



CHAPTER 2

Before You Begin

This chapter prepares you to configure switches from the CLI. It also describes the CLI command modes and how to use the switch file systems.

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About the Switch Prompt



Note

Refer to the *Cisco MDS 9200 Series Hardware Installation Guide* or the *Cisco MDS 9500 Series Hardware Installation Guide* for installation and connection instructions.

Once the switch is powered on successfully, you see the default switch prompt (switch#) as shown in [Example 2-1](#).

Example 2-1 Output When Switch Boots Up

```
Auto booting bootflash:/boot-279 bootflash:/system_image;...
Booting kickstart image:bootflash:/boot-279....
.....Image verification OK

Starting kernel...
INIT: version 2.78 booting
Checking all filesystems..... done.
Loading system software
Uncompressing system image: bootflash:/system_image
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
INIT: Entering runlevel: 3

<<<<<<SAN OS bootup log messages>>>>>>

      ---- Basic System Configuration Dialog ----

This setup utility will guide you through the basic configuration of
the system. Use ctrl-c to abort configuration dialog at any prompt.

Basic management setup configures only enough connectivity for
management of the system.

Would you like to enter the basic configuration dialog (yes/no): yes

<<<<<<after configuration>>>>>>

switch login:admin101
Password:*****
Cisco Storage Area Networking Operating System (SAN-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2006, 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 may be covered under the GNU Public
License or the GNU Lesser General Public License. A copy of
each such license is available at
http://www.gnu.org/licenses/gpl.html and
http://www.gnu.org/licenses/lgpl.html
switch#
```

You can perform embedded CLI operations, access command history, and use command parsing functions at this prompt. The switch gathers the command string upon detecting an **Enter** (CR) and accepts commands from a terminal.

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Default Switch Roles

By default, two roles exist in all switches:

- Network operator—Has permission to view the configuration.
- Network administrator—Has permission to perform all functions and to set up to 64 permission levels based on user roles and groups.

When you execute a command, perform command completion, or obtain context sensitive help, the switch software allows the operation to progress if you have the correct permission as specified in the description of the command. See [Chapter 37, “Configuring Users and Common Roles.”](#)

Using the CLI

This section includes the following topics:

- [CLI Command Modes, page 2-3](#)
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CLI Command Modes

Switches in the Cisco MDS 9000 Family have two main command modes—user EXEC mode and configuration mode. The commands available to you depend on the mode you are in. To obtain a list of available commands in either mode, type a question mark (?) at the system prompt.

[Table 2-1](#) lists and describes the two commonly used modes, how to enter the modes, and the resulting system prompts. The system prompt helps you identify which mode you are in and hence, which commands are available to you.

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Table 2-1 Frequently Used Switch Command Modes

Mode	Description of Use	How to Access	Prompt
EXEC	Enables you to temporarily change terminal settings, perform basic tests, and display system information. Note Changes made in this mode are generally not saved across system resets.	At the switch prompt, enter the required EXEC mode command.	switch#
Configuration mode	Enables you to configure features that affect the system as a whole. Note Changes made in this mode are saved across system resets if you save your configuration. See the “Saving a Configuration” section on page 2-14.	From EXEC mode, enter the config terminal command.	switch(config)#

You can abbreviate commands and keywords by entering just enough characters to make the command unique from other commands. For example, you can abbreviate the **config terminal** command to **conf t**.



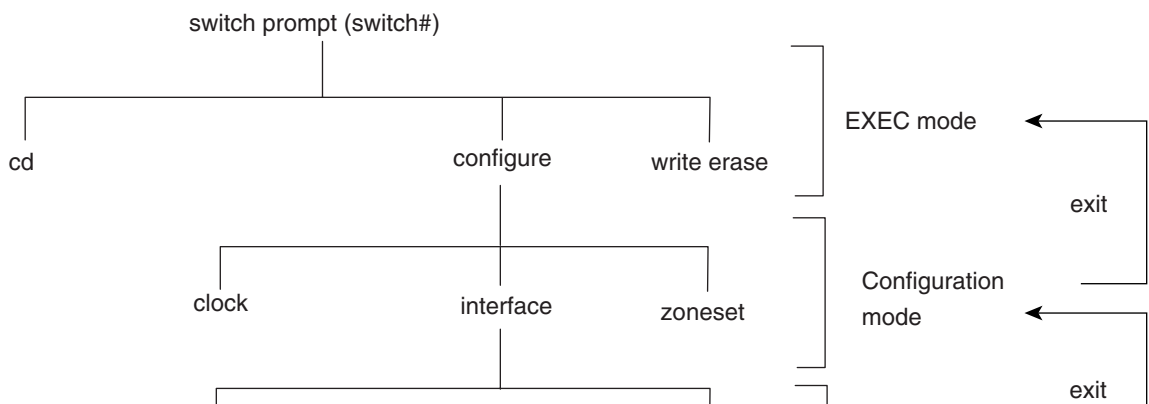
Note

Do not enter percent (%), pound (#), ellipsis (...), vertical bar (|), less than or great than (< >), brackets ([]), or braces ({ }) in command lines. These characters have special meaning in Cisco SAN-OS text strings.

CLI Command Hierarchy

The CLI commands are organized hierarchically, with commands that perform similar functions grouped under the same level. For example, all commands that display information about the system, configuration, or hardware are grouped under the **show** command, and all commands that allow you to configure the switch are grouped under the **config terminal** command. Figure 2-1 illustrates a portion of the **config terminal** command hierarchy.

Figure 2-1 CLI Command Hierarchy Example



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To start executing commands, enter the command at the top level of the hierarchy (EXEC mode). For example, to configure a Fibre Channel interface, use the **config terminal** command. Once you are in configuration mode, issue the **interface** command. When you are in the interface configuration submode, you can query the available commands there.

The following example shows how to query the available commands in the interface submode:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# interface fc1/1
switch(config-if)# ?
Interface configuration commands:
  channel-group  Add to/remove from a port-channel
  do             EXEC command
  exit          Exit from this submode
  fcdomain      Configure fcdomain parameters
  fspf          Configure FSPF parameters
  no            Negate a command or set its defaults
  rspan-tunnel  Configure remote span tunnel interface
  shutdown      Enable/disable an interface
  switchport    Configure switchport parameters
```

EXEC Mode Options

When you start a session on the switch, you begin in EXEC mode. Based on the role or group to which you belong, you have access to limited commands or to all commands (see the [“Role-Based Authorization” section on page 37-1](#)). From EXEC mode, you can enter configuration mode. Most of the EXEC commands are one-time commands, such as **show** commands, which display the current configuration status. Here is a list of EXEC mode commands:

```
switch# ?
Exec commands:
  attach      Connect to a specific linecard
  callhome    Callhome commands
  cd          Change current directory
  clear       Reset functions
  cli        CLI commands
  clock       Manage the system clock
  config      Enter configuration mode
  copy        Copy from one file to another
  debug       Debugging functions
  delete      Delete a file
  dir         List files in a directory
  discover    Discover information
  exit        Exit from the EXEC
  fcping     Ping an N-Port
  fctrace     Trace the route for an N-Port.
  find        Find a file below the current directory
  format      Format disks
  gunzip      Uncompresses LZ77 coded files
  gzip        Compresses file using LZ77 coding
  install     Upgrade software
  ips         Various sbyte module related commands
  isns        Re-registers specified interface with isns server
  mkdir       Create new directory
  modem       Modem commands
  move        Move files
  nasb        NASB control functionality
  no          Disable debugging functions
  ping        Send echo messages
  port-channel Port-Channel related commands
```

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purge	Deletes unused data
pwd	View current directory
reload	Reboot the entire box
rmdir	Delete a directory
run-script	Run shell scripts
send	Send message to open sessions
setup	Run the basic SETUP command facility
show	Show running system information
sleep	Sleep for the specified number of seconds
ssh	SSH to another system
system	System management commands
tac-pac	Save tac information to a specific location
tail	Display the last part of a file
telnet	Telnet to another system
terminal	Set terminal line parameters
test	Test command
traceroute	Trace route to destination
undebug	Disable Debugging functions (See also debug)
update	Update license
write	Write current configuration
zone	Execute Zone Server commands
zoneset	Execute zoneset commands

Configuration Mode

In configuration mode, you can make changes to the existing configuration. When you save the configuration, these commands are preserved across switch reboots. Once you are in configuration mode, you can enter interface configuration submode, zone configuration submode, and a variety of feature-specific submodes. Configuration mode is the starting point for all configuration commands. When you are in configuration mode, the switch expects configuration commands from the user.

The following example shows output from the **config terminal** command:

```
switch# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)#
```

Configuration Mode Commands and Submodes

Here is a list of configuration mode commands:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# ?
Configure commands:
aaa                Configure aaa functions
arp                [no] remove an entry from the ARP cache
banner            Configure banner message
boot              Configure boot variables
callhome          Enter the callhome configuration mode
cdp               CDP Configuration parameters
cfs               CFS configuration commands
cimserver         Modify cimserver configuration
cli               CLI configuration commands
clock             Configure time-of-day clock
cloud-discovery   Configure Cloud Discovery
crypto            Set crypto settings
device-alias      Device-alias configuration commands
do                EXEC command
dpvm              Configure Dynamic Port Vsan Membership
end               Exit from configure mode
```

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exit	Exit from configure mode
fabric-binding	Fabric Binding configuration
fc-tunnel	Configure fc-tunnel
fcalias	Fcalias configuration commands
fcanalyzer	Configure cisco fabric analyzer
fcc	Configure FC Congestion Control
fcdomain	Enter the fcdomain configuration mode
fcdroplateny	Configure switch or network latency
fcflow	Configure fcflow
fcid-allocation	Add/remove company id(or OUIs) from auto area list
fcinterop	Interop commands
fcip	Enable/Disable FCIP
fcns	Name server configuration
fcroute	Configure FC routes
fcrxbbcredit	Enable extended rx b2b credit configuration
fcs	Configure Fabric Config Server
fensp	Config commands for FC-SP
fctimer	Configure fibre channel timers
fdmi	Config commands for FDMI
ficon	Configure ficon information
fspf	Configure fspf
hw-module	Enable/Disable OBFL log information
in-order-guarantee	Set in-order delivery guarantee
interface	Select an interface to configure
ip	Configure IP features
ips	Various sbyte module related commands
ipv6	Configure IPv6 features
iscsi	Enable/Disable iSCSI
islb	iSCSI server load-balancing
isns	Configure iSNS
isns-server	iSNS server
ivr	Config commands for IVR
kernel	Kernel options
line	Configure a terminal line
logging	Modify message logging facilities
mcast	Configure multicast
nasb	Configure Third-Party Copy Functionality
no	Negate a command or set its defaults
ntp	NTP Configuration
port-security	Configure Port Security
port-track	Configure Switch port track config
power	Configure power supply
poweroff	Poweroff a module in the switch
qos	QoS Configuration commands
radius	Configure RADIUS configuration
radius-server	Configure RADIUS related parameters
rib	Configure RIB parameters
rmon	Remote Monitoring
role	Configure roles
rscn	Config commands for RSCN
san-ext-tuner	Enable/Disable San Extension Tuner tool
santap	Enter SanTap configuration
scheduler	Config commands for scheduler
scsi-target	Scsi-target configuration
snmp-server	Configure snmp server
span	Enter SPAN configuration mode
ssh	Configure SSH parameters
ssm	Config commands for SSM (Storage Services Module)
switchname	Configure system's network name
system	System config command
tacacs+	Enable tacacs+
telnet	Enable telnet
tlport	Configure TL Port information
trunk	Configure Switch wide trunk protocol

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```

username          Configure user information.
vsan              Enter the vsan configuration mode
wnn              Set secondary base MAC addr and range for additional WWNs
zone             Zone configuration commands
zone-attribute-group Zone attribute group commands
zoneset          Zoneset configuration commands

```

Configuration mode, also known as terminal configuration mode, has several submodes. Each of these submodes places you deeper in the prompt hierarchy. When you type **exit**, the switch backs out one level and returns you to the previous level. When you type **end**, the switch backs out to the user EXEC level. You can also type **Ctrl-Z** in configuration mode as an alternative to typing **end**.



Note

In configuration mode, you can alternatively enter

- **Ctrl-Z** instead of the **end** command, and
- **Ctrl-G** instead of the **exit** command

You can execute an EXEC mode command from a configuration mode or submode prompt. You can issue this command from any submode within the configuration mode. When in configuration mode (or in any submode), enter the **do** command along with the required EXEC mode command. The entered command is executed at the EXEC level and the prompt resumes its current mode level.

```

switch(config)# do terminal session-timeout 0
switch(config)#

```

In this example, **terminal session-timeout** is an EXEC mode command—you are issuing an EXEC mode command using the configuration mode **do** command.

The **do** command applies to all EXEC mode commands other than the **end** and **exit** commands. You can also use the help (?) and command completion (**Tab**) features for EXEC commands when issuing a **do** command along with the EXEC command.

[Table 2-2](#) lists some useful command key combinations that can be used in both EXEC and configuration modes:

Table 2-2 Useful Command Key Combination Descriptions

Command	Description
Ctrl-P	Up history.
Ctrl-N	Down history.
Ctrl-R	Refreshes the current line and reprints it.
Ctrl-X H	List history. When using this key combination, press and release the Ctrl and X keys together before pressing the H key.
Alt-P	History search backwards. Note The difference between Tab completion and Alt-P or Alt-N is that Tab completes the current word while Alt-P and Alt-N completes a previously entered command.
Alt-N	History search forwards.
Ctrl-G	Exit.
Ctrl-Z	End.
Ctrl-L	Clear screen.

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Displaying the Present Working Context

Some features have configuration submode hierarchy nested more than one level deep. In these cases, you can display the commands you used to reach your present working context (PWC). To display the command used to reach the current PWC, issue the **pwd** command at any command mode prompt.

```
switch(config-if)# pwd
(config t) -> (int mgmt 0)
```

CLI Command Navigation

To redisplay a command you previously entered, press the **Up Arrow** key. You can continue to press the **Up Arrow** key to see more previously issued commands. Similarly, you can press the **Down Arrow**, **Right Arrow**, **Left Arrow**, and **Delete** keys to navigate through the command history and to modify an existing command string.

Command Completion

In any command mode, you can begin a particular command sequence and immediately press the **Tab** key to complete the rest of the command.

```
switch(config)# ro<Tab>
switch(config)# role <Tab>
switch(config)# role name
```

This form of help is called command completion, because it completes a word for you. If several options are available for the typed letters, all options that match those letters are presented:

```
switch(config)# fc<Tab>
fc-tunnel      fcalias      fcanalyzer    fcc
fcdomain       fcdroplateny fcflow        fcid-allocation
fcinterop      fcip         fcns          fcroute
fcrxbbcredit   fcs         fcsp          fctimer

switch(config)# fc<Tab>
fcdomain       fcdroplateny

switch(config)# fcdo<Tab>
switch(config)# fcdomain
```

File System Completion

You can use the **Tab** key to complete schemes, servers, and file names available in the file system.

For example,

```
switch# cd bootflash:<Tab>
bootflash:      bootflash://sup-1/      bootflash://sup-remote/
bootflash:///    bootflash://sup-2/      bootflash://sup-standby/
bootflash://module-5/ bootflash://sup-active/
bootflash://module-6/ bootflash://sup-local/

switch# cd bootflash://mo<Tab>
bootflash://module-5/ bootflash://module-6/
cvswitch# cd bootflash://module-
```

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The no and Default Forms of Commands

You can issue the **no** form of any command to perform the following actions:

- Undo a wrongly issued command.

If you issue the **member** command in zone configuration submode, you can undo the results:

```
switch(config)# zone name test vsan 1
switch(config-zone)# member pwnn 12:12:12:12:12:12:12:12
switch(config-zone)# no member pwnn 12:12:12:12:12:12:12:12
WARNING: Zone is empty. Deleting zone test. Exit the submode.
switch(config-zone)#
```

- Delete a created facility.

If you want to delete a zone that you created:

```
switch(config)# zone name test vsan 1
switch(config-zone)# exit
switch(config)# no zone name test vsan 1
switch(config)#
```

You cannot delete a zone facility called test while residing in it. You must first exit the zone configuration submode and return to configuration mode.

- Revert to the default value.

If you issue the **zone merge-control restrict vsan** command, you can undo the results:

```
switch(config)# zone merge-control restrict vsan 10
switch(config)# no zone merge-control restrict vsan 10
switch(config)#
```

CLI Command Configuration Options

You can configure the software in one of two ways:

- You can create the configuration for the switch interactively by issuing commands at the CLI prompt.
- You can create an ASCII file containing a switch configuration and then load this file on the required system. You can then use the CLI to edit and activate the file (see the [“Working with Configuration Files” section on page 1-1](#)).

Getting Help

In any command mode, you can get a list of available commands by entering a question mark (?).

```
switch# ?
```

To obtain a list of commands that begin with a particular character sequence, type in those characters followed immediately by the question mark (?). Do not include a space.

```
switch# co?
configure copy
```

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To list keywords or arguments, enter a question mark in place of a keyword or argument. Include a space before the question mark. This form of help is called command syntax help, because it reminds you which keywords or arguments are applicable based on the commands, keywords, and arguments you have already entered.

```
switch# config ?
terminal Configure the system from the terminal
```



Tip

If you are having trouble entering a command, check the system prompt and enter the question mark (?) for a list of available commands. You might be in the wrong command mode or using incorrect syntax.

Managing the Switch Configuration

This section includes the following topics:

- [Displaying the Switch Configuration, page 2-11](#)
- [Saving a Configuration, page 2-14](#)
- [Clearing a Configuration, page 2-14](#)

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, issue the **show running-config** command. If the running configuration is different from the startup configuration, issue 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 run start** command was not issued 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 issuing 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.

Examples 2-2 to 2-8 display a few **show** command examples.

Example 2-2 Displays Details on the Specified Interface

```
switch# show interface fc1/1
fc1/1 is up
  Hardware is Fibre Channel, 20:01:ac:16:5e:4a:00:00
  vsan is 1
  Port mode is E
  Speed is 1 Gbps
  Beacon is turned off
  FCID is 0x0b0100
    0 frames input, 0 bytes, 0 discards
    0 runts, 0 jabber, 0 too long, 0 too short
    0 input errors, 0 CRC, 0 invalid transmission words
    0 address id, 0 delimiter
    0 EOF abort, 0 fragmented, 0 unknown class
    0 frames output, 0 bytes, 0 discards
  Received 0 OLS, 0 LRR, 0 NOS, 0 loop inits
  Transmitted 0 OLS, 0 LRR, 0 NOS, 0 loop inits
```

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Example 2-3 Displays the Software and Hardware Version

```
switch# show version
Cisco Storage Area Networking Operating System (SAN-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2006, 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 may be covered under the GNU Public
License or the GNU Lesser General Public License. A copy of
each such license is available at
http://www.gnu.org/licenses/gpl.html and
http://www.gnu.org/licenses/lgpl.html

Software
  BIOS:      version 1.0.8
  loader:    version 1.1(2)
  kickstart: version 2.0(1) [build 2.0(0.6)] [gdb]
  system:    version 2.0(1) [build 2.0(0.6)] [gdb]

  BIOS compile time:      08/07/03
  kickstart image file is: bootflash:///m9500-sf1ek9-kickstart-mzg.2.0.0.6.bin
  kickstart compile time: 10/25/2010 12:00:00
  system image file is:   bootflash:///m9500-sf1ek9-mzg.2.0.0.6.bin
  system compile time:    10/25/2020 12:00:00

Hardware
  RAM 1024584 kB

  bootflash: 1000944 blocks (block size 512b)
  slot0:      0 blocks (block size 512b)

172.22.92.181 uptime is 0 days 2 hours 18 minute(s) 1 second(s)

Last reset at 970069 usecs after Tue Sep 16 22:31:25 1980
  Reason: Reset Requested by CLI command reload
  System version: 2.0(0.6)
  Service:
```

Example 2-4 Displays the Running Configuration

```
switch# show running-config
Building Configuration ...
  interface fc1/1
  interface fc1/2
  interface fc1/3
  interface fc1/4
  interface mgmt0
ip address 172.22.95.112 255.255.255.0
no shutdown
vsan database
boot system bootflash:system-237; sup-1
boot kickstart bootflash:boot-237 sup-1
callhome
ip default-gateway 172.22.95.1
switchname switch
trunk protocol enable
username admin password 5 /AFDAMD4B2xK2 role network-admin
```

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Note

The interface configuration information can be display in multiple entries in the running configuration. See the “[Displaying Interface Information](#)” section on page 1-20.

Example 2-5 Displays the Difference Between the Running and Startup Configurations

```
switch# show running-config diff
Building Configuration ...
*** Startup-config
--- Running-config
***** 1,16 ****
    fcip enable
    ip default-gateway 172.22.91.1
    iscsi authentication none
    iscsi enable
! iscsi import target fc
    iscsi virtual-target name vt
        pWWN 21:00:00:04:cf:4c:52:c1
    all-initiator-permit
--- 1,20 ----
    fcip enable
+ aaa accounting logsize 500
+
+
    ip default-gateway 172.22.91.1
    iscsi authentication none
    iscsi enable
! iscsi initiator name junk
    iscsi virtual-target name vt
        pWWN 21:00:00:04:cf:4c:52:c1
    all-initiator-permit
```

Example 2-6 Displays the Configuration for a Specified Interface

```
switch# show running-config interface fc2/9
interface fc2/9
switchport mode E
no shutdown
```



Note

The `show running-config interface` command is different from the `show interface` command.

Example 2-7 Displays the Configuration for all Interfaces in a 16-Port Module

```
switch# show running-config interface fc2/10 - 12
interface fc2/10
switchport mode E
no shutdown

interface fc2/11
switchport mode E
no shutdown

interface fc2/12
switchport mode FL
no shutdown
```

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Example 2-8 *Displays the Configuration Per VSAN*

```
switch# show running vsan 1
Building Configuration ...
zone name m vsan 1
  member pwnn 21:00:00:20:37:60:42:5c
  member pwnn 21:00:00:20:37:4b:00:a2
zoneset name m vsan 1
  member m
zoneset activate name m vsan 1
```

Saving a Configuration

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

See the “Copying Configuration Files” section on page 1-5 and the “Preserving Module Configuration” section on page 1-7.

Clearing a Configuration

Use the **write erase** command to clear a startup configuration. Once this command is issued, 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
```

Displaying Users

Use the **show users** command to display all users currently accessing the switch.

```
switch# show users
admin pts/7 Jan 12 20:56 (10.77.202.149)
admin pts/9 Jan 12 23:29 (user1.example.com)
admin pts/11 Jan 13 01:53 (dhcp-10-10-1-1.example.com)
```

Sending Messages to Users

Use the **send** command to send a message to all active CLI users currently using the switch. This message is restricted to 80 alphanumeric characters with spaces.

This command sends a warning message to all active users about the switch being shut down.

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```
switch# send Shutting down the system in 2 minutes. Please log off.

Broadcast Message from admin@excal-112
 (/dev/pts/3) at 16:50 ...
Shutting down the system in 2 minutes. Please log off.
```

Using the ping and ping ipv6 Commands

Use the **ping** command to verify the connectivity of a remote host or server by sending echo messages.

The IPv4 syntax for this command is **ping host** or **ping ipv4-address**.

```
switch# ping 198.133.219.25
PING 198.133.219.25 (198.133.219.25) 56(84) bytes of data.
64 bytes from 198.133.219.25: icmp_seq=1 ttl=245 time=0.856 ms
64 bytes from 198.133.219.25: icmp_seq=2 ttl=245 time=1.02 ms

--- 198.133.219.25 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
rtt min/avg/max/mdev = 0.856/0.941/1.027/0.090 ms
```

The IPv6 syntax for this command is **ping ipv6 host** or **ping ipv6 ipv6-address**. The following example pings an IPv6 link-local address configured on a specific address.

```
shellfish# ping ipv6 fe80::205:30ff:fe01:a4fa interface gigabitethernet 1/1
PING fe80::205:30ff:fe01:a4fa(fe80::205:30ff:fe01:a4fa) from ::1 gige1-1: 56 data bytes
64 bytes from fe80::205:30ff:fe01:a4fa: icmp_seq=1 ttl=64 time=0.091 ms
64 bytes from fe80::205:30ff:fe01:a4fa: icmp_seq=2 ttl=64 time=0.077 ms
64 bytes from fe80::205:30ff:fe01:a4fa: icmp_seq=3 ttl=64 time=0.080 ms
64 bytes from fe80::205:30ff:fe01:a4fa: icmp_seq=4 ttl=64 time=0.075 ms
64 bytes from fe80::205:30ff:fe01:a4fa: icmp_seq=5 ttl=64 time=0.076 ms
```

To abnormally terminate a ping session, type the **Ctrl-C** escape sequence.

Using the Extended ping and ping ipv6 Commands

The **ping** and **ping ipv6** commands provide additional options to verify the connectivity of a remote host or server. To specify these additional parameters, just type **ping** at the CLI switch prompt and press **Enter**.

Table 2-3 summarizes the syntax and the defaults.

Table 2-3 Options and Defaults for the ping and ping ipv6 Commands

Option	Description	Default
Target IP address	The IPv4 address, IPv6 address, or host name of the destination node to ping.	Not applicable
Repeat count	The number of ping packets to be sent to the destination address.	5 packets
Datagram size	The size of each ping packet in bytes.	100 bytes
Timeout in seconds	The timeout interval before the ping or ping ipv6 command is terminated.	2 seconds
Extended commands	Specifies if a series of additional commands appear.	No

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Table 2-3 Options and Defaults for the ping and ping ipv6 Commands (continued)

Option	Description	Default
Sweep range of sizes	The sizes of the echo packets being sent. This option determines the minimum sizes of the MTUs configured on the nodes along the path to the destination address. You can then reduce packet fragmentation performance problems (see the “Configuring the MTU Frame Size” section on page 1-3).	No
Source address or interface	The numeric IP address or the name of the source interface.	Not applicable
Type of service	The quality of service (QoS) in Internet Control Message Protocol (ICMP) datagrams (see the “QoS” section on page 1-3).	0
Set DF bit in IP header	The Path MTU Discovery strategy (see the “Configuring the MTU Frame Size” section on page 1-3).	No
Data pattern	You may specify up to 16 bytes to pad the outgoing packet. This padding is useful when diagnosing data-dependent problems in a network. For example, <code>ff</code> fills the outgoing packet with all ones.	0xABCD

The syntax for this command is as follows:

```
switch# ping
Target IP address: 198.133.219.25
Target IP address: 198.133.219.25
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface:
Type of service [0]:
Set DF bit in IP header [n]:
Data pattern [0xABCD]:
Sweep range of sizes [n]:
PATTERN: 0xabcd
PING 198.133.219.25 (198.133.219.25) 100(128) bytes of data.
108 bytes from 198.133.219.25: icmp_seq=1 ttl=245 time=0.600 ms
108 bytes from 198.133.219.25: icmp_seq=2 ttl=245 time=0.614 ms
108 bytes from 198.133.219.25: icmp_seq=3 ttl=245 time=0.872 ms
108 bytes from 198.133.219.25: icmp_seq=4 ttl=245 time=0.558 ms
108 bytes from 198.133.219.25: icmp_seq=5 ttl=245 time=0.570 ms

--- 198.133.219.25 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 7996ms
rtt min/avg/max/mdev = 0.558/0.642/0.872/0.120 ms
```

To abnormally terminate a ping session, type the **Ctrl-C** escape sequence.

Using traceroute and traceroute ipv6 Commands

Use the **traceroute** command to print the routes taken to reach a specified host or IP address.

The IPv4 syntax for this command is **traceroute host** or **traceroute ipv4-address**.

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```
switch# traceroute www.cisco.com
Tracing route to www.cisco.com [198.133.219.25] 30 hops max, 38 byte packets
 1  bras3-10.pltnca.sbcglobal.net [151.164.184.79] 30 ms 30 ms 20 ms
 2  dist2-vlan50.pltn13.pbi.net [64.164.97.67] 20 ms 20 ms 30 ms
 3  bb2-g1-1.pltn13.pbi.net [67.116.251.194] 20 ms 20 ms 20 ms
 4  bb1-p12-0.pltn13.pbi.net [151.164.40.17] 20 ms 21 ms 20 ms
 5  bb2-p13-0.sntc01.pbi.net [151.164.191.65] 20 ms 20 ms 30 ms
 6  ex1-p3-0.egsjca.sbcglobal.net [64.161.1.54] 20 ms 20 ms 30 ms
 7  sl-st20-sj-0-0.sprintlink.net [144.223.242.81] 20 ms 20 ms 30 ms
 8  sl-bb25-sj-10-0.sprintlink.net [144.232.20.62] 20 ms 30 ms 20 ms
 9  sl-gw11-sj-10-0.sprintlink.net [144.232.3.134] 70 ms 30 ms 30 ms
10  sl-ciscopsn2-11-0-0.sprintlink.net [144.228.44.14] 20 ms 30 ms 20 ms
11  sjce-dmzbb-gw1.cisco.com [128.107.239.89] 20 ms 30 ms 30 ms
12  sjck-dmzdc-gw1.cisco.com [128.107.224.69] 20 ms 30 ms 20 ms
13  www.cisco.com (198.133.219.25) 2.496 ms * 2.135 ms
```

The IPv6 syntax for this command is **traceroute ipv6 host** or **traceroute ipv6 ipv6-address**.

```
switch# traceroute ipv6
Target IPv6 address: 2001:0DB8::3/64
Datagram size [40]:
Extended commands [n]: y
Maximum time-to-live [30]:
Source address:
Port number [33434]:
```

To cancel a **traceroute** or **traceroute ipv6** command before it completes, enter **Ctrl-C**.

Configuring Terminal Parameters

This section includes the following topics:

- [Setting the Terminal Session Timeout, page 2-17](#)
- [Setting the Terminal Timeout, page 2-18](#)
- [Setting the Terminal Type, page 2-19](#)
- [Setting the Terminal Screen Length, page 2-19](#)
- [Setting the Terminal Screen Width, page 2-19](#)
- [Displaying Terminal Settings, page 2-19](#)

Setting the Terminal Session Timeout

Use the **exec-timeout** command in configuration mode to configure the lifetime of all terminal sessions on that switch. When the time limit configured by this command is exceeded, the shell exits and closes that session. The syntax for this command is **exec-timeout minutes**.

The default is 30 minutes. You can configure different timeout values for a console or a virtual terminal line (VTY) session. You can set the **exec-timeout** value to 0 to disable this feature so the session remains active until you exit the switch. This change is saved in the configuration file.

- From the console:

```
switch(config)# line console
switch(config-console)# exec-timeout 60
```

Specifies the current console shell timeout to be 60 minutes.

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- From a VTY session (Telnet or SSH):

```
switch(config)# line vty
switch(config-line)# exec-timeout 60
```

Specifies the current console shell timeout to be 60 minutes.

Displaying Terminal Sessions

Use the **show line** command to display all configured terminal sessions:

```
switch# show line
line Console:
  Speed:          9600 bauds
  Databits:       8 bits per byte
  Stopbits:       1 bit(s)
  Parity:         none
  Modem In:       Disable
  Modem Init-String -
    default : ATE0Q1&D2&C1S0=1\015
  Statistics: tx:5558511 rx:5033958 Register Bits:RTS|CTS|DTR|DSR|CD|RI
line Aux:
  Speed:          9600 bauds
  Databits:       8 bits per byte
  Stopbits:       1 bit(s)
  Parity:         none
  Modem In:       Disable
  Modem Init-String -
    default : ATE0Q1&D2&C1S0=1\015
  Hardware Flowcontrol: ON
  Statistics: tx:35 rx:0 Register Bits:RTS|DTR
```

Clearing Terminal Sessions

Use the **clear line** command to clear a specified terminal session:

```
switch# clear line Aux
```

Setting the Terminal Timeout

Use the **terminal session-timeout** command in EXEC mode to configure the automatic logout time for the current terminal session on that switch. When the time limit configured by this command is exceeded, the switch closes that session and exits.

The syntax for this command is **terminal session-timeout** *minutes*.

The default is 30 minutes. You can set the **terminal session-timeout** value to 0 to disable this feature so the terminal remains active until you choose to exit the switch. This change is not saved in the configuration file.

```
switch# terminal session-timeout 600
```

Specifies the terminal timeout to be 600 minutes for the current session.

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Setting the Terminal Type

Use the **terminal terminal-type** command in EXEC mode to specify the terminal type for a switch:

The syntax for this command is **terminal terminal-type terminal-type**.

```
switch# terminal terminal-type vt100
```

Specifies the terminal type. The *terminal-type* string is restricted to 80 characters and must be a valid type (for example vt100 or xterm). If a Telnet or SSH session specifies an unknown terminal type, the switch uses the vt100 terminal by default.

Setting the Terminal Screen Length

Use the **terminal length** command in EXEC mode to set the terminal screen length for the current session. This command is specific to only the console port. Telnet and SSH sessions set the length automatically.

The syntax for this command is **terminal length lines**.

```
switch# terminal length 20
```

Sets the screen length for the current session to 20 lines for the current terminal session. The default is 24 lines.

Setting the Terminal Screen Width

Use the **terminal width** command in EXEC mode to set the terminal screen width for the current session. This command is specific to only the console port. Telnet and SSH sessions set the width automatically.

The syntax for this command is **terminal width columns**.

```
switch# terminal width 86
```

Sets the screen length for the current session to 86 columns for the current terminal session. The default is 80 columns.

Displaying Terminal Settings

Use the **show terminal** command to display the terminal settings for the current session:

```
switch# show terminal
TTY: Type: "vt100"
Length: 24 lines, Width: 80 columns
Session Timeout: 525600 minutes
```

Configuring the Switch Banner Message

You can issue the **banner motd** command in configuration mode to configure a message of the day (MOTD).

The syntax for this command is **banner motd [delimiting-character message delimiting-character]**

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The following example configures a banner message with the following text “Testing the MOTD Feature.”

```
switch# config t
switch(config)# banner motd # Testing the MOTD Feature. #
```

The message is restricted to 40 lines with a maximum of 80 characters in each line.

Use the **show banner motd** command to display the configured banner message.

The following example displays the configured banner message.

```
switch# show banner motd
Testing the MOTD Feature
```

The configured MOTD banner is displayed before the login prompt on the terminal whenever a user logs in to a Cisco MDS 9000 Family switch.

```
Testing the MOTD Feature
switch login:
```

Follow these guidelines when choosing your delimiting character:

- Do not use the *delimiting-character* in the *message* string.
- Do not use " and % as delimiters.

You can include tokens in the form \$(token) in the message text. Tokens will be replaced with the corresponding configuration variable. For example:

- \$(hostname) displays the host name for the switch
- \$(line) displays the vty or tty line or name

The following example spans multiple lines and uses tokens to configure the banner message:

```
switch# config t
switch(config)# banner motd #
Enter TEXT message. End with the character '#'.
Welcome to switch $(hostname).
Your tty line is $(line).
#
```

Directing show Command Output to a File

You can direct **show** command output to a file, either on the volatile file system, on slot0 CompactFlash memory, or on a remote server.

The following example shows how to direct the **show running-config** output to a file on the volatile file system.

```
switch1# show running-config > volatile:switch1-run.cfg
```

The following example shows how to direct the **show running-config** output to a file on slot0 CompactFlash memory.

```
switch2# show running-config > slot0:switch2-run.cfg
```

The following example shows how to direct the **show running-config** output to a file on a TFTP server.

```
switch3# show running-config > tftp://10.10.1.1/home/configs/switch3-run.cfg
Preparing to copy...done
```

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Using CLI Variables

The SAN-OS CLI parser supports the definition and use of variables in CLI commands. CLI variables can be used as follows: □

- Entered directly on the command line.
- Passed to the child script initiated using the **run-script** command. The variables defined in the parent shell are available for use in the child **run-script** command process (see the “[Executing Commands Specified in a Script](#)” section on page 2-35).
- Passed as command line arguments to the **run-script** command (see the “[Executing Commands Specified in a Script](#)” section on page 2-35).

CLI variables have the following characteristics: □

- You cannot reference a variable through another variable using nested references.
- You can define persistent variables that are available across switch reloads.
- You can reference only one predefined system variable, the **TIMESTAMP** variable.

User-Defined CLI Session Variables

You can define CLI session variables to persist only for the duration of your CLI session using the **cli var name** command in EXEC mode. CLI session variables are useful for scripts that you execute periodically.

The following example shows how to create a user-defined CLI session variable.

```
switch# cli var name testinterface fc 1/1
```

You can reference a variable using the syntax **\$(variable)**.

The following example shows how to reference a user-defined CLI session variable.

```
switch# show interface $(testinterface)
fc1/1 is up
  Hardware is Fibre Channel, SFP is short wave laser w/o OFC (SN)
  Port WWN is 20:01:00:0d:ec:0e:1d:00
  Admin port mode is auto, trunk mode is on
  snmp traps are enabled
  Port mode is F, FCID is 0x01000b
  Port vsan is 1
  Speed is 2 Gbps
  Transmit B2B Credit is 7
  Receive B2B Credit is 16
  Receive data field Size is 2112
  Beacon is turned off
  5 minutes input rate 256 bits/sec, 32 bytes/sec, 1 frames/sec
  5 minutes output rate 256 bits/sec, 32 bytes/sec, 1 frames/sec
    232692 frames input, 7447280 bytes
      0 discards, 0 errors
      0 CRC, 0 unknown class
      0 too long, 0 too short
    232691 frames output, 7448692 bytes
      0 discards, 0 errors
    0 input OLS, 0 LRR, 0 NOS, 0 loop inits
    1 output OLS, 1 LRR, 0 NOS, 1 loop inits
    16 receive B2B credit remaining
    7 transmit B2B credit remaining
```

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Use the **show cli variables** command to display user-defined CLI session variables.

The following example displays user-defined CLI session variables.

```
switch# show cli variables
VSH Variable List
-----
TIMESTAMP="2005-10-24-21.29.33"
testinterface="fc 1/1"
```

Use the **cli no var name** command to remove user-defined CLI session variables.

The following example removes a user-defined CLI session variable.

```
switch# cli no var name testinterface
```

User-Defined CLI Persistent Variables

You can define CLI variables that persist across CLI sessions and switch reloads using the **cli var name** command in configuration mode. These CLI persistent variables are configured in configuration mode and are saved in the running configuration file.

The following example shows how to create a user-defined CLI persistent variable.

```
switch# config t
switch(config)# cli var name mgmtport mgmt 0
switch(config)# exit
switch#
```

You can reference a variable using the syntax **\$(variable)**.

The following example shows how to reference a user-defined CLI persistent variable.

```
switch# show interface $(mgmtport)
mgmt0 is up
  Hardware is FastEthernet
  Address is 000e.38c6.2c6c
  Internet address is 10.10.10.1/24
  MTU 1500 bytes, BW 100 Mbps full Duplex
  288996 packets input, 97746406 bytes
    0 multicast frames, 0 compressed
    0 input errors, 0 frame, 0 overrun 0 fifo
  9089 packets output, 1234786 bytes, 0 underruns
    0 output errors, 0 collisions, 0 fifo
    0 carrier errors
```

Use the **show cli variables** command to display user-defined CLI persistent variables.

The following example displays user-defined CLI persistent variables.

```
switch# show cli variables
VSH Variable List
-----
TIMESTAMP="2005-10-24-21.37.13"
mgmtport="mgmt 0"
```

Use the **no cli var name** command in configuration mode to remove user-defined CLI persistent variables.

The following example removes a user-defined CLI persistent variable.

```
switch# config t
switch(config)# no cli var name mgmtport
```

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System-Defined Variables

Cisco MDS SAN-OS supports one predefined variable: `TIMESTAMP`. This variable refers to the time of execution of the command in the format `YYYY-MM-DD-HH.MM.SS`.



Note

The `TIMESTAMP` variable name is case sensitive. All letters must be uppercase.

The following example uses `$(TIMESTAMP)` when periodically gathering statistics into files using the command scheduler.

```
switch# config t l
switch(config)# scheduler enable
switch(config)# scheduler logfile size 16
switch(config)# scheduler job name j1
switch(config-job)# show interface mgmt0 | include mgmt > file
switch(config-job)# copy volatile:file bootflash:file.$(TIMESTAMP)
switch(config-job)# end
switch(config)#
```

The following example uses `$(TIMESTAMP)` when redirecting `show` command output to a file.

```
switch# show running-config > rcfg.$(TIMESTAMP)
Preparing to copy...done
switch# dir volatile:
      7231      Oct 03 20:20:42 2005  rcfg.2005-10-03-20.20.42
```

```
Usage for volatile://sup-local
8192 bytes used
20963328 bytes free
20971520 bytes total
```

Using Command Aliases

Command alias support has the following characteristics:

- Command aliases are global for all user sessions.
- Command aliases are persist across reboots.
- Commands being aliased must be typed in full without abbreviation.
- Command alias translation always takes precedence over any keyword in any configuration mode or submode.
- Command alias support is only available on the supervisor module, not the switching modules.
- Command alias configuration takes effect for other user sessions immediately.
- You cannot override the default command alias **alias**, which aliases the **show cli alias**.
- Nesting of command aliases is permitted to a maximum depth of 1. One command alias can refer to another command alias that must refer to a valid command, not to another command alias.
- A command alias always replaces the first command keyword on the command line.
- You can define command aliases for commands in any configuration submode or the EXEC mode.

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Defining Command Aliases

You can define command aliases using the **cli alias name** command in configuration mode.

The following example shows how to define command aliases.

```
switch# config t
switch(config)# cli alias name gigint interface gigabitethernet
switch(config)# cli alias name shintbr show interface brief
switch(config)# cli alias name shfcintup "shintbr | include up | include fc"
```

You can display the command aliases defined on the switch using the **alias** default command alias.

The following example shows how to display the command aliases defined on the switch.

```
switch# alias
CLI alias commands
=====
alias      :show cli alias
gigint     :interface gigabitethernet
shintbr    :show interface brief
shfcintup :shintbr | include up | include fc
```

About Flash Devices

Every switch in the Cisco MDS 9000 Family contains one internal bootflash (see [Figure 2-2](#)). The Cisco MDS 9500 Series additionally contains one external CompactFlash called slot0 (see [Figure 2-2](#) and [Figure 2-3](#)).

Figure 2-2 Flash Devices in the Cisco MDS 9000 Supervisor Module

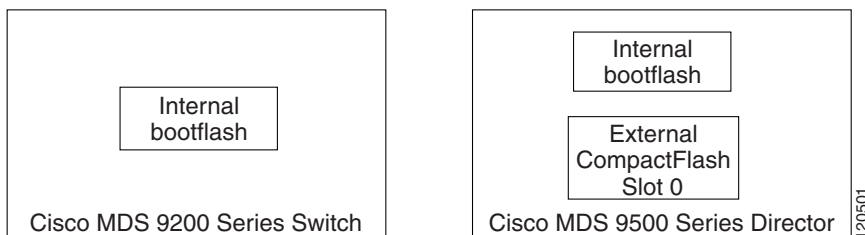
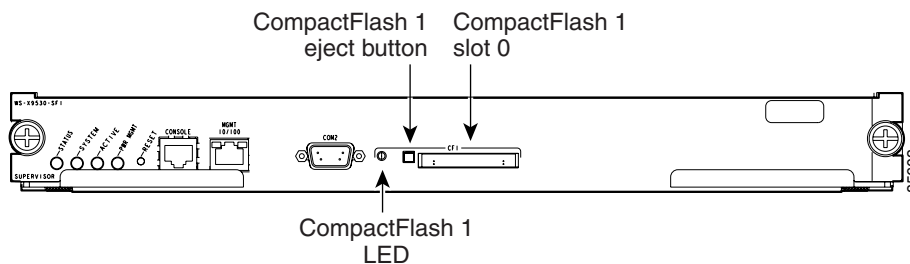


Figure 2-3 External CompactFlash in the Cisco MDS 9000 Supervisor Module



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Internal bootflash

All switches in the Cisco MDS 9000 Family have one internal bootflash: that resides in the supervisor or switching module. You have access to two locations within the internal bootflash: file system.

- The volatile: file system provides temporary storage, and it is also the default location for file system commands. Files in temporary storage (volatile:) are erased when the switch reboots.
- The bootflash: (nonvolatile storage) file system provides permanent storage. The files in bootflash: are preserved through reboots and power outages.

External CompactFlash (Slot0)

Cisco MDS 9500 Series directors contain an additional external CompactFlash referred to as the slot0: file system.

The external CompactFlash, an optional device for MDS 9500 Series directors, can be used for storing software images, logs, and core dumps.

Formatting Flash Devices and File Systems

By formatting a Flash device or a file system, you are clearing out the contents of the device or the file system and restoring it to its factory-shipped state.

See the “[About Flash Devices](#)” section on page 2-24 and the “[Using Switch File Systems](#)” section on page 2-28.

Initializing Internal bootflash

When a switch is shipped, the **init system** command is already performed and you do not need to issue it again. Initializing the switch resets the entire internal Flash device and erases all data in the bootflash: file system. The internal Flash device is composed of several file systems with bootflash: being one of them. All files in bootflash: are erased and you must download the system and kickstart images again. After issuing an **init system** command, you do not have to format the bootflash: again because bootflash: is automatically formatted.



Note

The **init system** command also installs a new loader from the existing (running) kickstart image. You can access this command from the `switch(boot)#` prompt (see [Chapter 6, “Software Images”](#)).



Caution

If your system has an active supervisor module currently running, you must issue the **system standby manual-boot** command in EXEC mode on the active supervisor module before issuing the **init system** command on the standby supervisor module to avoid corrupting the internal bootflash:. After the **init system** command completes on the standby supervisor module, issue the **system no standby manual-boot** command in EXEC mode on the active supervisor module.

If bootflash: is found corrupted during a boot sequence, you will see the following message:

```
ERROR:bootflash: has unrecoverable error; please do "format bootflash:"
```

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Use the **format bootflash:** command to only format the bootflash: file system. You can issue the **format bootflash:** command from either the `switch#` or the `switch(boot)#` prompts.

If you issue the **format bootflash:** command, you must download the kickstart and system images again.

Formatting External CompactFlash

Be sure to format an external CompactFlash device before using it to save files or images.

You can verify that the external CompactFlash device is formatted by inserting it into slot0: and issuing the **dir slot0:** command.

- If the external CompactFlash device is already formatted, you can see file system usage information (along with any existing files).
- If the external CompactFlash device is unformatted (corrupted), you will see the following message:

```
Device unavailable
```

In this case, you need to format the CompactFlash device using the **format slot0:** command.



Note

The slot0: file system cannot be accessed from either the standby `loader>` prompt or the `switch(boot)#` prompt if the disk is inserted after booting the switch.



Caution

The Cisco SAN-OS software only supports CompactFlash devices that are certified by Cisco Systems and formatted using Cisco MDS switches. Using uncertified CompactFlash devices may result in unpredictable consequences; formatting CompactFlash devices using other platforms may result in errors.

About USB Flash Drives

The Supervisor 2 modules on Cisco MDS 9000 Family switches contain two USB flash drive ports called `usb1` and `usb2`. Drives installed in these USB ports can be used for storing software images, logs, and core dumps. USB devices up to 2GB are supported.



Note

When attempting to use USB ports, the following message may be displayed: **Please upgrade Power Management EPLD to version 0xD or higher.** You may need to upgrade the Power Management EPLD for the supervisor modules, to version 0xD or higher, in order to use the USB ports. For information on installing and upgrading EPLD images, refer to the [Cisco MDS 9000 Family Release Notes for Cisco MDS 9000 EPLD Image](#).

Formatting USB Flash Drives

USB drives are accessible once the USB drives are formatted on SAN-OS. If the USB flash drive is not already formatted on SAN-OS, issue the **format usb1** or **format usb2** CLI commands.

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Viewing Files on USB Flash Drives

To view files on a USB flash drive that has already been formatted on SAN-OS, issue the **dir usb1:** or **dir usb2:** CLI commands.

Copying Files From USB Flash Drives

To copy files to and from the USB drives, use the **copy** CLI command.

For example, to copy files to a USB drive from the bootflash, issue the following command: **copy bootflash:someimage usb1:image_on_usb.**

To copy a file from a remote location to a USB drive, issue the following command: **copy scp://user@host:filelocation usb1:file.**

Supported USB Flash Drives

Table 2-4 lists the supported USB flash drives.

Table 2-4 Supported USB Drives

Brand	Size	Model
IBM	32 MB	IBM 32MB
Sony	2G	Micro Vault TINY 2GB
	2G	Micro Vault 2GB
	1G	Micro Vault 1GB
	1G	Micro Vault TINY 1GB
	512MB	Micro Vault 512MB
LEXAR	2G	JumpDrive FireFly 2GB
	2G	JumpDriver Lightning 2GB
	2G	JumpDriver 360 1GB
	1G	JumpDriver FireFly 1GB
	1G	JumpDriver 360 1GB
	1G	JumpDriver Lightning 1GB
	1G	JumpDriver Mercury 1GB
KINGSTON	2G	DataTraveler 2GB
	2	DataTraveler U3 Smart 2GB
	1	DataTraveler 1GB
	512MB	DataTraveler 512MB
SANDISK	2G	Cruzer Micro 2GB
	1G	Cruzer Micro 1GB
TDK	2G	TRANS-IT 2GB

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Table 2-4 Supported USB Drives

Brand	Size	Model
PQA	2G	PQI Traveling Disk 2GB
	1G	PQI Traveling Disk 1GB
PNY	2G	Optima Pro™ Attaché 2 GB
	1G	Optima Pro™ Attaché 1 GB
EMPREX	2G	USB Flash Drive PD330 2GB
	2G	USB Flash Drive PD10 2GB
MEMOREX	1G	Tracel Drive 1GB

Using Switch File Systems

The switch provides the following useful functions to help you manage software image files and configuration files:

- [Specifying File Systems, page 2-29](#)
- [Setting the Current Directory, page 2-29](#)
- [Displaying the Current Directory, page 2-30](#)
- [Displaying File Checksums, page 2-30](#)
- [Listing the Files in a Directory, page 2-31](#)
- [Creating a Directory, page 2-31](#)
- [Deleting an Existing Directory, page 2-31](#)
- [Moving Files, page 2-31](#)
- [Copying Files, page 2-32](#)
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Specifying File Systems

The syntax for specifying a file system is `scheme:[//server/]`. Table 2-5 describes the file system syntax components.

Table 2-5 File System Syntax Components

Scheme	Server	Description
bootflash	sup-active sup-local sup-1 module-5 ¹ module-7 ²	Internal CompactFlash memory located on the active supervisor used for storing system images, configuration files, and other miscellaneous files.
	sup-standby sup-remote sup-2 module-6 ¹ module-8 ²	Internal CompactFlash memory located on the standby supervisor used for storing system images, configuration files, and other miscellaneous files.
slot0	—	External CompactFlash installed in a supervisor module used for storing system images, configuration files, and other miscellaneous files
usb1 and usb2	—	USB ports installed in a Supervisor 2 module used for storing system images, configuration files, and other miscellaneous files
volatile	—	Volatile random-access memory (VRAM) located on a supervisor module used for temporary or pending changes
nvrnram	—	Nonvolatile random-access memory (NVRAM) located on a supervisor module used for storing the startup-config file
log	—	Memory on the active supervisor that stores logging file statistics
system	—	Memory on a supervisor module used for storing the running-config file
modflash	slot- <i>slot</i>	CompactFlash located on a Storage Services Module (SSM) used for storing the SSI boot image

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Setting the Current Directory

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

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Tip

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

The syntax for this command is `cd directory name`

This example changes the current directory to the root directory on the bootflash: file system.

```
switch# cd bootflash:
```

This example changes the current directory to the mydir directory that resides in the slot0: file system.

```
switch# cd slot0:mydir
```

This example changes the current directory to the mystorage directory that resides in the current directory.

```
switch# cd mystorage
```

If the current directory is slot0:mydir, this command changes the current directory to slot0:mydir/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:
```



Note

If you issue this command from the active supervisor module in a Cisco MDS 9500 Series (for example, module-5), then you cannot change the current working directory to the bootflash: of module-6. See the “Supervisor Modules” section on page 1-2.

Displaying File Checksums

The `show file file md5sum` command provides the MD5 checksum of the file. MD5 is an electronic fingerprint for the file. MD5 is the latest implementation of the Internet standards described in RFC 1321 and is useful for data security as well as integrity.

The `show file file cksum` command provides the checksum of the file. The checksum values compute a cyclic redundancy check (CRC) for each named file. Use this command to verify that the files are not corrupted—compare the checksum output for the received file against the checksum output for the original file.

This example provides the output of the `show file` command when a file is specified.

```
switch# show file bootflash://sup-1/ultimate_file.tar cksum
2569913991
```

```
switch# show file bootflash://sup-1/ultimate_file.tar md5sum
52479aae2dce1fd849b6f4916d750392
```

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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
      Usage for volatile: filesystem
                0 bytes total used
      20971520 bytes free
      20971520 bytes available
```

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** *directory name*.

This example creates a directory called test in the slot0 directory.

```
switch# mkdir slot0:test
```

This example creates a directory called test at the current directory level.

```
switch# mkdir test
```

If the current directory is slot0:mydir, this command creates a directory called slot0:mydir/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** *directory name*.

This example deletes the directory called test in the slot0 directory.

```
switch# rmdir slot0:test
This is a directory. Do you want to continue (y/n)? [y] y
```

The **delete** command is also capable of deleting empty and non-empty directories. When you issue this command a warning is displayed to confirm your intention to delete the directory.

This example deletes the directory called test at the current directory level.

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

If the current directory is slot0:mydir, this command deletes the slot0:mydir/test directory.

Moving Files

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

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**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 of the `slot0:` file system to the `mystorage` directory.

```
switch# move slot0:samplefile slot0:mystorage/samplefile
```

This example moves a file from the current directory level.

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

If the current directory is `slot0:mydir`, this command moves `slot0:mydir/samplefile` to `slot0: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.

The syntax for the **copy** command follows and is explained in [Table 2-6](#).

```
switch# copy scheme:[//module/]filename scheme:[//module/]filename
```

Table 2-6 *copy Command Syntax*

Scheme	Module	File Name
bootflash	sup-active sup-standby sup-1, module-5 ¹ , or module-7 ² sup-2, module-6 ¹ , or module-8 ² sup-local sup-remote	User-specified
slot0	—	User-specified
volatile	—	User-specified
nvrn	—	startup-config or snapshot-config
system	—	running-config

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This example copies the file called `samplefile` from the root directory of the `slot0:` file system to the `mystorage` directory.

```
switch# copy slot0:samplefile slot0:mystorage/samplefile
```

This example copies a file from the current directory level.

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


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If the current directory is `slot0:mydir`, this command copies `slot0:mydir/samplefile` to `slot0:mydir/mystorage/samplefile`.

This example shows how to copy a file from the active supervisor module's (sup-1 in slot 5 on the Cisco MDS 9506 and Cisco MDS 9509 switches or slot 7 on the Cisco MDS 9513 switch) bootflash to the standby supervisor module's (sup-2 in slot 6 on the Cisco MDS 9506 and Cisco MDS 9509 switches or slot 7 on the Cisco MDS 9513 switch) bootflash.

```
switch# copy bootflash:system_image bootflash://sup-2/system_image
```

This example shows how to overwrite the contents of an existing configuration in NVRAM.

```
switch# copy nvram:snapshot-config nvram:startup-config
```

Warning: this command is going to overwrite your current startup-config.

```
Do you wish to continue? {y/n} [y] y
```

You can also use the **copy** command to upload and download files from the `slot0:` or `bootflash:` file system to or from a FTP, TFTP, SFTP, or SCP server (see the “Copying Configuration Files” section on page 1-5).

Deleting Files

The **delete** command deletes a specified file or the specified directory and all its contents (see the “Deleting Configuration Files” section on page 1-8).

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

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

This example shows how to delete a file from an external CompactFlash (slot0).

```
switch# delete slot0:dns_config.cfg
```

This example deletes the entire `my-dir` 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.

The syntax for this command is **show file filename**.

This example displays the contents of the test file that resides in the slot0 directory.

```
switch# show file slot0:test
config t
Int fc1/1
no shut
end
show int fc1/1
```

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

```
switch# show file myfile
```

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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*—a file created at the same directory level. At the EXEC mode switch prompt, issue a **dir** command to view all files in this directory, including the recently saved *samplefile*. See [Chapter 4, “Initial Configuration,”](#) for information on saving and copying configuration files, and [Chapter 6, “Software Images,”](#) for information on saving and copying software images.



Note

Redirection is allowed only if the current directory is on the `volatile:` (default) or `slot0:` file systems. Redirection is not allowed if the current directory is on the `bootflash:` file system. The current directory can be viewed using the **pwd** command and changed using the **cd** command.

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 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
```

Displaying the Last Lines in a File

The **tail** command displays the last lines (tail end) of a specified file.

The syntax for this command is **tail filename [number-of-lines]**.

```
switch# tail mylog 10
```

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You see the last 10 lines of the mylog file.

Command Scripts

This section includes the following sections:

- [Executing Commands Specified in a Script, page 2-35](#)
- [Using CLI Variables in Scripts, page 2-36](#)
- [Setting the Delay Time, page 2-36](#)

Executing Commands Specified in a Script

The **run-script** command executes the commands specified in a file. To use this command, be sure to create the file and specify commands in the required order.



Note

You cannot create the script files at the switch prompt. You can create the script file on an external machine and copy it to the bootflash: directory. This section assumes that the script file resides in the bootflash: directory.

The syntax for this command is **run-script filename**.

This example displays the CLI commands specified in the testfile that resides in the slot0 directory.

```
switch# show file slot0:testfile
conf t
interface fc 1/1
no shutdown
end
sh interface fc1/1
```

This file output is in response to the **run-script** command executing the contents in the testfile file:

```
switch# run-script slot0:testfile
'conf t'
Enter configuration commands, one per line. End with CNTL/Z.
'interface fc1/1'
'no shutdown'
'end'
'sh interface fc1/1'
fc1/1 is down (Fcot not present)
  Hardware is Fibre Channel
  Port WWN is 20:01:00:05:30:00:48:9e
  Admin port mode is auto, trunk mode is on
  vsan is 1
  Beacon is turned off
  Counter Values (current):
    0 frames input, 0 bytes, 0 discards
    0 runts, 0 jabber, 0 too long, 0 too short
    0 input errors, 0 CRC, 0 invalid transmission words
    0 address id, 0 delimiter
    0 EOF abort, 0 fragmented, 0 unknown class
    0 frames output, 0 bytes, 0 discards
    Received 0 OLS, 0 LRR, 0 NOS, 0 loop inits
    Transmitted 0 OLS, 0 LRR, 0 NOS, 0 loop inits
  Counter Values (5 minute averages):
  ...
```

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Using CLI Variables in Scripts

You can use CLI variables defined by the **cli var** command (see the “Using CLI Variables” section on page 2-21) or passed as arguments in the **run-script** command.

The following example shows how to use CLI session variables in a script file used by the **run-script** command.

```
switch# cli var name testinterface fc 1/1

switch# show file bootflash:test1.vsh
show interface $(testvar)

switch# run-script bootflash:test1.vsh
`show interface $(testvar)`
fc1/1 is down (SFP not present)
Hardware is Fibre Channel
Port WWN is 20:01:00:05:30:00:8e:1e
Admin port mode is auto, trunk mode is on
Port vsan is 1
Receive data field Size is 2112
Beacon is turned off
5 minutes input rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
5 minutes output rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
1 frames input, 128 bytes
0 discards, 0 errors
0 CRC, 0 unknown class
0 too long, 0 too short
1 frames output, 128 bytes
0 discards, 0 errors
0 input OLS, 0 LRR, 0 NOS, 0 loop inits
0 output OLS, 0 LRR, 0 NOS, 0 loop inits
0 receive B2B credit remaining
0 transmit B2B credit remaining
```

The following example shows how you can pass CLI session variable as arguments to a child **run-script** command process.

```
switch# show file bootflash:test1.vsh
show interface $(var1) $(var2)

switch# run bootflash:test2.vsh var1="fc1/1" var2="brief"
`show interface $(var1) $(var2)`
-----
Interface  Vsan   Admin  Admin  Status      SFP   Oper  Oper  Port
           Mode   Mode   Trunk                                     Mode  Speed Channel
                               Mode                                     (Gbps)
-----
fc1/1     1     auto  on     sfpAbsent  --  --   --
```

Setting the Delay Time

The **sleep** command delays an action by a specified number of seconds.

The syntax for this command is **sleep seconds**.

```
switch# sleep 30
```

You will see the switch prompt return after 30 seconds.

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This command is useful within scripts. For example, if you create a command script called test-script.

```
switch# show file slot0:test-script
discover scsi-target remote
sleep 10
show scsi-target disk
switch# run-script slot0:test-script
```

When you execute the slot0:test-script command script, the switch software executes the **discover scsi-target remote** command, and then waits for 10 seconds before executing the **show scsi-target disk** command.

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