Initial Switch Configuration

This chapter describes the command-line interface (CLI) and CLI command modes of Cisco Nexus 5000 Series switches. It includes the following sections:

Configuring the Switch

Image Files on the Switch

The Cisco Nexus 5000 Series switches have the following images:

- BIOS and loader images combined in one file
- Kickstart image
- System image that includes a BIOS image that can be upgraded

The switch has flash memory that consists of two separate flash parts:

- A 2 MB flash part holds two BIOS and loader images.
- A 1 GB flash part holds configuration files, kickstart images, systems images, and other files.

The upgradeable BIOS and the golden BIOS are programmed onto the 2 MB flash part. You cannot upgrade the golden BIOS.

When you download a new pair of kickstart and system images, you also get a new BIOS image because it is included in the system image. You can use the **install all** command to upgrade the kickstart, system, and upgradeable BIOS images.

Starting the Switch

A Cisco Nexus 5000 Series switch starts its boot process as soon as its power cord is connected to an A/C source. The switch does not have a power switch.

Boot Sequence

When the switch boots, the golden BIOS validates the checksum of the upgradeable BIOS. If the checksum is valid, then control is transferred to the upgradeable BIOS image. The upgradeable BIOS launches the kickstart image, which then launches the system image. If the checksum of the upgradeable BIOS is not valid, then the golden BIOS launches the kickstart image, which then launches the system image.

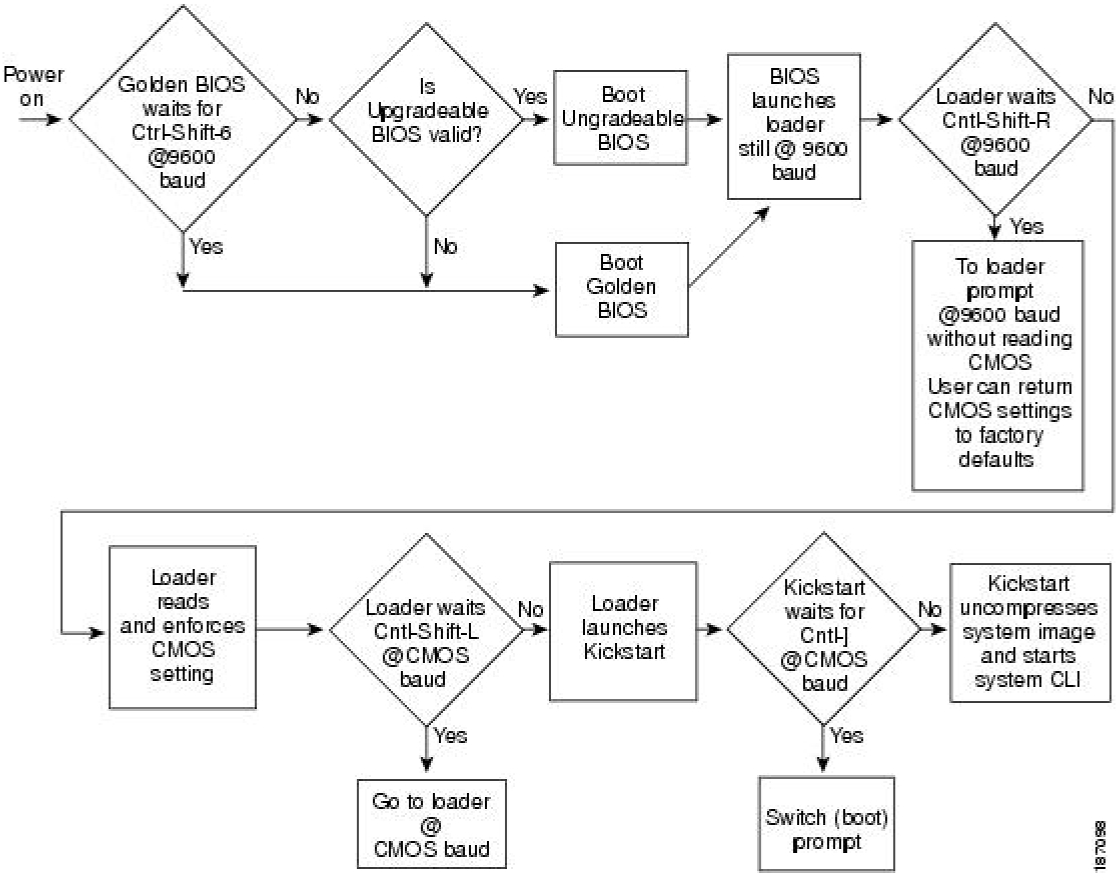
You can force the switch to bypass the upgradeable BIOS and use the golden BIOS instead. If you press **Ctrl-Shift-6** within two seconds of when power is supplied to the switch, the golden BIOS will be used to launch the kickstart image, even if the checksum of the upgradeable BIOS is valid.

Note When you press **Ctrl-Shift-6**, the console settings must be set to their defaults: 9600 baud, 8 data bits, no parity, and 1 stop bit.

Before the boot sequence starts, the BIOS performs internal tests on the switch. If the tests fail, then the loader does not gain control. Instead, the BIOS image retains control and prints a message to the console at 9600 baud every 30 seconds that indicates a failure.

The following figure shows the normal and recovery boot sequence.

Figure 1: Boot Sequence


Power on
Golden BIOS waits for Ctrl-Shift-6 @9600 baud
No
Yes
Is Upgradeable BIOS valid?
Yes
No
Boot Ungradeable BIOS
Boot Golden BIOS
BIOS launches loader still @ 9600 baud
Loader waits Cntl-Shift-R @9600 baud
No
Yes
To loader prompt @9600 baud without reading CMOS User can return CMOS settings to factory defaults
Loader reads and enforces CMOS setting
Loader waits Cntl-Shift-L @CMOS baud
No
Yes
Go to loader @ CMOS baud
Loader launches Kickstart
Kickstart waits for Cntl-] @CMOS baud
No
Yes
Switch (boot) prompt
Kickstart uncompresses system image and starts system CLI
187098

For additional information, see *Troubleshooting*.

Console Settings

The loader, kickstart, and system images have the following factory default console settings:

- Speed—9600 baud
- Databits—8 bits per byte
- Stopbits—1 bit
- Parity—none

These settings are stored on the switch, and all three images use the stored console settings.

To change a console setting, use the **line console** command in configuration mode. The following example configures a line console and sets the options for that terminal line:

```
switch# configure terminal
switch(config)# line console
switch(config-console)# databits 7
switch(config-console)# exec-timeout 30
switch(config-console)# parity even
switch(config-console)# stopbits 2
```

You cannot change the BIOS console settings. These are the same as the default console settings.

Upgrading the Switch Software

Note You must have the network-admin role before you can upgrade the software image on the switch.

You must log in to the switch on its console port connection.

To upgrade the software on the switch, follow these steps:

SUMMARY STEPS

1. Log in to Cisco.com to access the Software Download Center. 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.
2. Access the Software Download Center using this URL: http://www.cisco.com/kobayashi/sw-center/index.shtml
3. Navigate to the software downloads for Cisco Nexus 5000 Series switches.
4. Read the release notes for the related image file.
5. Select and download the kickstart and system software files to a local server.
6. Ensure that the required space is available in the bootflash: directory for the image file(s) to be copied.
7. If you need more space on the active supervisor module bootflash, delete unnecessary files to make space available.
8. Copy the kickstart and system images to the switch bootflash using a transfer protocol. You can use **ftp**, **tftp**, **scp**, or **sftp**. The examples in this procedure use **scp**.
9. Install the new images, specifying the new image names that you downloaded in the previous step.
10. After the switch completes the installation, log in and verify that the switch is running the required software version.

DETAILED STEPS

Step 1 Log in to Cisco.com to access the Software Download Center. 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 2 Access the Software Download Center using this URL: http://www.cisco.com/kobayashi/sw-center/index.shtml

Step 3 Navigate to the software downloads for Cisco Nexus 5000 Series switches.

You see links to the download images for the switch.

Step 4 Read the release notes for the related image file.

Step 5 Select and download the kickstart and system software files to a local server.

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

Example:

```
switch# dir bootflash:
       4681     Nov 24 02:43:52 2008  config
   13176836     Nov 24 07:19:36 2008  gdb.1
      49152     Jan 12 18:38:36 2009  lost+found/
     310556     Dec 23 02:53:28 2008  n1
   20058112     Nov 07 02:35:22 2008  n5000-uk9-kickstart.4.0.1a.N1.0.62.bin
   20217856     Jan 12 18:26:54 2009  n5000-uk9-kickstart.4.0.1a.N2.0.140.bin
   76930262     Nov 07 02:35:22 2008  n5000-uk9.4.0.1a.N1.0.62.bin
  103484727     Jan 12 18:29:08 2009  n5000-uk9.4.0.1a.N2.0.140.bin

Usage for bootflash://sup-local
   74934272 bytes used
    5550080 bytes free
   80484352 bytes total
```

Caution We recommend that you keep the kickstart and system image files for at least one previous software release 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.

Example:

```
switch# delete bootflash:n5000-uk9-kickstart.4.0.1a.N1.0.62.bin
switch# delete bootflash:n5000-uk9.4.0.1a.N1.0.62.bin
```

Step 8 Copy the kickstart and system images to the switch bootflash using a transfer protocol. You can use **ftp**, **tftp**, **scp**, or **sftp**. The examples in this procedure use **scp**.

Example:

```
switch# copy scp://user@scpserver.cisco.com/downloads/n5000-uk9.4.1.3.N1.0.96.bin
bootflash:n5000-uk9.4.1.3.N1.0.96.bin
switch# copy scp://user@scpserver.cisco.com/downloads/n5000-uk9-kickstart.4.1.3.N1.0.96.bin
bootflash:n5000-uk9-kickstart.4.1.3.N1.0.96.bin
```

Step 9 Install the new images, specifying the new image names that you downloaded in the previous step.

Example:

```
switch# install all kickstart bootflash:n5000-uk9-kickstart.4.1.3.N1.0.96.bin system
bootflash:n5000-uk9.4.1.3.N1.0.96.bin
```

The **install all** command performs the following actions:

- Performs compatibility checks (equivalent to the **show incompatibility** command) for the images that you have specified. If there are compatibility issues, an error message is displayed and the installation does not proceed.
- Displays the compatibility check results and displays whether the installation is disruptive.
- Provides a prompt to allow you to continue or abort the installation.

  Caution After completing the installation, all traffic through the switch is disrupted while the switch reboots.

- Updates the boot variables to reference the specified images and saves the configuration to the startup configuration file.

Step 10 After the switch completes the installation, log in and verify that the switch is running the required software version.

Example:

```
switch# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2009, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
other third parties and are used and distributed under license.
Some parts of this software are covered under the GNU Public
License. A copy of the license is available at
http://www.gnu.org/licenses/gpl.html.

Software
  BIOS:      version 1.2.0
  loader:    version N/A
  kickstart: version 4.1(3)N1(1) [build 4.1(3)N1(0.96)]
  system:    version 4.1(3)N1(1) [build 4.1(3)N1(0.96)]
  BIOS compile time:       06/19/08
  kickstart image file is: bootflash:/n5000-uk9-kickstart.4.1.3.N1.0.96.bin
  kickstart compile time:  7/14/2009 4:00:00 [07/14/2009 04:27:38]
  system image file is:    bootflash:/n5000-uk9.4.1.3.N1.0.96.bin
  system compile time:     7/14/2009 4:00:00 [07/14/2009 05:20:12]
```

```
Hardware
  cisco Nexus5020 Chassis ("40x10GE/Supervisor")
  Intel(R) Celeron(R) M CPU    with 2074240 kB of memory.
  Processor Board ID JAB1232002F

  Device name: switch
  bootflash:    1003520 kB

Kernel uptime is 13 day(s), 23 hour(s), 25 minute(s), 5 second(s)

Last reset at 720833 usecs after  Tue Jul 14 11:18:32 2009

  Reason: Reset by installer
  System version: 4.1(3)N1(0.96)
  Service:


plugin
  Core Plugin, Ethernet Plugin
```

Downgrading from a Higher Release

The procedure to downgrade the switch is identical to a switch upgrade, except that the image files to be loaded are for an earlier release than the image currently running on the switch.

Note Prior to downgrading to a specific release, check the release notes for the current release installed on the switch, to ensure that your hardware is compatible with the specific release. There are special caveats you must be aware of before you downgrade the switch software to a 4.0(0)-based release. See the *Cisco Nexus 5000 Series and Cisco Nexus 2000 Series Release Notes* for details.

To downgrade the software on the switch, follow these steps:

SUMMARY STEPS

1. Locate the image files you will use for the downgrade by entering the **dir bootflash:** command.
2. Install the new images.
3. After the switch completes the installation, log in and verify that the switch is running the required software version.

DETAILED STEPS

Step 1 Locate the image files you will use for the downgrade by entering the **dir bootflash:** command.
If the image files are not stored on the bootflash memory, download the files from Cisco.com:

a) Log in to Cisco.com to access the Software Download Center. 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.

b) Access the Software Download Center using this URL: http://www.cisco.com/kobayashi/sw-center/index.shtml

c) Navigate to the software downloads for Cisco Nexus 5000 Series switches.

You see links to the download images for the switch.

d) Read the release notes for the related image file then select and download the kickstart and system software files to a local server

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

Caution We recommend that you keep the kickstart and system image files for at least one previous software release to use if the new image files do not load successfully.

f) Copy the kickstart and system images to the switch bootflash using a transfer protocol. You can use **ftp**, **tftp**, **scp**, or **sftp**.

Step 2 Install the new images.

Example:

```
switch# install all kickstart bootflash:n5000-uk9-kickstart.4.0.1a.N1.0.62.bin system
bootflash:n5000-uk9.4.0.1a.N1.0.62.bin
```

The **install all** command performs the following actions:

- Performs compatibility checks (equivalent to the **show incompatibility** command) for the images that you have specified. If there are compatibility issues, an error message is displayed and the installation does not proceed.
- Displays the compatibility check results and displays whether the installation is disruptive.
- Provides a prompt to allow you to continue or abort the installation.

  Note A disruptive installation causes traffic disruption while the switch reboots.

- Updates the boot variables to reference the specified images and saves the configuration to the startup configuration file.

Step 3 After the switch completes the installation, log in and verify that the switch is running the required software version.

Example:

```
switch# show version
```

Initial Configuration

Configuration Prerequisites

The following procedure is a review of the tasks you should have completed during hardware installation. These tasks must be completed before you can configure the switch.

Before you can configure a switch, follow these steps:

SUMMARY STEPS

1. Verify the following physical connections for the new Cisco Nexus 5000 Series switch:
2. Verify that the default console port parameters are identical to those of the computer terminal (or terminal server) attached to the switch console port:

DETAILED STEPS

Step 1 Verify the following physical connections for the new Cisco Nexus 5000 Series switch:

- The console port is physically connected to a computer terminal (or terminal server).
- The management Ethernet port (mgmt0) is connected to an external hub, switch, or router.

Refer to the *Cisco Nexus 5000 Series Hardware Installation Guide* (for the required product) for more information.

Tip Save the host ID information for future use (for example, to enable licensed features). The host ID information is provided in the Proof of Purchase document that accompanies the switch.

Step 2 Verify that the default console port parameters are identical to those of the computer terminal (or terminal server) attached to the switch console port:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit

Initial Setup

The first time that you access a switch in the Cisco Nexus 5000 Series, it runs a setup program that prompts you for the IP address and other configuration information necessary for the switch to communicate over the Ethernet interface. This information is required to configure and manage the switch.

Note The IP address can only be configured from the CLI. When the switch powers up for the first time, you should assign the IP address. After you perform this step, the Cisco MDS 9000 Family Fabric Manager can reach the switch through the console port.

Preparing to Configure the Switch

Before you configure Cisco Nexus 5000 Series switch for the first time, you need the following information:

- Administrator password.

  Note If a password is weak (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a strong password.

- If you are using an IPv4 address for the management interface, you need the following information:
  - IPv4 subnet mask for the switch’s management interface.

    - ◦ IPv4 address of the default gateway (optional).

- SSH service on the switch (optional).

  To enable this service, select the type of SSH key (dsa/rsa/rsa1) and number of SSH key bits (768 to 2048).

- NTP server IPv4 address (optional).
- SNMP community string (optional).
- Switch name (optional).

  This is your switch prompt.

- An additional login account and password (optional).

Note If you are using IPv4, be sure to configure the IPv4 route, the IPv4 default network address, and the IPv4 default gateway address to enable SNMP access.

Default Login

The switch has the network administrator as a default user (admin). You cannot change the default user at any time.

There is no default password so you must explicitly configure a strong password. If a password is trivial (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a strong password. If you configure and subsequently forget this new password, you have the option to recover this password.

Note If you enter the **write erase** command and reload the switch, you must reconfigure the default user (admin) password using the setup procedure.

Configuring the Switch

This section describes how to initially configure the switch.

Note Press **Ctrl-C** at any prompt to skip the remaining configuration options and proceed with what you have configured up to that point. Entering the new password for the administrator is a requirement and cannot be skipped.

Tip If you do not want to answer a previously configured question, or if you want to skip answers to any questions, press **Enter**. If a default answer is not available (for example, switch name), the switch uses what was previously configured and skips to the next question.

To configure the switch for first time, follow these steps:

SUMMARY STEPS

1. Ensure that the switch is on. Switches in the Cisco Nexus 5000 Series boot automatically.
2. Enter the new password for the administrator.
3. Enter yes to enter the setup mode.
4. Enter the new password for the administrator (admin is the default).
5. Enter yes (no is the default) to create additional accounts.
6. Enter yes (yes is the default) to create an SNMP read-only community string.
7. Enter a name for the switch.
8. Enter yes (yes is the default) to configure out-of-band management and enter the mgmt0 IPv4 address.
9. Enter yes (yes is the default) to configure the IPv4 default gateway (recommended) and enter the IPv4 address for the default gateway.
10. Enter yes (yes is the default) to enable the Telnet service.
11. Enter yes (no is the default) to enable the SSH service.
12. Enter yes (no is the default) to configure the NTP server and enter the IPv4 address for the NTP server.
13. Enter yes (yes is the default) to configure basic Fibre Channel configurations.
14. Enter shut (shut is the default) to configure the default Fibre Channel switch port interface to the shut (disabled) state.
15. Enter on (on is the default) to configure the switch port trunk mode.
16. Enter permit (deny is the default) to deny a default zone policy configuration.
17. Enter yes (no is the default) to enable a full zone set distribution.
18. You see the new configuration. Review and edit the configuration that you have just entered. Enter no (no is the default) if you are satisfied with the configuration.
19. Enter yes (yes is default) to use and save this configuration:

DETAILED STEPS

Step 1 Ensure that the switch is on. Switches in the Cisco Nexus 5000 Series boot automatically.

Step 2 Enter the new password for the administrator.

Example:

```
Enter the password for admin: <password>
```

Tip If a password is weak (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a strong password. Passwords are case-sensitive.

Step 3 Enter yes to enter the setup mode.

Example:

```
This setup utility will guide you through the basic configuration of
the system. Setup configures only enough connectivity for management
of the system.
*Note: setup is mainly used for configuring the system initially,
when no configuration is present. So setup always assumes system
defaults and not the current system configuration values.
Press Enter at anytime to skip a dialog. Use ctrl-c at anytime
to skip the remaining dialogs.
Would you like to enter the basic configuration dialog (yes/no): yes
```

The setup utility guides you through the basic configuration process. Press **Ctrl-C** at any prompt to end the configuration process.

Step 4 Enter the new password for the administrator (admin is the default).

Example:

```
Enter the password for admin: admin
```

Step 5 Enter yes (no is the default) to create additional accounts.

Example:

```
Create another login account (yes/no) [n]: yes
```

While configuring your initial setup, you can create an additional user account (in the network-admin role) besides the administrator's account.

a) Enter the user login ID.

Example:

```
Enter the user login ID: user_name
```

b) Enter the user password.

Example:

```
Enter the password for user_name: user-password
```

Step 6 Enter yes (yes is the default) to create an SNMP read-only community string.

Example:

```
Configure read-only SNMP community string (yes/no) [n]:yes

SNMP community string: snmp_community
```

Step 7 Enter a name for the switch.

Note The switch name is limited to 32 alphanumeric characters. The default name is "switch".

Example:

```
Enter the switch name: switch_name
```

Step 8 Enter yes (yes is the default) to configure out-of-band management and enter the mgmt0 IPv4 address.

Example:

```
Continue with Out-of-band (mgmt0) management configuration? [yes/no]: yes
Mgmt0 IPv4 address: ip_address
```

Step 9 Enter yes (yes is the default) to configure the IPv4 default gateway (recommended) and enter the IPv4 address for the default gateway.

Example:

```
Configure the default-gateway: (yes/no) [y]: yes
IPv4 address of the default-gateway: default_gateway
```

Step 10 Enter yes (yes is the default) to enable the Telnet service.

Example:

```
Enable the telnet service? (yes/no) [y]: yes
```

Step 11 Enter yes (no is the default) to enable the SSH service.

Example:

```
Enabled SSH service? (yes/no) [n]: yes
```

a) Enter the SSH key type that you would like to generate.

Example:

```
Type the SSH key you would like to generate (dsa/rsa/rsa1)? dsa
```

b) Enter the number of key bits within the specified range.

Example:

```
Enter the number of key bits? (768 to 2048): 768
```

Step 12 Enter yes (no is the default) to configure the NTP server and enter the IPv4 address for the NTP server.

Example:

```
Configure NTP server? (yes/no) [n]: yes

NTP server IP address: ntp_server_IP_address
```

Step 13 Enter yes (yes is the default) to configure basic Fibre Channel configurations.

Example:

```
Enter basic FC configurations (yes/no) [n]: yes
```

Step 14 Enter shut (shut is the default) to configure the default Fibre Channel switch port interface to the shut (disabled) state.

Example:

```
Configure default physical FC switchport interface state (shut/noshut) [shut]: shut
```

Step 15 Enter on (on is the default) to configure the switch port trunk mode.

Example:

```
Configure default physical FC switchport trunk mode (on/off/auto) [on]: on
```

Step 16 Enter permit (deny is the default) to deny a default zone policy configuration.

Example:

```
Configure default zone policy (permit/deny) [deny]: permit
```

Permits traffic flow to all members of the default zone.

Note If you are executing the setup script after entering a **write erase** command, you explicitly must change the default zone policy to permit for VSAN 1 after finishing the script using the following command:

```
Configure read-only SNMP community string (yes/no) [n]: zone default-zone permit vsan 1
```

Step 17 Enter yes (no is the default) to enable a full zone set distribution.

Example:

```
Enable full zoneset distribution (yes/no) [n]: yes
```

Overrides the switch-wide default for the full zone set distribution feature.

Step 18 You see the new configuration. Review and edit the configuration that you have just entered. Enter no (no is the default) if you are satisfied with the configuration.

Example:

```
The following configuration will be applied:
  username admin password <user-password> role network-admin
  snmp-server community snmp_community ro
  switchname switch
  feature telnet
  ssh key dsa 768 force
  feature ssh
  system default switchport shutdown san
  system default switchport trunk mode on
  system default zone default-zone permit
  system default zone distribute full
Would you like to edit the configuration? (yes/no) [n]: no
```

Step 19 Enter yes (yes is default) to use and save this configuration:

Example:

```
Use this configuration and save it? (yes/no) [y]: yes
```

Caution If you do not save the configuration at this point, none of your changes are updated the next time the switch is rebooted. Type yes to save the new configuration. This operation ensures that the kickstart and system images are also automatically configured.

Related Topics

- Image Files on the Switch, page 1

Changing the Initial Configuration

To make changes to the initial configuration at a later time, enter the **setup** command in EXEC mode:

```
switch# setup
---- Basic System Configuration Dialog ----
This setup utility will guide you through the basic configuration of
the system. Setup configures only enough connectivity for management
of the system.
*Note: setup is mainly used for configuring the system initially,
when no configuration is present. So setup always assumes system
defaults and not the current system configuration values.
Press Enter at anytime to skip a dialog. Use ctrl-c at anytime
to skip the remaining dialogs.
Would you like to enter the basic configuration dialog (yes/no): yes
```

The setup utility guides you through the basic configuration process.

Accessing the Switch

After the initial configuration, you can access the switch in a number of ways:

- Serial console access—You can use a serial port connection to access the CLI.
- Out-of-band access—You can use Telnet or SSH to access a Cisco Nexus 5000 Series switch or use the Cisco Data Center Network Manager (DCNM) or the Cisco MDS 9000 Fabric Manager application to connect to the switch using SNMP and XML.

Additional Switch Configuration

Assigning a Switch Name

Each switch in the network requires a unique name. You can assign names to easily identify the switch by its physical location, its network association, or the organization to which it is deployed. The assigned name is displayed in the command-line prompt. The switch name is limited to 20 alphanumeric characters.

Note This guide refers to a switch in the Cisco Nexus 5000 Series switch as switch , and it uses the switch# prompt.

To change the name of the switch, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# [**no**] **switchname** *name*

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters configuration mode.
Step 2	switch(config)# [**no**] **switchname** *name*	Changes the switch name prompt to the specified name. The **no** command reverts the switch name prompt to its default.

This example shows how to change the name of a switch and change it back:

```
switch# configure terminal
switch(config)# switchname myswitch1
myswitch1(config)#
...
myswitch1(config)# no switchname
switch(config)#
```

Configuring Date and Time

The Cisco Nexus 5000 Series switches use Universal Coordinated Time (UTC), which is the same as Greenwich Mean Time (GMT). To change the default time on the switch, perform this task:

SUMMARY STEPS

1. switch# **clock set** *HH:MM:SS DD Month YYYY*

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **clock set** *HH:MM:SS DD Month YYYY*	Sets the default time on the switch. HH represents hours in 24-hour time (15 for 3 P.M.), MM is minutes (58), SS is seconds (09), DD is the date (29), Month is the month in words (February), and YYYY is the year (2008).

The following example sets the time for the switch:

```
switch# clock set 15:58:09 29 June 2009
Mon Jun 20 15:58:09 UTC 2009
```

Note The **clock** command changes are saved across system resets.

Configuring Time Zone

The Cisco Nexus 5000 Series switches use Universal Coordinated Time (UTC), which is the same as Greenwich Mean Time (GMT). You can specify a time zone for the switch. To specify the local time without the daylight saving time feature, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **clock timezone** *timezone hours_offset minutes_offset*
3. switch(config)# **exit**
4. switch# **show clock**
5. switch# **show run**

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters configuration mode.
Step 2	switch(config)# **clock timezone** *timezone hours_offset minutes_offset*	Sets the time zone. timezone is the three letter time zone (PST for Pacific Standard), the hours offset from UTC (-8 for the PST offset), and minutes offset (needed for time zones such as Newfoundland Standard (NST) or India Standard (IST)).
Step 3	switch(config)# **exit**	Returns to EXEC mode.
Step 4	switch# **show clock**	Verifies the time zone configuration.
Step 5	switch# **show run**	Displays changes made to the time zone configuration along with other configuration information.

Adjusting for Daylight Saving Time or Summer Time

You can configure your switch to adjust for daylight saving time (or summer time). By default, Cisco NX-OS does not automatically adjust for daylight saving time. You must manually configure the switch to adjust to the daylight saving time.

For example, following U.S. standards (defined by the *Energy Policy Act* of 2005), you can have the switch advance the clock one hour at 2:00 a.m. on the second Sunday in March and move back the clock one hour at 2:00 a.m. on the first Sunday in November. You can also explicitly specify the start and end dates and times and whether or not the time adjustment recurs every year.

To enable the daylight saving time clock adjustment, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **clock summer-time** *timezone start_week start_day start_month start_time end_week end_day end_month end_time offset*
3. switch(config)# **no clock summer-time**
4. switch(config)# **exit**
5. switch# **show running-config | include summer-time**

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters configuration mode.
Step 2	switch(config)# **clock summer-time** *timezone start_week start_day start_month start_time end_week end_day end_month end_time offset*	Sets the daylight savings time for a specified time zone. The start and end values are as follows: • Week ranging from 1 through 5 • Day ranging from Sunday through Saturday • Month ranging from January through December The daylight offset ranges from 1 through 1440 minutes, which are added to the start time and deleted time from the end time.
Step 3	switch(config)# **no clock summer-time**	Disables the daylight saving time adjustment feature.
Step 4	switch(config)# **exit**	Returns to EXEC mode.
Step 5	switch# **show running-config | include summer-time**	Verifies the time zone configuration.

The following example adjusts the daylight savings time for the U.S. Pacific daylight time by 60 minutes starting the second Sunday in March at 2 a.m. and ending the first Sunday in November at 2 a.m:

```
switch# configure terminal
switch(config)# clock summer-time PDT 1 Sunday March 02:00 5 Sunday November 02:00 60
```

NTP Configuration

A Network Time Protocol (NTP) server provides a precise time source (radio clock or atomic clock) to synchronize the system clocks of network devices. NTP uses User Datagram Protocol (UDP) on port 123 as its transport layer. An NTP server receives its time from a reference time source, such as a radio clock or atomic clock, attached to the server. NTP distributes this time across the network. All NTP communications use Universal Time Coordinated (UTC).

About NTP

In a large enterprise network, having one time standard for all network devices is critical for management reporting and event logging functions when trying to correlate interacting events logged across multiple devices. Many enterprise customers with extremely mission-critical networks maintain their own stratum-1[1] NTP source.

Time synchronization happens when several frames are exchanged between clients and servers. The switches in client mode know the address of one or more NTP servers. The servers act as the time source and receive client synchronization requests.

[1] NTP uses a hierarchical, layered system of levels of clock sources. Each level of this hierarchy is termed a *stratum*. Stratum 0 devices are atomic clocks, GPS clocks, or other radio clocks and are typically not directly connected to the network. Stratum 1 devices are directly attached to a Stratum 0 device as well as to the network and are referred to as *time servers*.

By configuring an IP address as a peer, the switch will obtain and provide time as required. The peer is capable of providing time on its own and is capable of having a server configured. If both these instances point to different time servers, your NTP service is more reliable. Even if the active server link is lost, you can still maintain the right time due to the presence of the peer.

If an active server fails, a configured peer helps in providing the NTP time. Provide a direct NTP server association and configure a peer to ensure backup support if the active server fails.

If you only configure a peer, the most accurate peer takes on the role of the NTP server and the other peer(s) acts as a peer(s).

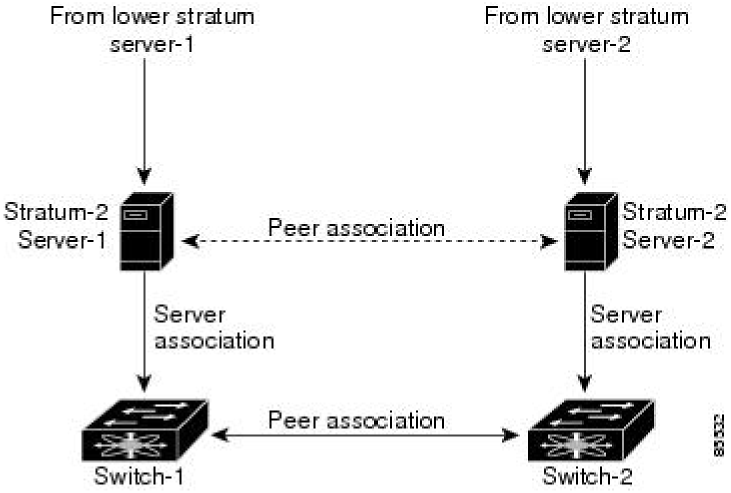
NTP Configuration Guidelines

The following guidelines apply to all NTP configurations:

- You should have a peer association with another switch only when you are sure that your clock is reliable (which means that you are a client of a reliable NTP server).
- A peer configured alone takes on the role of a server and should be used as backup. If you have two servers, then you can have several switches point to one server, and the remaining switches to the other server. You would configure peer association between these two sets, which forces the clock to be more reliable.
- If you only have one server, it is better for all the switches to have a client association with that server.

Not even a server down time will affect well-configured switches in the network. The following figure displays a network with two NTP stratum 2 servers and two switches.

Figure 2: NTP Peer and Server Association



In this configuration, the switches were configured as follows:

- Stratum 2 Server 1
    - IPv4 address–10.10.10.10
    - Stratum–2 Server-2
    - IPv4 address–10.10.10.9

- Switch 1 IPv4 address–10.10.10.1
- Switch 1 NTP configuration commands

```
switch(config)# ntp server 10.10.10.10
switch(config)# ntp peer 10.10.10.2
```

- Switch 2 IPv4 address–10.10.10.2
- Switch 2 NTP configuration commands

```
switch(config)# ntp server 10.10.10.9
switch(config)# ntp peer 10.10.10.1
```

Configuring NTP

You can configure NTP using either IPv4 addresses, IPv6 addresses, or Domain Name Services (DNS) names. To configure NTP associations, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **ntp server** {*ip-address* | *ipv6-address* | *dns-name*}
3. switch(config)# **ntp peer** {*ip-address* | *ipv6-address* | *dns-name*}
4. (Optional) switch# **copy running-config startup-config**
5. (Optional) switch# **show ntp peers**

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters configuration mode.
Step 2	switch(config)# **ntp server** {*ip-address* | *ipv6-address* | *dns-name*}	Forms an association with a server.
Step 3	switch(config)# **ntp peer** {*ip-address* | *ipv6-address* | *dns-name*}	Forms an association with a peer. You can specify multiple associations.
Step 4	switch# **copy running-config startup-config**	(Optional) Saves your configuration changes to NVRAM.
Step 5	switch# **show ntp peers**	(Optional) Displays the configured server and peer associations.

NTP CFS Distribution

You can enable NTP fabric distribution for all Cisco Nexus 5000 Series switches in a fabric using the Cisco Fabric Services (CFS). When you perform NTP configurations, and distribution is enabled, the entire server or peer configuration is distributed to all the switches in the fabric.

You automatically acquire a fabric-wide lock when you enter the first configuration command after you enabled distribution in a switch.The NTP application uses an effective and pending database model to store or commit the commands based on your configuration. You changes are stored in the pending database and committed to the effective database.

For additional information, see Information About CFS in the *Cisco Nexus 5000 Series NX-OS System Management Configuration Guide*.

Enabling NTP Distribution

To enable NTP configuration fabric distribution, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **ntp distribute**
3. switch(config)# **no ntp distribute**

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters configuration mode.
Step 2	switch(config)# **ntp distribute**	Enables NTP configuration distribution to all switches in the fabric. Acquires a fabric lock and stores all future configuration changes in the pending database.
Step 3	switch(config)# **no ntp distribute**	Disables (default) NTP configuration distribution to all switches in the fabric.

Committing NTP Configuration Changes

When you commit the NTP configuration changes, the effective database is overwritten by the configuration changes in the pending database and all the switches in the fabric receive the same configuration. When you commit the NTP configuration changes without implementing the session feature, the NTP configurations are distributed to all the switches in the fabric.

To commit the NTP configuration changes, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **ntp commit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters configuration mode.

	Command or Action	Purpose
Step 2	switch(config)# **ntp commit**	Distributes the NTP configuration changes to all switches in the fabric and releases the lock. Overwrites the effective database with the changes made to the pending database.

Discarding NTP Configuration Changes

After making the configuration changes, you can choose to discard the changes or to commit them. In either case, the lock is released.

To discard NTP configuration changes, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **ntp abort**

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters configuration mode.
Step 2	switch(config)# **ntp abort**	Discards the NTP configuration changes in the pending database and releases the fabric lock.

Releasing Fabric Session Lock

If you have performed an NTP fabric task and have forgotten to release the lock by either committing or discarding the changes, an administrator can release the lock from any switch in the fabric. If the administrator performs this task, your changes to the pending database are discarded and the fabric lock is released.

The changes are only available in the volatile directory and are subject to being discarded if the switch is restarted.

To use administrative privileges and release a locked NTP session, use the **clear ntp session** command.

```
switch# clear ntp session
```

Database Merge Guidelines

When merging two fabrics, follow these guidelines:

- Be aware that the merge is a union of the existing and the received database in each switch in the fabric.
- Do not configure an IP address as a server on one switch and as a peer on another switch. The merge can fail if this configuration exists.
- Verify that the union of the databases does not exceed the maximum limit of 64.

NTP Session Status Verification

To verify the status of the NTP session, use the **show ntp session-status** command.

```
switch# show ntp session-status
last-action : Distribution Enable    Result : Success
```

Management Interface Configuration

The management interface on the switch allows multiple simultaneous Telnet, SSH, or SNMP sessions. You can remotely configure the switch through the management interface (mgmt0), but first you must configure some IP parameters so that the switch is reachable. You can manually configure the management interface from the CLI through the console port.

About the mgmt0 Interface

The mgmt0 interface on a Cisco Nexus 5000 Series switch provides out-of-band management, which enables you to manage the switch by its IPv4 or IPv6 address. The mgmt0 interface is a 10/100/1000 Ethernet port.

Note Before you begin to configure the management interface manually, obtain the switch's IP address and subnet mask. Also make sure that the console cable is connected to the console port.

Configuring the Management Interface

To configure the management (mgmt0) Ethernet interface to connect over IP, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **interface mgmt 0**
3. Configure the IP address for IPv4 or IPv6:
4. switch(config-if)# **no shutdown**
5. switch(config-if)# **exit**
6. switch(config)# **vrf context management**
7. Configure the IP address (IPv4 or IPv6) for the next hop:
8. switch(config-vrf)# **exit**
9. (Optional) switch# **copy running-config startup-config**

DETAILED STEPS

Step 1 switch# **configure terminal**
Enters configuration mode.

Step 2 switch(config)# **interface mgmt 0**
Selects the management Ethernet interface on the switch and enters interface configuration submode.

Step 3 Configure the IP address for IPv4 or IPv6:

a) switch(config-if)# **ip address** *ipv4-address*[/ *length*]
Configures the IPv4 address and its subnet mask.

b) switch(config-if)# **ip address** *ipv4-address* [*subnet-mask*]
An alternative method that configures the IPv4 address and its subnet mask.

c) switch(config-if)# **ipv6 address** *ipv6-address*[/ *length*]
Configures the IPv6 address and its subnet mask.

Step 4 switch(config-if)# **no shutdown**
Enables the interface.

Step 5 switch(config-if)# **exit**
Returns to configuration mode.

Step 6 switch(config)# **vrf context management**
Enters VRF context management configuration mode.

Step 7 Configure the IP address (IPv4 or IPv6) for the next hop:

a) switch(config-vrf)# **ip route** *ipv4-prefix*[/ *length*] *ipv4-nexthop-address*
Configures the IPv4 address of the next hop.

b) switch(config-vrf)# **ipv6 route** *ipv6-prefix*[/ *length*] *ipv6-nexthop-address*
Configures the IPv6 address of the next hop.

Step 8 switch(config-vrf)# **exit**
Returns to EXEC mode.

Step 9 (Optional) switch# **copy running-config startup-config**
Saves your configuration changes to the file system.

In some cases, a switch interface might be administratively shut down. You can check the status of an interface at any time by using the **show interface mgmt 0** command.

Displaying Management Interface Configuration

To display the management interface configuration, use the **show interface mgmt 0** command.

```
switch# show interface mgmt0
mgmt0 is up
    Hardware is GigabitEthernet, address is 000d.ec8f.cb00 (bia 000d.ec8f.cb00)
    Internet Address is 172.16.131.202/24
    MTU 1500 bytes, BW 0 Kbit, DLY 0 usec,
       reliability 255/255, txload 1/255, rxload 1/255
    Encapsulation ARPA
    full-duplex, 1000 Mb/s
    Input flow-control is off, output flow-control is off
    8540 packets input, 2835036 bytes
    5202 multicast frames, 0 compressed
    0 input errors, 0 frame, 0 overrun, 0 fifo
    570 packets output, 85555 bytes
    0 underrun, 0 output errors, 0 collisions
    0 fifo, 0 carrier errors
```

Shutting Down the Management Interface

To shut down the management interface (mgmt0), you use the **shutdown** command. A system prompt requests you confirm your action before it executes the command. You can use the force option to bypass this confirmation.

The following example shuts down the interface without using the force option:

```
switch# configure terminal
switch(config)# interface mgmt 0
switch(config-if)# shutdown
Shutting down this interface will drop all telnet sessions.
Do you wish to continue (y/n)? y
```

The following example shuts down the interface using the force option:

```
switch# configure terminal
switch(config)# interface mgmt 0
switch(config-if)# shutdown force
```

Managing the Switch Configuration

Displaying the Switch Configuration

You can view the ASCII form of the configuration file when required. To view the current configuration tree from the EXEC prompt, enter the **show running-config** command. If the running configuration is different from the startup configuration, enter the **show startup-config** command to view the ASCII version of the current startup configuration that was used to boot the switch if a **copy running-config startup-config** command was not entered after the reboot. Use the **show startup-config** command to view the contents of the current startup configuration.

You can also gather specific information on the entire switch configuration by entering the relevant **show** commands. Configurations are displayed based on a specified feature, interface, module, or VSAN. Available **show** commands for each feature are briefly described in this section and listed at the end of each chapter.

Saving a Configuration

Use the **copy running-config startup-config** command to save the new configuration into nonvolatile storage. Once this command is entered, the running and the startup copies of the configuration are identical.

Clearing a Configuration

Use the **write erase** command to clear a startup configuration. Once this command is executed, the switch's startup configuration reverts to factory defaults. The running configuration is not affected.

⚠

Caution The **write erase command** erases the entire startup configuration with the exception of any configuration that affects the loader functionality.

The **write erase boot** command only erases the configuration that affects the loader functionality. The loader functionality configuration includes the boot variables and the mgmt0 IP configuration information (IP address, netmask, and default gateway).

```
switch# write erase boot
```

This command will erase the boot variables and the IP configuration of interface mgmt 0.

Using Switch File Systems

Setting the Current Directory

The **cd** command changes the current directory level to a specified directory level. The CLI defaults to the volatile: file system. This command expects a directory name input.

Any file saved in the volatile: file system is erased when the switch reboots.

The syntax for this command is **cd** *directory name*.

This command exchanges the current directory to the root directory on the bootflash: file system:

```
switch# cd bootflash:
```

This example changes the current directory to a mystorage directory that resides in the current directory:

```
switch# cd mystorage
```

Displaying the Current Directory

The **pwd** command displays the current directory location. This example changes the directory and displays the current directory:

```
switch# cd bootflash:
switch# pwd
bootflash:
```

Listing the Files in a Directory

The **dir** command displays the contents of the current directory or the specified directory. The syntax for this command is **dir** *directory* or **dir** *filename*.

This example shows how to list the files on the default volatile file system:

```
switch# dir volatile:
Usage for volatile://sup-local
          0 bytes used
   20971520 bytes free
   20971520 bytes total
```

Creating a Directory

The **mkdir** command creates a directory at the current directory level or at a specified directory level.

The syntax for this command is **mkdir** *name*.

This example creates a directory called test in the bootflash directory.

```
switch# mkdir bootflash:test
```

This example creates a directory called test in the current directory.

```
switch# mkdir test
```

Deleting an Existing Directory

The **rmdir** command deletes an existing directory at the current directory level or at a specified directory level. The directory must be empty to be deleted.

The syntax for this command is **rmdir** *name*.

This example deletes the directory called test in the bootflash directory:

```
switch# rmdir bootflash:test
This is a directory.  Do you want to continue (y/n)?  [y] y
```

The **delete** command can also delete empty and nonempty directories. When you enter this command, a warning is displayed to confirm your intention to delete the directory.

This example deletes the directory called test in the current directory:

```
switch# delete test
This is a directory.  Do you want to continue (y/n)?  [y] y
```

If the current directory is bootflash:mydir, this command deletes the bootflash:mydir/test directory.

Moving Files

The **move** command removes a file from the source directory and places it in the destination directory.

Caution If a file with the same name already exists in the destination directory, that file is overwritten by the moved file.

This example moves the file called `samplefile` from the root directory to the `mystorage` directory:

```
switch# move bootflash:samplefile bootflash:mystorage/samplefile
```

This example moves a file from the current directory level:

```
switch# move samplefile mystorage/samplefile
```

If the current directory is `bootflash:mydir`, this command moves `bootflash:mydir/samplefile` to `bootflash:mydir/mystorage/samplefile`.

Copying Files

The **copy** command copies a file between file systems within a switch.

Note Use the **dir** command to ensure that enough space is available in the target file system. If enough space is not available, use the **delete** command to remove unneeded files.

This example copies the file called samplefile from the root directory to the mystorage directory:

```
switch# copy bootflash:samplefile bootflash:mystorage/samplefile
```

This example copies a file from the current directory level:

```
switch# copy samplefile mystorage/samplefile
```

If the current directory is bootflash:mydir, this command copies bootflash:mydir/samplefile to bootflash:mydir/mystorage/samplefile.

Deleting Files

The **delete** command deletes a specified file or the specified directory and all its contents.

This example shows how to delete a file from the current working directory:

```
switch# delete dns_config.cfg
```

This example deletes the entire bootflash: directory and all its contents:

```
switch# delete bootflash:my-dir
```

Caution If you specify a directory, the **delete** command deletes the entire directory and all its contents.

Displaying File Contents

The **show file** command displays the contents of a specified file in the file system.

This example displays the contents of a file residing in the current directory:

```
switch# show file myfile
```

Saving Command Output to a File

You can force all screen output to go to a file by appending **>** *filename* to any command. For example, enter **show interface > Samplefile** at the EXEC mode switch prompt to save the interface configuration to Samplefile which is a file created at the same directory level. At the EXEC mode switch prompt, enter a **dir** command to view all files in this directory, including the recently saved Samplefile.

Compressing and Uncompressing Files

The **gzip** command compresses (zips) the specified file using LZ77 coding.

This example directs the output of the **show tech-support** command to a file (Samplefile), and then zips the file and displays the difference in the space used up in the volatile directory:

```
switch# show tech-support > Samplefile
Building Configuration ...
switch# dir
    1525859     Jul 04 00:51:03 2003 Samplefile
Usage for volatile://
    1527808 bytes used
   19443712 bytes free
   20971520 bytes total
switch# gzip volatile:Samplefile
switch# dir
     266069     Jul 04 00:51:03 2003 Samplefile.gz
Usage for volatile://
     266240 bytes used
   20705280 bytes free
   20971520 bytes total
```

The **gunzip** command uncompresses (unzips) LZ77 coded files.

This example unzips the file that was compressed in the previous example:

```
switch# gunzip Samplefile
switch# dir
    1525859     Jul 04 00:51:03 2003 Samplefile
Usage for volatile://
    1527808 bytes used
   19443712 bytes free
   20971520 bytes total
```