



I Commands

The commands in this chapter apply to the Cisco MDS 9000 Family of multilayer directors and fabric switches. All commands are shown here in alphabetical order regardless of command mode. See the “Command Modes” section to determine the appropriate mode for each command. For more information, refer to the *Cisco MDS 9000 Family Configuration Guide*.

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in-order-guarantee

To enable in-order delivery in the Cisco MDS 9000 Family of switches, use the **in-order-guarantee** command in configuration mode. To disable in-order delivery, use the **no** form of the command.

in-order-guarantee

no in-order-guarantee

Syntax Description This command has no arguments or keywords.

Defaults Disabled.

Command Modes Configuration mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines In-order delivery of data frames guarantees frame delivery to a destination in the same order that they were sent by the originator.

Examples The following example shows how to enable in-order delivery.

```
switch## config t
switch(config)##
switch(config) # in-order-guarantee
switch(config) #
switch(config) # no in-order-guarantee
switch(config) #
```

install all

To upgrade all modules in any Cisco MDS 9000 family switch, use the **install all** command. This upgrade can happen nondisruptively or disruptively depending on the current configuration of your switch.

install all *asm-sfn* | *kickstart* | *system* *URL*

Syntax	Description
install all	Upgrades the system.
asm-sfn	Upgrades the ASM image.
system	Upgrades the system image.
kickstart	Upgrades the kickstart image.
<i>URL</i>	The location URL of the source file to be installed.

The following table lists the aliases for *URL*.

bootflash:	Source location for internal bootflash memory.
slot0:	Source location for the CompactFlash memory or PCMCIA card.
volatile:	Source location for the volatile file system.
tftp:	Source location for a Trivial File Transfer Protocol (TFTP) network server. The syntax for this URL is tftp:[[/location]/directory]/filename .
ftp:	Source location for a File Transfer Protocol (FTP) network server. The syntax for this URL is ftp:[[/location]/directory]/filename .
sftp:	Source location for a Secure Trivial File Transfer Protocol (SFTP) network server. The syntax for this URL is sftp:[[/<username>location]/directory]/filename .
scp:	Source location for a Secure Copy Protocol (SCP) network server. The syntax for this URL is scp:[[/location]/directory]/filename .
<i>image-filename</i>	The name of the source image file.

Defaults None.

Command Modes EXEC mode.

Command History This command was modified in Cisco MDS SAN-OS Release 1.2(2).

Usage Guidelines The **install all** command upgrades all modules in any Cisco MDS 9000 Family switch. To copy a remote file, specify the entire remote path exactly as it is.

**Caution**

If a switchover is required when you issue the **install all** command from a Telnet or SSH session, all open sessions are terminated. If no switchover is required, the session remains unaffected. The software issues a self-explanatory warning at this point and provides the option to continue or terminate the installation.

See the *Cisco MDS 9000 Family Configuration Guide* for detailed procedures.

Examples

The following example displays the result of the **install all** command if the system and kickstart files are specified locally.

```
switch# install all system bootflash:system_image kickstart bootflash:kickstart_image
switch# install all system bootflash:system-image kickstart bootflash:kickstart-image
Verifying image bootflash:/kickstart-image.bin
[#####] 100% -- SUCCESS

Verifying image bootflash:/system-image.bin
[#####] 100% -- SUCCESS

Extracting "slc" version from image bootflash:/system-image.bin.
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash:/system-image.bin.
[#####] 100% -- SUCCESS

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

Extracting "loader" version from image bootflash:/kickstart-image.bin.
[#####] 100% -- SUCCESS

Compatibility check is done:
Module  bootable          Impact  Install-type  Reason
-----  -
      2      yes  non-disruptive      none
      5      yes  non-disruptive      none
      6      yes  non-disruptive      none
      9      yes  non-disruptive      none

Images will be upgraded according to following table:
Module      Image      Running-Version      New-Version      Upg-Required
-----  -
      2      slc      1.2(1)      1.2(1)      no
      2      bios      v1.1.1(03/20/03)      v1.1.1(03/20/03)      no
      5      system      1.2(1)      1.2(1)      no
      5      kickstart      1.2(1)      1.2(1)      no
      5      bios      v1.1.1(03/20/03)      v1.1.1(03/20/03)      no
      5      loader      1.0(3a)      1.0(3a)      no
      6      system      1.2(1)      1.2(1)      no
      6      kickstart      1.2(1)      1.2(1)      no
      6      bios      v1.1.1(03/20/03)      v1.1.1(03/20/03)      no
      6      loader      1.0(3a)      1.0(3a)      no
      9      slc      1.2(1)      1.2(1)      no
      9      bios      v1.1.1(03/20/03)      v1.1.1(03/20/03)      no

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

Install is in progress, please wait.
```

```

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

Syncing image bootflash:/system-image.bin to standby.
[#####] 100% -- SUCCESS

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

Module 5: Waiting for module online.
-- SUCCESS

Install has been successful.

```

The following example displays the result of the **install all** command if the system and kickstart files are specified remotely.

```

switch# install all system ftp://171.71.188.111/m9500-sflek9-mzg.1.2.2.bin kickstart
ftp://171.71.188.111/m9500-sflek9-kickstart-mzg.1.2.2.bin
For ftp://171.71.188.111, please enter user name:user
For ftp://user@171.71.188.111, please enter password:
For ftp://171.71.188.111, please enter user name:user
For ftp://user@171.71.188.111, please enter password:

Copying image from ftp://user@171.71.188.111/m9500-sflek9-kickstart-mzg.1.2.2.bin to
bootflash:///m9500-sflek9-kickstart-mzg.1.2.2.bin.
[#####] 100% -- SUCCESS

Copying image from ftp://user@171.71.188.111/m9500-sflek9-mzg.1.2.2.bin to
bootflash:///m9500-sflek9-mzg.1.2.2.bin.
[#####] 100% -- SUCCESS

Verifying image bootflash:///m9500-sflek9-kickstart-mzg.1.2.2.bin
[#####] 100% -- SUCCESS

Verifying image bootflash:///m9500-sflek9-mzg.1.2.2.bin
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash:///m9500-sflek9-mzg.1.2.2.bin.
[#####] 100% -- SUCCESS

Extracting "kickstart" version from image
bootflash:///m9500-sflek9-kickstart-mzg.1.2.2.bin.
[#####] 100% -- SUCCESS

Extracting "loader" version from image bootflash:///m9500-sflek9-kickstart-mzg.1
.3.0.51.bin.
[#####] 100% -- SUCCESS

Extracting "slc" version from image bootflash:///m9500-sflek9-mzg.1.2.2.bin.
[#####] 100% -- SUCCESS

```

```

Compatibility check is done:
Module  bootable          Impact  Install-type  Reason
-----  -
      5      yes  non-disruptive      reset
      6      yes  non-disruptive      reset
      8      yes  non-disruptive      rolling

```

Images will be upgraded according to following table:

Module	Image	Running-Version	New-Version	Upg-Required
5	system	1.2(1)	1.2(2)	yes
5	kickstart	1.2(1)	1.2(2)	yes
5	bios	v1.0.8(08/07/03)	v1.0.8(08/07/03)	no
5	loader	1.2(1)	1.2(2)	no
6	system	1.2(1)	1.2(2)	yes
6	kickstart	1.2(1)	1.2(2)	yes
6	bios	v1.0.7(03/20/03)	v1.0.8(08/07/03)	yes
6	loader	1.2(1)	1.2(2)	no
8	slc	1.2(1)	1.2(2)	yes
8	bios	v1.0.8(08/07/03)	v1.0.8(08/07/03)	no

WARNING: A switchover terminates all open terminal sessions.
To have access to the full output of 'install all', issue the command from a console terminal.

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

+++++

Related Commands

Command	Description
install module bios	Upgrades the supervisor or switching module BIOS.
install module image	Upgrades the supervisor or switching module image.
install module loader	Upgrades the bootloader on the active or standby supervisor or modules.

install license

To program the supervisor or switching module BIOS, use the **install license** command.

```
install license [ bootflash: | slot0: | volatile: ] file-name}}
```

Syntax Description	install license	Upgrades the BIOS for a supervisor or switching module.
	bootflash:	Source location for the license file.
	slot0:	Source location for the license file.
	volatile:	Source location for the license file.
	<i>file-name</i>	The name of the license file.

Defaults None.

Command Modes EXEC mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.2(1).

Usage Guidelines If a target file name is provided after the source URL, the license file is installed with that name. Otherwise, the filename in the source URL is used. This command also verifies the license file before installing it.

Examples The following example installs a file named license-file which resides in the bootflash: directory..

```
switch# install license bootflash:license-file
```


install module bios

To program the supervisor or switching module BIOS, use the **install module bios system** command.

```
install module module-number bios {system [bootflash: | slot0: | volatile: | system-image]}
```

Syntax Description	install module	Upgrades the BIOS for a supervisor or switching module.
	<i>module-number</i>	From slot 1 to 9 in a Cisco MDS 9500 Series switch. From slot 1 to 2 in a Cisco MDS 9200 Series switch.
	bios	Configures the BIOS in the specified module.
	system	Specifies the system image to use (optional). If system is not specified, the current running image is used.
	bootflash:	Source location for internal bootflash memory
	slot0:	Source location for the CompactFlash memory or PCMCIA card.
	volatile:	Source location for the volatile file system.
	<i>system-image</i>	The name of the system or kickstart image.

Defaults None.

Command Modes EXEC mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(3).

Usage Guidelines If the BIOS is upgraded, you need to reboot to make the new BIOS effective. You can schedule the reboot at a convenient time so traffic will not be impacted.

The console baud rate automatically reverts to the default rate (9600) after any BIOS upgrade.

The URL is always the system image URL in the supervisor module, and points to the bootflash: or slot0: directories.

Examples The following example shows how to perform a non disruptive upgrade for the system.

```
switch# install module 1 bios
Started bios programming .... please wait
###
BIOS upgrade succeeded for module 1
```

In this example, the switching module in slot 1 was updated.

install module epld

To upgrade the electrically programmable logical devices (EPLDs) module, use the **install module epld** command. This command is only for supervisor modules, not switching modules.

install module *module-number* **epld** [**bootflash:** | **ftp:** | **scp:** | **sftp:** | **tftp:** | **volatile:**]

Syntax Description

install module	Upgrades the BIOS for a supervisor or switching module.
<i>module-number</i>	Enters the number for the standby supervisor modules or any other line card.
epld	Upgrades the EPLD images on the specified module.
bootflash:	Source location for internal bootflash memory.
ftp	Local/Remote URI containing EPLD Image.
scp	Local/Remote URI containing EPLD Image.
sftp	Local/Remote URI containing EPLD Image.
tftp	Local/Remote URI containing EPLD Image.
volatile:	Source location for the volatile file system.

Defaults

None.

Command Modes

EXEC mode.

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.2(1).

Usage Guidelines

Issue this command from the active supervisor module to update any other module.

If you forcefully upgrade a module that is not online, all EPLDs are forcefully upgraded. If the module is not present in the switch, an error is returned. If the module is present, the command process continues.

Do not insert or extract any modules while an EPLD upgrade or downgrade is in progress.

Examples

The following example upgrades the EPLDs for the module in slot 2.

```
switch# install module 2 epld scp://user@10.6.16.22/users/dino/epld.img

The authenticity of host '10.6.16.22' can't be established.
RSA1 key fingerprint is 55:2e:1f:0b:18:76:24:02:c2:3b:62:dc:9b:6b:7f:b7.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.6.16.22' (RSA1) to the list of known hosts.
user@10.6.16.22's password:
epld.img          100% |*****| 1269 KB    00:00

Module Number          2
EPLD                   Curr Ver    New Ver
-----
Power Manager          0x06
XBUS IO                0x07        0x08
UD chip Fix            0x05
Sahara                 0x05        0x05

Module 2 will be powered down now!!
Do you want to continue (y/n) ? y
\ <-----progress twirl
Module 2 EPLD upgrade is successful
```

The following example forcefully upgrades the EPLDs for the module in slot 2.

```
switch# install module 2 epld scp://user@10.6.16.22/epld-img-file-path

Module 2 is not online, Do you want to continue (y/n) ? y
cchetty@171.69.16.22's password:
epld.img          100% |*****| 1269 KB    00:00
\ <-----progress twirl
Module 2 EPLD upgrade is successful
```

Related Commands

Command	Description
show version module <i>number</i> epld	Displays the current EPLD versions.
show version epld	Displays the available EPLD versions.

install module image

To program the supervisor or switching module image, use the **install module image** command.

install module *module-number* **image kickstart** [**bootflash:** | **slot0:** | **volatile:** | *system-image*]

Syntax Description		
install module		Upgrades the BIOS for a supervisor or switching module.
<i>module-number</i>		Switching modules: From slot 1 to 4 and 7 to 9 in a Cisco MDS 9500 Series switch. For slot 2 in a Cisco MDS 9200 Series switch. Supervisor modules: Slot 5 or 6—only on the active supervisor module in a Cisco MDS 9500 Series switch. Slot 1—upgrades both the supervisor and switching parts of the module in a Cisco MDS 9200 Series switch.
image		Configures the running image if system is not specified.
kickstart		Specifies the kickstart image to use (optional). If the image is not specified, the current running image is used.
bootflash:		Source location for internal bootflash memory
slot0:		Source location for the CompactFlash memory or PCMCIA card.
volatile:		Source location for the volatile file system.
<i>system-image</i>		The name of the system image.

Defaults None.

Command Modes EXEC mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(3).

Usage Guidelines The **install module** command only upgrades the system image on any module (other than the standby supervisor module). If error occur for any switching module, the module is reset and the new image is downloaded for that module.

If you are issuing this command on the supervisor module, follow these requirements:

- Update the environment variables before issuing this command.
- If any errors occur during this process, the switch is reset to guarantee that the system does not continue with a half installed image. In this case, the switch uses the image that was saved in the SYSTEM environment variable prior to this installation procedure.
- Specify the slot number of the active supervisor module. The following example assumes the active supervisor module is in slot 5.

Examples

The following example shows how to perform a non disruptive upgrade for the system.

```
switch# install module 5 image system bootflash:system.img
Beginning the install check...
  bootflash:/system.img and kickstart image...is compatible.
  bootflash:/system.img image...can be upgraded non-disruptively from current.
Preliminary install check done.
Beginning the install process.
  Parsing of versioning database successful.
  Preparing file system plan now...Done.
  Preparing upgrade group plan now...Done.
  Executing pre-uninstall scripts...Done.
  Updating the File System for installation...Done.
  Executing post-install scripts...Done.
  System Manager will restart the services according to upgrade plan..Done.
Installation completed successfully.
```

Related Commands

Command	Description
show version compatibility	Shows the system software that is currently running on the switch

install module loader

To upgrade the bootloader on either the active or standby supervisor module, use the **install module loader** command. This command is only for supervisor modules, not switching modules.

```
install module module-number loader kickstart [bootflash: | slot0: | volatile: | kickstart-image]
```

Syntax Description	install module	Upgrades the BIOS for a supervisor or switching module.
	<i>module-number</i>	Enters the module number for the active or standby supervisor modules (only slot 5 or 6).
	loader	Configures the bootloader.
	kickstart	Specifies the kickstart image to use.
	bootflash:	Source location for internal bootflash memory
	slot0:	Source location for the CompactFlash memory or PCMCIA card.
	volatile:	Source location for the volatile file system.
	<i>kickstart-image</i>	The name of the kickstart image.

Defaults None.

Command Modes EXEC mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(3).

Usage Guidelines Before issuing the **install module loader** command, be sure to read the release notes to verify compatibility issues between the boot loader and the kickstart or system images.

If you install a loader version that is the same as the currently-installed version, the loader will not be upgraded. When both the current version and the installed version are the same, use the **init system** command to force a loader upgrade.

Examples The following example shows how to perform a non disruptive upgrade for the system.

```
switch# install module 6 loader bootflash:kickstart_image
```

This example displays the command being issued on the standby supervisor module in slot 6.

Related Commands	Command	Description
	show version	Verify the output before and after the upgrade.

interface

To configure an interface on the Cisco MDS 9000 Family of switches, use the **interface** command in configuration mode. To disable an interface, use the **no** form of the command.

interface fc | mgmt | port-channel | sup-fc | vsan

no interface fc | mgmt | port-channel | sup-fc | vsan

Syntax Description	fc	Fiber Channel interface. Slot number range is from 1 to 9.
	mgmt	Management interface. Management interface number range is 0-0.
	port-channel	PortChannel interface.
	sup-fc	Inband interface
	vsan	IPFC VSAN interface. VSAN number range is from 1 to 4093.

Defaults Disabled.

Command Modes Configuration mode

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines You can specify a range of interfaces by issuing a command with the following example format:

interface fc1/1 - 5 , fc2/5 - 7

The spaces are required before and after the dash (-) and before and after the comma (,).

Examples The following example displays the options for the interface command.

```
switch## config t
switch(config)# interface ?
  cpp           Virtualization IPFC interface
  fc            Fiber Channel interface
  fc-tunnel     Fc-tunnel interface
  fcip          Fcip interface
  gigabitethernet Ethernet interface
  iscsi        ISCSI interface
  mgmt         Management interface
  port-channel  Port Channel interface
  sup-fc       Inband Interface
  vsan         IPFC VSAN interface
```

Related Commands	Command	Description
	show interface	Displays an interface configuration for a specified interface.

interface fc

To configure a Fibre Channel interface on the Cisco MDS 9000 Family of switches, use the **interface fc** command. To disable a Fibre Channel interface, use the **no** form of the command.

```
interface fc slot_number [channel-group number force] | [fcdomain rcf-reject vsan vsan-id] |
  [fspf cost link_cost vsan vsan-id | dead-interval seconds vsan vsan-id | hello-interval seconds
  vsan vsan-id | passive vsan vsan-id | retransmit-interval seconds vsan vsan-id]
```

Syntax	Description
<i>slot-number</i>	Specifies a slot number and port number.
channel-group	Adds to or removes from a PortChannel.
<i>number</i>	Specify a PortChannel number from 1 to 128.
force	Forcefully adds a port.
exit	Exits from submode.
fcdomain	Enters the interface submode.
rcf-reject	Configures the rcf-reject flag.
vsan	Configures the VSAN range.
<i>vsan-id</i>	The ID of the VSAN is from 1 to 4093.
fspf	Configures FSPF parameters.
cost	Configures FSPF link cost.
<i>link-cost</i>	Enters FSPF link cost 1-65535.
dead-interval	Configures FSPF dead interval.
<i>seconds</i>	Specifies interval in seconds from 1 to 65535.
hello-interval	Configures FSPF hello-interval.
passive	Enables or disables FSPF on the interface.
retransmit-interval	Configures FSPF retransmit interface.
no	Negates a command or sets its defaults.
shutdown	Enables or disables an interface.
switchport	Configures switchport parameters.

Defaults Disabled.

Command Modes Configuration mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines You can specify a range of interfaces by issuing a command with the following example format:
interface space fc 1/1space-space5space,spacefc2/5space-space7

Examples

The following example configures ports 1 to 4 in Fibre Channel interface 9.

```
switch# config t  
Enter configuration commands, one per line. End with CNTL/Z.  
switch(config)# int fc9/1 - 4
```

Related Commands

Command	Description
show interface	Displays an interface configuration for a specified interface.

interface fc-tunnel

To configure a Fibre Channel interface on the Cisco MDS 9000 Family of switches, use the **interface fc** command. To disable a Fibre Channel interface, use the **no** form of the command.

```
interface fc-tunnel number [destination ip-address ] | [explicit-path path-name ] | [source
ip-address ]
```

```
no interface fc-tunnel number [destination ip-address ] | [explicit-path path-name ] | [source
ip-address ]
```

Syntax Description	Command	Description
	fc-tunnel	Configures a FC tunnel.
	<i>number</i>	Specifies a tunnel ID range form 1 to 255.
	destination <i>ip-address</i>	Maps the IP address of the destination switch
	explicit-path <i>path-name</i>	Specifies a name for the explicit path (16 alphanumeric characters).
	source <i>ip-address</i>	Maps the IP address of the source switch

Defaults None.

Command Modes Configuration mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.2(1).

Usage Guidelines None.

Examples The following example initiates the FC tunnel (100) in the source switch (switch S).

```
switchS(config)# interface fc-tunnel 100
switchS(config-if)#
```

The following example maps the IP address of the source switch (switch S) to the FC tunnel (100).

```
switchS(config-if)# source 10.10.10.1
```

The following example maps the IP address of the destination switch (switch D) to the FC tunnel (100).

```
switchS(config-if)# destination 10.10.10.2
```

The following example enables traffic flow through this interface. .

```
switchS(config-if)# no shutdown
```

The following example references the configured path in the source switch (switch S).

```
switchS# config t
switchS(config)# interface fc-tunnel 100
switchS(config)# explicit-path Path1
```

Related Commands	Command	Description
	show interface fc-tunnel	Displays an FC tunnel interface configuration for a specified interface.
	fc-tunnel explicit-path	Configures a new or existing nex-hop path.

interface fcip

To configure a Fibre Channel over IP Protocol (FCIP) interface on the Cisco MDS 9000 Family of switches, use the **interface fcip** command. To disable a FCIP interface, use the **no** form of the command.

```
interface fcip interface_number bport | bport-keepalives | [channel-group number | force] exit |
fcdomain rcf-reject vsan vsan-id | [fspf cost link_cost vsan vsan-id | dead-interval seconds
vsan vsan-id | hello-interval seconds vsan vsan-id | passive vsan vsan-id | retransmit-interval
seconds vsan vsan-id] | no | passive-mode | [peer-info ipaddress address | port number] | |
special-frame peer-wnn pwwn-id | tcp-connection number | [time-stamp | acceptable-diff
number] | use-profile profile-id
```

```
no interface fcip interface_number bport | bport-keepalives | [channel-group number | force]
exit | fcdomain rcf-reject vsan vsan-id | [fspf cost link_cost vsan vsan-id | dead-interval
seconds vsan vsan-id | hello-interval seconds vsan vsan-id | passive vsan vsan-id |
retransmit-interval seconds vsan vsan-id] | no | passive-mode | [peer-info ipaddress address
| port number] | special-frame peer-wnn pwwn-id | tcp-connections number | [time-stamp |
acceptable-diff number] | use-profile profile-id
```

Syntax Description

interface fcip	Selects the FCIP interface to configure.
<i>interface-number</i>	Configures the specified interface from 1 to 255.
bport	Sets the B port mode.
bport-keepalives	Sets the B port keepalive responses.
channel-group	Adds to or removes from a PortChannel.
<i>number</i>	Specifies a PortChannel number from 1 to 128.
force	Forcefully adds a port.
exit	Exits from submode.
fcdomain	Enters the fcdomain mode for this FCIP interface
rcf-reject	Configures the rcf-reject flag.
vsan	Configures the VSAN.
<i>vsan-id</i>	Specifies a VSAN ID from 1 to 4093.
fspf	Configures FSPF parameters.
cost	Configures FSPF link cost.
<i>link-cost</i>	Enters FSPF link cost from 1 to 65535.
dead-interval	Configures FSPF dead interval.
<i>seconds</i>	Specifies interval in seconds from 1 to 65535.
hello-interval	Configures FSPF hello-interval.
passive	Enables or disables FSPF on the interface.
retransmit-interval	Configures FSPF retransmit interface.
vsan <i>vsan-id</i>	Enters FSPF global configuration mode for the specified VSAN or range of VSANs from 1 to 4096. If no VSAN ID is specified, the default VSAN is selected.
no	Negates a command or sets its defaults.
passive-mode	Configures a passive connection.
peer-info	Configures the peer information.

ipaddress	Configures the peer IP address.
<i>address</i>	Enters the IP address.
port	Configures a peer port.
<i>number</i>	Enters the peer port number from 1 to 65535.
shutdown	Enables or disables an interface.
special-frame	Configures special frames.
peer-wwn	Configures the peer WWN for special frames.
<i>pwwn-id</i>	Enters the peer pWWN ID.
switchport	Configures switchport parameters.
tcp-connections	Configures the number of TCP connection attempts.
<i>number</i>	Enters the number of attempts (1 or 2).
time-stamp	Configures time-stamp.
acceptable-diff	Configures the acceptable time difference for time-stamps.
<i>number</i>	Enters the acceptable time from 1 to 60000.
use-profile	Configures the interface using an existing profile.
<i>profile-id</i>	Enters the profile ID to be used from 1 to 255.

Defaults

Disabled

Command Modes

Configuration mode

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.1(1).

Usage Guidelines

You can specify a range of interfaces by issuing a command with the following example format:

interface space fcip space1space-space5space,spacefc2/5space-space7

Examples

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# interface fcip 1
switch(config-if)#
```

Related Commands

Command	Description
show interface fcip	Displays an interface configuration for a specified FCIP interface.

interface fc-tunnel

To configure a Fibre Channel tunnel and facilitate RSPAN traffic in the Cisco MDS 9000 Family of switches, use the **interface fc-tunnel** command. To remove a configured tunnel or revert to factory defaults, use the **no** form of the command.

```
interface fctunnel tunnel-id {destination destination-ip-address | explicit-path path-name |
shutdown | source source-ip-address }
```

```
no interface fctunnel tunnel-id {destination destination-ip-address | explicit-path path-name |
shutdown | source source-ip-address }
```

Syntax Description

<i>tunnel-id</i>	Enters the FC tunnel ID from 1 to 4095.
destination	Maps the IP address of the destination switch to the FC tunnel.
<i>destination-ip-address</i>	Specifies the IP address of the destination switch.
explicit-path	Configures a name for an explicit-path for the FC tunnel.
<i>path-name</i>	Specifies the path name (maximum of 16 alphanumeric characters).
shutdown	Configures traffic flow through the interface.
source	Maps the IP address of the source switch to the FC tunnel.
<i>source-ip-address</i>	Specifies the IP address of the source switch.

Defaults

Disabled

Command Modes

Configuration mode

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.1(1).

Usage Guidelines

None.

Examples

```
switch(config)# interface fc-tunnel 100
switch(config-if)# source 10.10.10.1
switch(config-if)# destination 10.10.10.2
switch(config-if)# no shutdown
```

Related Commands

Command	Description
show interface fc-tunnel	Displays an interface configuration for a specified FC tunnel.

interface fc switchport

To configure an interface on the Cisco MDS 9000 Family of switches, use the **interface** command in configuration mode.

```
interface fc slot-number {switchport beacon | description text | encap eisl | [fcrxbbcredit credit
mode E | Fx] fcrxbbcredit default | switchport [fcrxbufsize size | mode auto (E | F | FL | Fx
| SD | TL)] | speed (1000 | 2000 | auto) | trunk allowed vsan vsan-id] | add [vsan number | all]
| mode [auto | off | on]}
```

```
no interface fc slot-number {switchport beacon | description text | encap eisl | [fcrxbbcredit
credit mode E | Fx] fcrxbbcredit default | switchport [fcrxbufsize size | mode auto (E | F |
FL | Fx | SD | TL)] | speed (1000 | 2000 | auto) | trunk allowed vsan vsan-id] | add [vsan
number | all] | mode [auto | off | on]}
```

Syntax	Description
interface	Selects an interface to configure.
fc	Fiber Channel interface. Slot number range is 1-9.
<i>slot-number</i>	Specifies a slot number and port number.
switchport	Configure switchport parameters
beacon	Disable/enable the beacon for an interface
description	Enter description of maximum 80 characters
<i>text</i>	Description text of maximum 80 characters (Max Size - 80)
encap	Configure encapsulation for the port
eisl	EISL encapsulation
fcrxbbcredit	Configure receive BB_credit for the port
<i>credit</i>	Enter receive BB_credit 1-255
mode	Configure receive BB_credit for specific mode
E	Configure receive BB_credit for E or TE mode
Fx	Configure receive BB_credit for F or FL mode
default	Default receive BB_credit
fcrxbufsize	Configure receive data field size for the port
<i>size</i>	Enter receive data field size 256-2112
mode	Enter the port mode
auto	Autosense mode
E	E port mode
F	F port mode
FL	FL port mode
Fx	Fx port mode
SD	SD port mode
TL	TL port mode
speed	Enter the port speed
1000	1000 Mbps speed
2000	2000 Mbps speed

auto	Autosense speed
trunk	Configure trunking parameters on an interface
allowed	Configure allowed list for interface(s)
add	Give VSAN id range to add to allowed vsan list
all	Add all the VSANs to allowed VSAN list
mode	Configure trunking mode
auto	Autosense trunking for an interface
off	Disable trunking for an interface
on	Enable trunking for an interface

Defaults

Disabled

Command Modes

Configuration mode

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines

You can specify a range of interfaces by issuing a command with the following example format:

```
interface space fc1/1space-space5space,spacefc2/5space-space7
```

Examples

The following example changes to Configuration mode, configures a Fibre Channel interface, and configures switchport mode E for the specified BB credit.

```
switch## config t
switch(config)# interface fc1/1
switch(config-if)# switchport fcrxbbcredit 2 mode E
```

Related Commands

Command	Description
show interface	Displays an interface configuration for a specified interface.

interface mgmt

To configure a management interface on the Cisco MDS 9000 Family of switches, use the **interface mgmt** command in configuration mode. Use the **no** form of this command to negate the command or return it to its factory defaults.

interface mgmt *number* | **ip** | **shutdown** *force* | **switchport** **description** *text* [**vrrp** *vrrp_id*]

nointerface mgmt *number* | **ip** | **shutdown** *force* | **switchport** **description** *text* [**vrrp** *vrrp_id*]

Syntax Description

<i>number</i>	Specifies the management interface number which is 0.
ip	IP address of the interface.
shutdown	Enables the interface.
<i>force</i>	Forces the management 0 interface to shutdown without a confirmation.
switchport	Configure switchport parameters
description	Enter description of maximum 80 characters
<i>text</i>	Description text of maximum 80 characters (Max Size - 80)
vrrp	Configure vrrp on this interface
<i>vrrp_id</i>	Enters VRRP id.

Defaults

Disabled.

Command Modes

Configuration mode. Issue **interface mgmt** commands from the config-interface (config-if) mode.

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines

When you try to shutdown a management interface(mgmt0), a follow-up message confirms your action before performing the operation. Use the **force** option to bypass this confirmation, if required.

Examples

The following example configures the management interface, displays the options available for the configured interface, and exits to configuration mode.

```
switch## conf t
switch(config)##
switch(config)# interface mgmt 0
switch(config-if)# ?
Interface configuration commands:
  exit          Exit from this submode
  ip            [no] ip address
  no           Negate a command or set its defaults
  shutdown     Enable/disable an interface
  switchport   Configure switchport parameters
  vrrp         [no] vrrp vr_id: Configure vrrp on this interface

switch(config-if)# exit
switch(config)#
```

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

```
switch# conf t
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# conf t
switch(config-if)# shutdown force
```

Related Commands

Command	Description
show interface mgmt	Displays interface configuration for specified interface.

interface port-channel

To configure a port channel interface on the Cisco MDS 9000 Family of switches, use the **interface port-channel** command.

```
interface port-channel number [fcdomain rcf-reject vsan vsan-id] | fspf [cost link_cost | dead-interval seconds | hello-interval seconds | passive | retransmit-interval seconds] | shutdown | switchport
```

```
no interface port-channel number [fcdomain rcf-reject vsan vsan-id] | fspf [cost link_cost | dead-interval seconds | hello-interval seconds | passive | retransmit-interval seconds] | shutdown | switchport
```

Syntax Description		
interface	Selects an interface to configure.	
port-channel	Configure port channel parameters	
<i>number</i>	Enter PortChannel number 1-128	
fcdomain	Enter the interface submodule	
rcf-reject	Configure the rcf-reject flag	
vsan	Specify the vsan range	
<i>vsan-id</i>	The ID of the VSAN is from 1 to 4093.	
fspf	Configure FSPF parameters	
cost	Configure FSPF link cost	
<i>link_cost</i>	Enter FSPF link cost 1-65535	
dead-interval	Configure FSPF dead interval	
<i>seconds</i>	Enter dead interval (in sec) 2-65535	
hello-interval	Configure FSPF hello-interval	
<i>seconds</i>	Enter hello interval (in sec) 1-65535	
passive	Enable/disable FSPF on the interface	
retransmit-interval	Configure FSPF retransmit interface	
<i>seconds</i>	Enter retransmit interval (in sec) 1-65535	
no	Negate a command or set its defaults	
shutdown	Enable/disable an interface	
switchport	Configure switchport parameters	

Defaults Disabled

Command Modes Configuration mode

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

■ interface port-channel

Usage Guidelines None.

Examples The following example enters configuration mode and configures a PortChannel interface.

```
switch## config t
switch(config)##
switch(config)# interface port-channel 32
switch(config-if)#
```

Related Commands

Command	Description
show interface	Displays interface configuration for specified interface.

interface vsan

To configure a VSAN interface on the Cisco MDS 9000 Family of switches, use the **interface vsan** command.

```
interface vsan vsan-id exit [ip | no ip] no | shutdown | [vrrp | no vrrp vr_id]
```

Syntax Description

interface	Selects an interface to configure.
vsan	IPFC VSAN interface. VSAN number range is 1-4093.
<i>vsan-id</i>	VSAN id range 1-4093
no	Negate a command or set its defaults
shutdown	Enable/disable an interface
ip	ip address
shutdown	Enable/disable an interface
vrrp	Configure vrrp on this interface
<i>vr_id</i>	Enter vrrp id

Defaults

Disabled.

Command Modes

Configuration mode.

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines

None.

Examples

The following example configures a VSAN interface.

```
switch(config)# interface vsan 1
switch(config-if)#
```

Related Commands

Command	Description
show interface	Displays interface configuration for specified interface.

ip access-group

To create an access group to use an access list, use the **ip access-group** command in interface mode. Use the **no** form of this command to negate a previously issued command or revert to factory defaults.

ip access-group *group-name* [**in** | **out**]

Syntax Description		
ip access-group		Specifies the IP access-group .
<i>group-name</i>		Identifies the IP access-group name with a limit of 29 alphanumeric characters, case insensitive.
in		Specifies that the group is for ingress traffic.
out		Specifies that the group is for egress traffic.

Defaults Groups are created for both ingress and egress traffic.

Command Modes Interface mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.2(1).

Usage Guidelines The access-group command controls access to an interface. Each interface can only be associated with one access list. The access group becomes active on creation.

We recommend creating all rules in an access list, before creating the access group that uses this access-list.

If you create an access group before an access-list, all packets in that interface are dropped, because the access list is empty.

The access-group configuration for the ingress traffic applies to both local and remote traffic. The access-group configuration for the egress traffic applies only to local traffic. You can create a different access-group for each type of traffic.

Examples The following example creates an access group called SampleName for both the ingress and egress traffic (default)

```
switch(config-if)# ip access-group SampleName
```

The following example deletes the access group called NotRequired.

```
switch(config-if)# no ip access-group NotRequired
```

The following example creates an access group called SampleName (if it does not already exist) for ingress traffic.

```
switch(config-if)# ip access-group SampleName1 in
```

The following example deletes the access group called SampleName for ingress traffic.

```
switch(config-if)# no ip access-group SampleName1 in
```

The following example creates an access group called SampleName (if it does not already exist) for local egress traffic.

```
switch(config-if)# ip access-group SampleName2 out
```

The following example deletes the access group called SampleName for local egress traffic.

```
switch(config-if)# no ip access-group SampleName2 out
```

Related Commands

Command	Description
ip access-list	Configures IP access control lists.
show ip access-list	Displays the IP-ACL configuration information.

ip access-list

To configure IP access control lists (ACL), use the **ip access-list** command in configuration mode. Use the **no** form of this command to negate a previously issued command or revert to factory defaults.

```
ip access-list list-number [ deny | permit ] ip-protocol source source-wildcard [ operator
port-value ] destination destination-wildcard [ operator port port-value ] [ icmp-type
icmp-value ] [ established ] [ precedence precedence-value ] [ tos tos-value ] [ log ]
```

Syntax	Description
ip access-list	Specifies the IP access-list .
<i>list-number</i>	Identifies the IP-ACL with an integer ranging from 1 to 256.
deny	Denies access if the conditions match.
permit	Provides access if the conditions match.
<i>ip-protocol</i>	Specifies the name or number (integer range from 0 to 255) of an IP protocol. The IP protocol name can be EIGRP, GRE, ICMP, IGMP, IGRP, IP, IPINIP, NOS, OSPF, PIM, TCP, or UDP.
<i>source</i>	Specifies the network from which the packet is sent. There are two ways to specify the source: <ul style="list-style-type: none"> • A 32-bit quantity in four-part, dotted-decimal format • A keyword any as an abbreviation for a destination and destination-wildcard of 0.0.0.0 255.255.255.255
<i>source-wildcard</i>	Applies the wildcard bits to the source. Each wildcard bit set to zero indicates that the corresponding bit position in the packet's IP address must exactly match the bit value in the corresponding position of the packet's ip address will be considered a match to this access list. There are two ways to specify the destination wildcard: <ul style="list-style-type: none"> • A 32-bit quantity in four-part, dotted-decimal format • A keyword any as an abbreviation for a destination and destination-wildcard of 0.0.0.0 255.255.255.255
<i>destination</i>	Specifies the network from which the packet is sent. There are two ways to specify the destination: <ul style="list-style-type: none"> • A 32-bit quantity in four-part, dotted-decimal format • A keyword any as an abbreviation for a destination and destination-wildcard of 0.0.0.0 255.255.255.255
<i>destination-wildcard</i>	Applies the wildcard bits to the destination. There are two ways to specify the destination wildcard: <ul style="list-style-type: none"> • A 32-bit quantity in four-part, dotted-decimal format • A keyword any as an abbreviation for a destination and destination-wildcard of 0.0.0.0 255.255.255.255
<i>operator</i>	Compares source or destination ports. and has the following options: eq = equal neq = not equal

<i>port-value</i>	<p>Specifies the decimal number (ranges from 0 to 65535) or one of the following names to indicate a TCP or UDP port.</p> <p>The TCP port names are: bgp, chargen, daytime, discard, domain, echo, finger, ftp, ftp-data, gopher, hostname, irc, klogin, kshell, lpd, nntp, pop2, pop3, smtp, sunrpc, syslog, tacacs-ds, talk, telnet, time, uucp, whois, or www.</p> <p>The UDP port names are, biff, bootpc, bootps, discard, dns, dnsiz, echo, mobile-ip, nameserver, netbios-dgm, netbios-ns, ntp, rip, snmp, snmptrap, sunrpc, syslog, tacacs-ds, talk, tftp, time, who, or xdmcp.</p>
icmp-type <i>icmp-value</i>	Filters ICMP packets by ICMP message type (a number from 0 to 255).
established	Indicates an established connection for the TCP protocol. A match occurs if the TCP datagram has the ACK, FIN, PSH, RST, SYN or URG control bits set. The non matching case is that of the initial TCP datagram to form a connection.
precedence <i>precedence-value</i>	Filters packets by precedence level (a number from 0 to 7), or the following names: critical, flash, flash-override, immediate, internet, network, priority, or routine.
tos <i>tos-value</i>	Filters packets by type of service level (a number from 0 to 15), or the following names: max-reliability, max-throughput, min-delay, min-monetary-cost, or normal
log	Sends an information logging message to the console about the packet that matches the entry.

Defaults

Denied.

Command Modes

Configuration mode.

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.2(1).

Usage Guidelines

Using the **log-deny** option at the end of the individual ACL entries shows the ACL number and whether the packet was permitted or denied, in addition to port-specific information. This option causes an information logging message about the packet that matches the dropped entry (or entries).

Examples

The following example configures the an IP-ACL called List 1 and permits IP traffic from any source address to any destination address

```
switch# config t
switch(config)# ip access-list List1 permit ip any any
```

The following example removes the IP-ACL called List 1.

```
switch# config t
switch(config)# no ip access-list List1 permit ip any any
```

The following example updates List 1 to deny TCP traffic from any source address to any destination address.

```
switch# config t
switch(config)# ip access-list List1 deny tcp any any
```

The following example defines an IP-ACL that permits this network. Subtracting 255.255.248.0 (normal mask) from 255.255.255.255 yields 0.0.7.255.

```
switch# config t
switch(config)# ip access-list List1 permit udp 192.168.32.0 0.0.7.255
```

The following example permits all IP traffic from and to the specified networks.

```
switch# config t
switch(config)# ip access-list List1 permit ip 10.1.1.0 0.0.0.255 172.16.1.0 0.0.0.255
```

The following example denies TCP traffic from 1.2.3.0 through source port 5 to any destination.

```
switch# config t
switch(config)# ip access-list List2 deny tcp 1.2.3.0 0.0.0.255 eq port 5 any
```

The following example removes this entry from the IP-ACL.

```
switch# config t
switch(config)# no ip access-list List2 deny tcp 1.2.3.0 0.0.0.255 eq port 5 any
```

The following example creates an access group called SampleName for both the ingress and egress traffic (default).

```
switch# config t
switch(config)# interface mgmt0
switch(config-if)# ip access-group SampleName
```

The following example deletes the access group called NotRequired.

```
switch# config t
switch(config)# interface mgmt0
switch(config-if)# no ip access-group SampleName
```

The following example creates an access group called SampleName (if it does not already exist) for ingress traffic.

```
switch# config t
switch(config)# interface mgmt0
switch(config-if)# ip access-group SampleName1 in
```

Related Commands

Command	Description
show ip access-list	Displays the IP-ACL configuration information.

ip address

To assign the local IP address of a Gigabit Ethernet interface to the FCIP profile, use the **ip address** command.

ip address *address*

no ip address *address*

Syntax Description	Command	Description
	ip address	Configures the peer IP address.
	<i>address</i>	Enters the IP address.

Defaults Disabled

Command Modes Configuration mode—fcip profile submode

Command History This command was introduced in Cisco MDS SAN-OS Release 1.1(1).

Usage Guidelines To create a FCIP profile, you must assign a local IP address of a Gigabit Ethernet interface to the FCIP profile.

Examples

```
switch## config t
switch(config)# fcip profile 5
switch(config-profile)# ip address 10.5.1.1
```

Related Commands	Command	Description
	show fcip profile	Displays information about the FCIP profile.
	interface fcip <i>interface_number</i> use-profile <i>profile-id</i>	Configures the interface using an existing profile ID from 1 to 255.
	show interface fcip	Displays an interface configuration for a specified FCIP interface.

ip default-gateway

To configure the IP address of the default gateway, use the **ip default-gateway** command. To disable the IP address of the default gateway, use the **no** form of the command.

ip default-gateway *destination-ip-address*

no ip default-gateway *destination-ip-address*

Syntax Description	<i>destination-ip-address</i> Specifies the IP address,				
Defaults	None.				
Command Modes	Configuration mode.				
Command History	This command was introduced in Cisco MDS SAN-OS Release 1.0(2).				
Usage Guidelines	None.				
Examples	<p>The following examples configures the IP default gateway to 1.1.1.4.</p> <pre>switch## config t switch(config)## switch(config)# ip default-gateway 1.1.1.4 switch(config)#</pre>				
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show ip route</td> <td>Displays the IP address of the default gateway.</td> </tr> </tbody> </table>	Command	Description	show ip route	Displays the IP address of the default gateway.
Command	Description				
show ip route	Displays the IP address of the default gateway.				

ip default-network

To configure the IP address of the default network, use the **ip default-network** command in configuration mode. To disable the IP address of the default network, use the **no** form of the command.

ip default-network *ip-address*

no ip default-network *ip-address*

Syntax Description	<i>ip-address</i> Specifies the IP address of the default network.
Defaults	None.
Command Modes	Configuration mode.
Command History	This command was introduced in Cisco MDS SAN-OS Release 1.0(2).
Usage Guidelines	None.
Examples	<p>The following examples configures the IP address of the default network to 1.1.1.4.</p> <pre>switch## config t switch(config)## switch(config)# ip default-network 1.1.1.4 switch(config)#</pre>

ip domain-list

To configure the IP domain list, use the **ip domain-list** command in configuration mode. To disable the IP domain list, use the **no** form of the command.

ip domain-list *domain-name*

no ip domain-list *domain-name*

Syntax Description	<i>domain-name</i>	Specifies the domain name for the IP domain list.
--------------------	--------------------	---

Defaults	None.
----------	-------

Command Modes	Configuration mode.
---------------	---------------------

Command History	This command was introduced in Cisco MDS SAN-OS Release 1.0(2).
-----------------	---

Usage Guidelines	None.
------------------	-------

Examples	The following example configures the IP domain list.
----------	--

```
switch## config t
switch(config)##
switch(config)# ip domain domain name
switch(config)#
```

ip domain-lookup

To enable the DNS server lookup feature, use the **ip domain-lookup** command in configuration mode. Use the **no** form of this command to disable this feature.

ip domain-lookup

Syntax Description

This command has no arguments or keywords.

Defaults

None.

Command Modes

Configuration mode.

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines

Instead of IP addresses, you can configure the switch using meaningful names. The configured name automatically looks up the corresponding IP address.

Examples

The following example configures a DNS server domain name.

```
switch## config t
switch(config)##
switch(config) # ip domain-lookup
switch(config) #
```

ip domain-name

To configure a domain name, use the **ip domain-name** command in configuration mode.

ip domain-name *domain name*

Syntax Description	<i>domain-name</i> Specifies the domain name.
Defaults	None.
Command Modes	Configuration mode.
Command History	This command was introduced in Cisco MDS SAN-OS Release 1.0(2).
Usage Guidelines	None.
Examples	<p>The following example configures a domain name.</p> <pre>switch## config t switch(config)## switch(config)# ip domain-name <i>domain name</i> switch(config)#</pre>

ip name-server

To configure a name server, use the **ip name-server** command in configuration mode.

ip name-server *ip-address*

Syntax Description	<i>ip-address</i>	Specifies the IP address for the name server.
---------------------------	-------------------	---

Defaults	None.
-----------------	-------

Command Modes	Configuration mode.
----------------------	---------------------

Command History	This command was introduced in Cisco MDS SAN-OS Release 1.0(2).
------------------------	---

Usage Guidelines	You can configure a maximum of six servers. By default, no server is configured.
-------------------------	--

Examples	The following example configure a name server with an IP address of 1.1.1.4.
-----------------	--

```
switch## config t
switch(config)# ip name-server 1.1.1.4
```

The following example specifies the first address (15.1.0.1) as the primary server and the second address (15.2.0.0) as the secondary sever.

```
switch(config)# ip name-server 15.1.0.1 15.2.0.0
```

The following example deletes the configured server(s) and reverts to factory default.

```
switch(config)# no ip name-server
```

ip route

To configure a static route, use the **ip route** command in configuration mode.

```
ip route ip-address subnet-mask [nexthop_ip-address] [ interface (mgmt 0 | vsan number) ]
[distance distance-number]
```

Syntax Description		
<i>ip-address</i>		Specifies the IP address for the route.
<i>subnet-mask</i>		Specifies the subnet mask for the route.
<i>nexthop_ip-address</i>		Specifies the IP address of the next hop switch.
interface		Configures the interface associated with the route.
mgmt 0		Specifies the management interface (mgmt 0).
vsan		Specifies a VSAN interface.
<i>number</i>		Specifies the VSAN interface number.
distance		Configures the distance metric for this route.
<i>distance-number</i>		Specifies the distance metric for this route. It can be from 0 to 32766.

Defaults None.

Command Modes Configuration mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines None.

Examples The following examples shows how to configure a static route.

```
switch## config t
switch(config)##
switch(config)# IP route 10.0.0.0 255.0.0.0 20.20.20.10 distance 10 interface vsan 1
switch(config)#
```

Related Commands	Command	Description
	show ip route	Displays the IP address routes configured in the system.

ip routing

To enable the IP forwarding feature, use the **ip routing** command in configuration mode.

ip routing

Syntax Description This command has no arguments or keywords.

Defaults Disabled.

Command Modes Configuration mode.

Command History This command was introduced in Cisco MDS SAN-OS Release 1.0(2).

Usage Guidelines None.

Examples The following example enables the IP forwarding feature.

```
switch## config t
switch(config)##
switch(config) # ip routing
switch(config) #
```

iscsi authentication

Use the **iscsi authentication** command to configure the default authentication method for iSCSI.

iscsi authentication chap | none

no iscsi authentication chap | none

Syntax Description

iscsi	Configures iSCSI parameters.
authentication	Configures the global iSCSI authentication level.
chap	Configures the Challenge Handshake Authentication Protocol (CHAP) authentication method.
none	Specifies that no authentication is required for the selected interface

Defaults

CHAP or none.

Command Modes

Configuration mode

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.1(1).

Usage Guidelines

By default, the MDS switch accepts an iSCSI initiator with either no authentication or CHAP authentication. If CHAP authentication is always required, use the **iscsi authentication chap** command. If no authentication is always required, use the **iscsi authentication none** command. To change back to the default setting use the **no iscsi authentication** command.

Examples

```
switch## config t
switch(config)# iscsi authentication chap
switch(config)# iscsi authentication none
```

Related Commands

Command	Description
show iscsi global	Displays all iSCSI initiators configured by the user..

iscsi import target fc

To allow dynamic mapping of Fibre Channel targets, use the **iscsi import target fc** command.

iscsi import target fc

no iscsi import target fc

Syntax Description	iscsi	Configures iSCSI parameters.
	import	Imports Fibre Channel targets to iSCSI domains.
	targets	Configures targets to import to the iSCSI domain.
	fc	Specifies Fibre Channel targets.

Defaults Disabled

Command Modes Configuration mode

Command History This command was introduced in Cisco MDS SAN-OS Release 1.1(1).

Usage Guidelines This command directs iSCSI to dynamically import all Fibre Channel targets into iSCSI.

Examples

```
switch## config t
switch(config)# iscsi import target fc
switch(config)# no iscsi import target fc
```

Related Commands	Command	Description
	show iscsi global	Displays all iSCSI initiators configured by the user..

iscsi initiator ip address

To assign persistent WWNs to an iSCSI initiator or assign an iSCSI initiator into VSANs other than the default VSAN, use the **iscsi initiator ip address** command.

```
iscsi initiator ip address ipaddress [static (nwwn wwn-id | pwwn wwn-id) | system-assign number ] | vsan vsan-id ]
```

```
no iscsi initiator ip address ipaddress [static (nwwn wwn-id | pwwn wwn-id) | system-assign number] | vsan vsan-id ]
```

Syntax Description		
iscsi		Configures iSCSI parameters.
initiator		Configures the iSCSI initiator node name.
ip address <i>ipaddress</i>		Configures the specified initiator IP address.
exit		Exits from submode.
nwwn		Configures the initiator node WWN hex value.
pwwn		Configures the peer WWN for special frames.
<i>wwn-id</i>		Enters the pWWN or nWWN ID.
system-assign <i>number</i>		Generates the nWWN value automatically. The number ranges from 1 to 64.
vsan		Configures the VSAN.
<i>vsan-id</i>		Specifies a VSAN ID from 1 to 4093.

Defaults Disabled

Command Modes Configuration mode—iSCSI-initiator submode

Command History This command was introduced in Cisco MDS SAN-OS Release 1.1(1).

Usage Guidelines Under a circumstance where an iSCSI initiator needs to have a persistent binding to FC WWNs, this command should be used. Also, an iSCSI initiator can be put into multiple VSANs. An iSCSI host can become a member of one or more VSANs.

Examples The following command configures an iSCSI initiator. using the IP address of the initiator node.

```
switch(config)# iscsi initiator ip address 10.50.1.1
```

The following command deletes the configured iSCSI initiator.

```
switch(config)# no iscsi initiator ip address 10.5.0.0
```

The following command uses the switch's WWN pool to allocate the nWWN for this iSCSI initiator and keeps it persistent.

```
switch(config-(iscsi-init))# static nwwn system-assign
```

The following command assigns the user provided WWN as nWWN for the iSCSI initiator. You can only specify one nWWN for each iSCSI node.

```
switch(config-(iscsi-init))# nWWN 20:00:00:05:30:00:59:11
```

The following command uses the switch's WWN pool to allocate two pWWNs for this iSCSI initiator and keeps it persistent.

```
switch(config-(iscsi-init))# static pWWN system-assign 2
```

The following command assigns the user provided WWN as pWWN for the iSCSI initiator.

```
switch(config-(iscsi-init))# pWWN 21:00:00:20:37:73:3b:20
```

Related Commands

Command	Description
show iscsi initiator	Displays information about configured iSCSI initiators.

iscsi initiator name

To assign persistent WWNs to an iSCSI initiator or assign an iSCSI initiator into VSANs other than the default VSAN, use the **iscsi initiator name** command.

iscsi initiator name *name* [**static** (**nwwn** *wwn-id* | **pwwn** *wwn-id*) | **system-assign**] | **vsan** *vsan-id*]

no iscsi initiator name *name* [**static** (**nwwn** *wwn-id* | **pwwn** *wwn-id*) | **system-assign**] | **vsan** *vsan-id*]

Syntax Description

iscsi	Configures iSCSI parameters.
initiator	Configures the iSCSI initiator node name.
name	Configures the initiator node name.
<i>name</i>	Enters the initiator name to be used from 1 to 255 characters. The minimum length is 16 characters.
exit	Exits from submode.
nwwn	Configures the initiator node WWN hex value.
pwwn	Configures the peer WWN for special frames.
<i>wwn-id</i>	Enters the pWWN or nWWN ID.
system-assign	Generates the nWWN value automatically.
vsan	Configures the VSAN.
<i>vsan-id</i>	Specifies a VSAN ID from 1 to 4093.

Defaults

Disabled

Command Modes

Configuration mode—iSCSI-initiator submode

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.1(1).

Usage Guidelines

Under a circumstance where an iSCSI initiator needs to have a persistent binding to FC WWNs, this command should be used. Also, an iSCSI initiator can be put into multiple VSANs. An iSCSI host can become a member of one or more VSANs.

Examples

The following command configures an iSCSI initiator using the iSCSI name of the initiator node.

```
switch(config)# iscsi initiator name iqn.1987-02.com.cisco.initiator
```

The following command deletes the configured iSCSI initiator.

```
switch(config)# no iscsi initiator name iqn.1987-02.com.cisco.initiator
```


The following command configures an iSCSI initiator, using the IP address of the initiator node.

```
switch(config)# iscsi initiator ip-address 10.50.0.0
```

The following command deletes the configured iSCSI initiator.

```
switch(config)# no iscsi initiator ip-address 10.50.0.0
```

The following command uses the switch's WWN pool to allocate the nWWN for this iSCSI initiator and keeps it persistent.

```
switch(config-(iscsi-init))# static nWWN system-assign
```

The following command assigns the user provided WWN as nWWN for the iSCSI initiator. You can only specify one nWWN for each iSCSI node.

```
switch(config-(iscsi-init))# nWWN 20:00:00:05:30:00:59:11
```

The following command uses the switch's WWN pool to allocate two pWWNs for this iSCSI initiator and keeps it persistent.

```
switch(config-(iscsi-init))# static pWWN system-assign 2
```

The following command assigns the user provided WWN as pWWN for the iSCSI initiator.

```
switch(config-(iscsi-init))# pWWN 21:00:00:20:37:73:3b:20
```

Related Commands

Command	Description
show iscsi initiator	Displays information about configured iSCSI initiators.

iscsi virtual-target name

To create a static iSCSI virtual target, use the **iscsi virtual-target** command.

iscsi virtual-target name *name* [**advertise interface gigabitethernet** *interface-number* | **initiator name** *initiator-name* | **pwwn** *pwwn-id* (**secondary-pwwn** *secondary pwwn-id* | **fc-lun** *number* | **iscsi-lun** *number* | **name** *initiator-name*) | **ip-address** *ip-address* (*ip-subnet*) **permit**

no iscsi virtual-target name *name* [**advertise interface gigabitethernet** *interface-number* | **initiator name** *initiator-name* | **pwwn** *pwwn-id* (**secondary-pwwn** *secondary pwwn-id* | **fc-lun** *number* | **iscsi-lun** *number* | **name** *initiator-name*) | **ip-address** *ip-address* (*ip-subnet*) **permit**

Syntax Description

iscsi	Configures iSCSI parameters.
virtual-target	Configures the iSCSI virtual target name.
name	Configures the virtual target name.
<i>name</i>	Enters the virtual target name to be used from 1 to 255 characters.
advertise	Advertises the virtual target name on the specified interface.
interface gigabitethernet	Selects the Gigabit Ethernet interface to configure.
<i>interface-number</i>	Configures the specified interface from 1 to 255.
initiator	Allows the iSCSI initiator to access a specified target.
name	Configures the iSCSI initiator name.
<i>initiator-name</i>	Enters the initiator name to be used from 1 to 255 characters.
ip-address	Configures the iSCSI initiator's IP address.
<i>ip-address</i>	Enters the initiator IP address.
<i>ip-subnet</i>	Configures all initiators in the subnet.
permit	Permits access to the specified target.
pwwn	Configures the peer WWN for special frames.
<i>pwwn-id</i>	Enters the peer pWWN ID.
secondary-pwwn	Enters the secondary pWWN ID
<i>secondary pwwn-id</i>	Enters the peer pWWN ID.
fc-lun number	Specifies the Fibre Channel Logical Unit Number
iscsi-lun number	Specifies the iSCSI virtual target number

Defaults

Disabled

Command Modes

Configuration mode.

Command History

This command was introduced in Cisco MDS SAN-OS Release 1.1(1).

Usage Guidelines

This command is used to configure a static iSCSI target for access by iSCSI initiators. A virtual target may contain a subset of LUs of an FC target or one whole FC target.

Don't specify the LUN if you wish to map the whole Fibre Channel target to an iSCSI target. All Fibre Channel LUN targets are exposed to iSCSI.

One iSCSI target cannot contain more than one Fibre Channel target.

Examples

```
switch## config t

switch(config)# iscsi virtual-target name abc123
switch(config-(iscsi-tgt))# ?
ISCSI Virt-tgt Configuration:
  advertise  Advertise virtual target on interfaces specified
  exit       Exit from this submode
  initiator  Allow iSCSI initiator access to this target
  no         Negate a command or set its defaults
  pWWN      Enter the pWWN of the fc-target
```

The following command advertises the virtual target only on the specified interface. By default, it is advertised on all interfaces in all IPS modules

```
switch(config-(iscsi-tgt))# advertise interface gigabitethernet 4/1
```

The following command maps a virtual target node to a Fibre Channel target.

```
switch(config-(iscsi-tgt))# pwwn 26:00:01:02:03:04:05:06
```

The following command enters the secondary pWWN for the virtual target node.

```
switch(config-(iscsi-tgt))# pwwn 26:00:01:02:03:04:05:06 secondary-pwwn
66:00:01:02:03:04:05:02
```

Use the LUN option to map different Fibre Channel LUNs to different iSCSI virtual targets. If you have already mapped the whole Fibre Channel target, you will not be able to use this option.

```
switch(config-(iscsi-tgt))# pwwn 26:00:01:02:03:04:05:06 fc-lun 0 iscsi-lun 0
```

The following command allows the specified iSCSI initiator node to access this virtual target. You can issue this command multiple times to allow multiple initiators.

```
switch(config-(iscsi-tgt))# initiator iqn.1987-02.com.cisco.initiator1 permit
```

The following command prevents the specified initiator node from accessing virtual targets.

```
switch(config-(iscsi-tgt))# no initiator iqn.1987-02.com.cisco.initiator1 permit
```

The following command allows the specified IP address to access this virtual target:

```
switch(config-(iscsi-tgt))# initiator ip address 10.50.1.1 permit
```

The following command prevents the specified IP address from accessing virtual targets:

```
switch(config-(iscsi-tgt))# no initiator ip address 10.50.1.1 permit
```

The following command allows all initiators in this subnet to access this virtual target:

```
switch(config-(iscsi-tgt))# initiator ip address 10.50.0.0 255.255.255.0 permit
```

iscsi virtual-target name

The following command prevents all initiators in this subnetwork from accessing virtual targets:

```
switch(config-(iscsi-tgt))# no initiator ip address 10.50.0.0 255.255.255.0 permit
```

The following command allows all initiator nodes to access this virtual target.

```
switch(config-(iscsi-tgt))# all-initiator-permit
```

The following command prevents any initiator node from accessing virtual targets.

```
switch(config-(iscsi-tgt))# no all-initiator-permit
```

Related Commands

Command	Description
show iscsi virtual target	Displays information about iSCSI virtual targets.