-------------------|--------------|
| 1 | lc1n7k | 4.0(1a) | 4.0(2u) | yes |
| 1 | bios | v1.10.5(02/27/08) : v1.10.5(02/27/08) | v1.10.5(02/27/08) | no |
| 3 | lc1n7k | 4.0(1a) | 4.0(2u) | yes |
| 3 | bios | v1.10.5(02/27/08) : v1.10.5(02/27/08) | v1.10.5(02/27/08) | no |
| 5 | system | 4.0(1a) | 4.0(2u) | yes |
| 5 | kickstart | 4.0(1a) | 4.0(2u) | yes |
| 5 | bios | v3.17.0(03/23/08) : v3.17.0(03/23/08) | v3.17.0(03/23/08) | no |
| 5 | cmp | 4.0(1au) | 4.0(2u) | yes |
| 5 | cmp-bios | 02.01.01 | 02.01.03 | yes |
| 6 | system | 4.0(1a) | 4.0(2u) | yes |
| 6 | kickstart | 4.0(1a) | 4.0(2u) | yes |
| 6 | bios | v3.17.0(03/23/08) : v3.17.0(03/23/08) | v3.17.0(03/23/08) | no |

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```

6          cmp          4.0(1au)          4.0(2u)          yes
6  cmp-bios          02.01.01          02.01.03          yes
10         lc1n7k          4.0(1a)          4.0(2u)          yes
10         bios          v1.10.5(02/27/08): v1.10.5(02/27/08)  v1.10.5(02/27/08)  no

```

Switch will be reloaded for disruptive upgrade.
Do you want to continue with the installation (y/n)? [n] **y**

Install is in progress, please wait.

Syncing image bootflash:/n7000-s1-kickstart.4.0.1a.bin to standby.
[#####] 100% -- SUCCESS

Syncing image bootflash:/n7000-s1-dk9.4.0.1a.bin to standby.
[#####] 100% -- SUCCESS

Setting boot variables.
[#####] 100% -- SUCCESS

Performing configuration copy.
[#####] 100% -- SUCCESS

Rebooting the switch to finish the upgrade.
Raw time read from Hardware Clock: Y=2008 M=4 D=18 02:31:29
writing reset reason 31,

```

NX7 SUP Ver 3.17.0
Serial Port Parameters from CMOS
PMCON_1: 0x200
PMCON_2: 0x0
PMCON_3: 0x3a
PM1_STS: 0x101
Performing Memory Detection and Testing
Testing 1 DRAM Patterns
Total mem found : 4096 MB
Memory test complete.
NumCpus = 2.
Status 61: PCI DEVICES Enumeration Started
Status 62: PCI DEVICES Enumeration Ended
Status 9F: Dispatching Drivers
Status 9E: IOFPGA Found
Status 9A: Booting From Primary ROM
Status 98: Found Cisco IDE
Status 98: Found Cisco IDE
Status 90: Loading Boot Loader
Reset Reason Registers: 0x10 0x0
Filesystem type is ext2fs, partition type 0x83

```

GNU GRUB version 0.97

```

Autobooting bootflash:/n7000-s1-kickstart.4.0.1a.bin bootflash:/n7000-s1-dk9.4.0.1a.bin...
Filesystem type is ext2fs, partition type 0x83
Booting kickstart image: bootflash:/n7000-s1-kickstart.4.0.1a.bin....
.....Image verification OK

```

```

Starting kernel...
INIT: version 2.85 booting
Checking all filesystems..r.r.r.. done.
/bootflash//n7000-s1-dk9.4.0.1a.bin read done
duplicate password entry

```

```

delete line `adminbackup:x:0:0:/:var/home/adminbackup:/bin/bash'? No
duplicate password entry

```

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```
delete line `adminbackup:x:2003:504::/var/home/adminbackup:/isan/bin/vsh_perm'? No
pwck: no changes
Setting kernel variables: sysctlnet.ipv4.ip_forward = 0
net.ipv4.ip_default_ttl = 64
net.ipv4.ip_no_pmtu_disc = 1
.
Setting the System Clock using the Hardware Clock as reference...System Clock set. Local time: Fri Apr 18
02:33:51 UTC 2008
Loading system software
Uncompressing system image: bootflash:/n7000-s1-dk9.4.0.1a.bin

Load plugins that defined in image conf: /isan/plugin_img/img.conf
Loading plugin 0: core_plugin...
INIT: Entering runlevel: 3
Exporting directories for NFS kernel daemon...done.
Starting NFS kernel daemon:rpc.nfsd.
rpc.mountddone.

System is coming up ... Please wait ...
System is coming up ... Please wait ...
System is coming up ... Please wait ...
```

```
User Access Verification
switch login: admin
Password: <password>
```



Note A supervisor module switchover has occurred and the active supervisor module is now the standby supervisor module.

The following example console session output from the standby supervisor module shows that the standby supervisor module switches over to become the active supervisor module.

```
switch(standby)#
NX7 SUP Ver 3.17.0
Serial Port Parameters from CMOS
PMCON_1: 0x200
PMCON_2: 0x0
PMCON_3: 0x3a
PM1_STS: 0x101
Performing Memory Detection and Testing
Testing 1 DRAM Patterns
Total mem found : 4096 MB
Memory test complete.
NumCpus = 2.
Status 61: PCI DEVICES Enumeration Started
Status 62: PCI DEVICES Enumeration Ended
Status 9F: Dispatching Drivers
Status 9E: IOFPGA Found
Status 9A: Booting From Primary ROM
Status 98: Found Cisco IDE
Status 98: Found Cisco IDE
Status 90: Loading Boot Loader

Reset Reason Registers: 0x10

0x0
Filesystem type is ext2fs, partition type 0x83

GNU GRUB version 0.97

Autobooting bootflash:/n7000-s1-kickstart.4.0.1a.bin bootflash:/n7000-s1
```

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```

-dk9.4.0.1a.bin...
Filesystem type is ext2fs, partition type 0x83
Booting kickstart image: bootflash:/n7000-s1-kickstart.4.0.1a.bin...
.....Image verification OK

Starting kernel...
INIT: version 2.85 booting
Checking all filesystems..r.r.r.. done.
/bootflash//n7000-s1-dk9.4.0.1a.bin read done
duplicate password entry

delete line `adminbackup:x:0:0::/var/home/adminbackup:/bin/bash'? No
duplicate password entry

delete line `adminbackup:x:2003:504::/var/home/adminbackup:/isan/bin/vsh_perm'? No
pwck: no changes
Setting kernel variables: sysctlnet.ipv4.ip_forward = 0
net.ipv4.ip_default_ttl = 64
net.ipv4.ip_no_pmtu_disc = 1
.
Setting the System Clock using the Hardware Clock as reference...System Clock set. Local time: Fri Apr 18
02:33:42 UTC 2008
Loading system software
Uncompressing system image: bootflash:/n7000-s1-dk9.4.0.1a.bin

Load plugins that defined in image conf: /isan/plugin_img/img.conf
Loading plugin 0: core_plugin...
INIT: Entering runlevel: 3
Exporting directories for NFS kernel daemon...done.
Starting NFS kernel daemon:rpc.nfsd.
rpc.mountddone.

User Access Verification
switch login: admin
Password: <password>

```

Example Upgrade of a Device with a Single Supervisor

The following console session output shows the execution of the **reload** command on a device with a single supervisor module:

```

switch(config)# reload
This command will reboot the system. (y/n)? [n] y
2008 Apr 13 20:16:52 switch %$ VDC-1 %$ %PLATFORM-2-PFM_SYSTEM_RESET: Manual sys
tem restart from Command Line Interface
Raw time read from Hardware Clock: Y=2008 M=4 D=13 20:17:01
writing reset reason 9,

NX7 SUP Ver 3.15.0
Serial Port Parameters from CMOS
PMCON_1: 0x200
PMCON_2: 0x0
PMCON_3: 0x3a
PM1_STS: 0x1
Performing Memory Detection and Testing
Testing 1 DRAM Patterns

```

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```

NX7 SUP Ver 3.15.0
Serial Port Parameters from CMOS
PMCON_1: 0x200
PMCON_2: 0x0
PMCON_3: 0x3a
PM1_STS: 0x1
Performing Memory Detection and Testing
Testing 1 DRAM Patterns
Total mem found : 2048 MB
Memory test complete.
NumCpus = 2.
Status 61: PCI DEVICES Enumeration Started
Status 62: PCI DEVICES Enumeration Ended
Status 9F: Dispatching Drivers
Status 9E: IOFPGA Found
Status 9A: Booting From Primary ROM
Status 98: Found Cisco IDE
Status 90: Loading Boot Loader

Reset Reason Registers: 0x10 0x10
Filesystem type is ext2fs, partition type 0x83

GNU GRUB version 0.97

Autobooting bootflash:/n7000-s1-kickstart.4.0.1a.bin bootflash:/o
ld_images/n7000-s1-dk9.4.0.1a.bin...
Filesystem type is ext2fs, partition type 0x83
Booting kickstart image: bootflash:/n7000-s1-kickstart.4.0.1a.bin
....
.....Image
verification OK

Starting kernel...
INIT: version 2.85 booting
Checking all filesystems..r.r.r.. done.
no matching password file entry

delete line `adminbackup:$1$0ip/C5Ci$0Odx7oJS1BCFpNRmQK4na.:13419:0:99999:7:::?'
No
pwck: no changes
Setting kernel variables: sysctlnet.ipv4.ip_forward = 0
net.ipv4.ip_default_ttl = 64
net.ipv4.ip_no_pmtu_disc = 1
.
Setting the System Clock using the Hardware Clock as reference...System Clock se
t. Local time: Sun Apr 13 20:19:38 UTC 2008
Loading system software
/bootflash//n7000-s1-dk9.4.0.1a.bin read done
Uncompressing system image: bootflash:/n7000-s1-dk9.4.0.1a.bin

Loading plugin 0: core_plugin...
INIT: Entering runlevel: 3
Exporting directories for NFS kernel daemon...done.
Starting NFS kernel daemon:rpc.nfsd.
rpc.mountddone.

2008 Apr 13 20:21:45 switch %$ VDC-1 %$ %KERN-2-SYSTEM_MSG: Starting kernel... - kernel
2008 Apr 13 20:22:09 switch %$ VDC-1 %$ %VDC_MGR-2-VDC_ONLINE: vdc 1 has come online

```

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```
User Access Verification
switch login: admin
password: <password>
```

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

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