



F Commands

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failover eligibility

To enable failover by eligibility for all SCSI routing instances running on the storage router, use the **failover eligibility** command. To disable failover by eligibility, use the **no** form of this command.

failover eligibility on

no failover eligibility on

Syntax Description	on	Keyword used to enable failover by eligibility for all SCSI routing instances running on the storage router.
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Defaults Failover by eligibility is enabled.

Command Modes Administrator mode.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines Each storage router in a cluster maintains and exchanges information about available resources. Failover by eligibility is enabled by default; HA bases the decision to automatically fail over a SCSI routing instance to another node in a cluster based on the Fibre Channel and other resources available to that SCSI routing instance.

Failover occurs when:

- All mapped targets are unavailable or a critical resource for the SCSI routing instance is unavailable, and some or all mapped targets would be available from another node in the cluster. A critical resource can be a configured Gigabit Ethernet interface, a required Fibre Channel interface, or an internal resource needed to run the SCSI routing instance.
- Some mapped targets are unavailable and all mapped targets are available on another node in the cluster.
- All mapped targets are available, but another node in the cluster also has all targets available and is designated at the primary for the SCSI routing instance.
- The storage router stops receiving heartbeats from another node within the cluster.

For more manual control over where a SCSI routing instance runs, use the **no failover eligibility on** command to prevent failover by eligibility on a storage router. If a SCSI routing instance is running on (or fails over to) a storage router that is configured with failover by eligibility turned off, it will continue running on that storage router unless there are no mapped targets available or a critical resource is unavailable.

Use the **failover eligibility on** command to restore normal failover functions.

The failover eligibility setting is not retained across a reboot; restarting the storage router restores the default setting (failover by eligibility is enabled).

Examples

The following example disables failover by eligibility for all SCSI routing instances running on the storage router named SN 5428-2A:

```
[SN5428-2A] no failover eligibility on
```

Related Commands

Command	Description
failover scsirouter	Cause the named SCSI routing instance to cease running on the storage router.
show ha	Display HA operational statistics for the storage router or for a specific application.
show scsirouter	Display configuration and operational information for the named SCSI routing instance.

failover scsirouter

To cause the named SCSI routing instance to cease running on this storage router and start running on another storage router in the cluster, use the **failover scsirouter** command.



Note

If no eligible storage router is found, the SCSI routing instance will start running again on the same node. If the storage router is configured as a standalone system, failover is not allowed.

failover scsirouter *name* [**pri** | **sec** | **to** *systemname*]

failover scsirouter **all** [**to** *systemname*]

Syntax Description

<i>name</i>	The name of the SCSI routing instance to be failed over.
all	Failover all instances currently running on this storage router.
pri	(Optional) Force failover to the designated primary storage router on the failover list.
sec	(Optional) Force failover to the designated secondary storage router on the failover list.
to <i>systemname</i>	(Optional) Perform the failover to the specified storage router. This node must be active in the cluster.

Defaults

None.

Command Modes

Administrator.

Command History

Release	Modification
2.5.1	This command was introduced for the SN 5428.
3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines

Use the **all** keyword to failover all SCSI routing instances currently running on this storage router. Each storage router can run a maximum of 12 SCSI routing instances; there is a maximum of 12 SCSI routing instances per cluster.

Examples

The following example causes the SCSI routing instance named *foo* to failover to another storage router in the cluster:

```
[SN5428-2A] # failover scsirouter foo
```

The following example causes all SCSI routing instances to failover to the storage router named *TestLab1*:

```
[SN5428-2A]# failover scsirouter all to TestLab1
```

Related Commands	Command	Description
	scsirouter enable	Stop or start the named SCSI routing instance.
	scsirouter failover	Add the storage router to the HA failover list for the specified SCSI routing instance.
	setup cluster	Change the configuration of the high availability environment.

fcalias

To create an alias entity for use in Fibre Channel zoning, use the **fcalias** command. An alias is a group of FC ports or devices (such as switches, storage or storage routers) that are grouped together for convenience.

fcalias *alias-name*

Syntax Description	<i>alias-name</i>	The name of the alias entity created by this command. Enter a maximum of 31 characters. The name must begin with an alpha character.
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Defaults	None.
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Command Modes	Administrator.
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Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines An alias allows you to group FC ports and devices together for zoning purposes. Unlike zones, however, aliases do not impose any communication restrictions on its members. An alias can belong to one or more zones, but a zone cannot be a member of an alias, nor can an alias be a member of another alias.

You must create a named alias entity before you can add members to the alias.

A default alias of *iscsi* is provided that contains both initiators WWPN1 and WWPN2.



Caution

If the storage router is connected to the FC switched fabric, all zoning changes (including the creation of an alias) are immediately propagated to other storage routers and switches in the fabric.

Refer to the appropriate *Cisco Storage Router Software Configuration Guide* for your storage router model for more information about FC fabric zoning.

Examples The following example creates an alias entity named *LabGroupA*:

```
[SN5428-2A]# fcalias LabGroupA
```

Related Commands	Command	Description
	delete falias	Delete the named alias or the specified alias member.
	falias member	Add the specified member to the named alias.
	show falias	Display information about aliases and their members.
	zone member	Add a device or an alias to a zone.

falias member

To add the specified member to the named alias, use the **falias member** command. An alias is a group of FC ports or devices (such as switches, storage or storage routers) that are grouped together for convenience.

```
falias alias-name member wwpn xxxxxxxxxxxxxxxx
```

Syntax Description	
<i>alias-name</i>	The name of the alias entity.
wwpn xxxxxxxxxxxxxx	The World Wide Port Name (WWPN) of the port or device to be added to the alias. Note WWPN address notation is represented by 16 hex digits. The digits may be separated by colons. When entering WWPN addresses, colons can be omitted or placed anywhere in the address notation as long as they do not leave one character without a partner character.

Defaults None.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines

An alias allows you to group FC ports and devices together for zoning purposes. Unlike zones, however, aliases do not impose any communication restrictions on its members. An alias can belong to one or more zones, but a zone cannot be a member of an alias, nor can an alias be a member of another alias.

The command verifies the format of the WWPN, but does not verify that the specified device exists. A default alias of *iscsi* is provided that contains both initiators WWPN1 and WWPN2.



Caution

If the storage router is connected to the FC switched fabric, all zoning changes (including adding a member to an alias) are immediately propagated to other storage routers and switches in the fabric.

Refer to the appropriate *Cisco Storage Router Software Configuration Guide* for your storage router model for more information about FC fabric zoning.

Examples

The following example creates the alias named *LabGroupA*, and then adds the devices with the WWPN *2200001026558a0f* and *220000201744ab3c* to the named alias:

```
[SN5428-2A]# falias LabGroupA
[SN5428-2A]# falias LabGroupA member wwpn 2200001026558a0f
[SN5428-2A]# falias LabGroupA member wwpn 220000201744ab3c
```

Related Commands

Command	Description
delete falias	Delete the named alias or the specified alias member.
falias	Create an alias entity for use in Fibre Channel zoning.
show falias	Display information about aliases and their members.
zone member	Add a device or an alias to a zone.

fcip

To create an FCIP instance, use the **fcip** command.

fcip *name*

Syntax Description	<i>name</i>	The name of the FCIP instance. Valid named are <i>fcip1</i> and <i>fcip2</i> .
Defaults	None.	
Command Modes	Administrator.	
Command History	Release	Modification
	3.3.1	This command was introduced for the SN 5428-2.

Usage Guidelines

FCIP provides connectivity between SANs. Technically, it employs Fibre Channel over TCP/IP (FCIP) to provide block oriented FC devices connectivity over an IP network. FCIP allows the interconnection of islands of FC storage area networks (SANs) over IP-based networks to form a unified SAN in a single FC fabric. The FCIP instance becomes a binding point for the association of other configuration parameters.

An FCIP instance runs with a point-to-point connection to an FCIP instance on a peer SN 5428-2 Storage Router or MDS 9000 Series system. Each FCIP instance requires one and only one peer.

There can be a maximum of 2 FCIP instances defined per storage router. Each FCIP instance is associated with:

- An internal FC interface *fci1* or *fci2* (*fci1* is initiator WWPN1 and *fci2* is initiator WWPN2). The FCIP instance named *fcip1* is associated with *fci1*; the instance named *fcip2* is associated with *fci2*. This association is made automatically.
- A network interface, which provides IP connectivity to the peer destination. The FCIP instance named *fcip1* uses the Gigabit Ethernet interface, *ge1*; the instance named *fcip2* uses *ge2*. If both Gigabit Ethernet interfaces are cabled to the same network, you can configure the FCIP instance to failover to the secondary interface in case of a failure on the primary interface.
- A destination, which is the IP address (or name) of the FCIP instance on the peer system. The destination configuration includes the connection protocol (TCP/IP or raw IP) used between the FCIP instances.

This command updates the running configuration of the storage router. You must save the FCIP instance configuration to the bootable configuration for it to be retained in the storage router when it is restarted. Issue the **save fcip** command with the **bootconfig** keyword to save the FCIP instance to the storage router bootable configuration.

Examples

The following example creates an FCIP instance named *fcip1*:

```
[SN5428-2A]# fcip fcip1
```

Related Commands

Command	Description
clear counters fcip	Reset accumulated operational statistics for the specified SCSI routing instance.
debug fcip	Enable debugging for the named FCIP instance.
delete fcip	Delete the named FCIP instance or the specified element of the FCIP instance.
fcip description	Add user-defined identification information to the named FCIP instance.
fcip destination config	Configure operational parameters for the named FCIP instance.
fcip destination raw	Add a peer destination to the named FCIP instance, with a connection type of raw IP.
fcip destination tcpclient	Add a peer destination to the named FCIP instance, with a connection type of TCP/IP. The named FCIP instance initiates the TCP connection.
fcip destination tcpserver	Add a peer destination to the named FCIP instance, with a connection type of TCP/IP. The named FCIP instance listens for the TCP connection from the named destination.
fcip enable	Stop or start the named FCIP instance.
fcip networkif	Assign a Gigabit Ethernet interface and IP address to the named FCIP instance.
restore fcip	Restore the named FCIP instance from the named configuration file.
save fcip	Save configuration information for the named FCIP instance.
show debug fcip	Display debugging information for the named FCIP instance.
show fcip	Display configuration and operational information for the named FCIP instance.

fcip description

To add user-defined identification information to the named FCIP instance, use the **fcip description** command.

fcip *name* **description** "*user text*"

Syntax Description		
	<i>name</i>	The name of this FCIP instance. Valid named are <i>fcip1</i> and <i>fcip2</i> .
	" <i>user text</i> "	User-defined identification information associated with this FCIP instance. If the string contains spaces, enclose it in quotes. Enter a maximum of 64 characters.

Defaults None.

Command Modes Administrator.

Command History	Release	Modification
	3.3.1	This command was introduced for the SN 5428-2.

Usage Guidelines This command allows you to add a new description or change an existing description. Descriptions are site-specific.

Examples The following example adds the description "*Access to lab SAN island 7*" to the FCIP instance *fcip1*:

```
[SN5428-2A]# fcip fcip2 description "Access to lab SAN island 7"
```

Related Commands	Command	Description
	fcip	Create an FCIP instance.
	show fcip	Display configuration and operational information for the named FCIP instance.

fcip destination config

To configure operational parameters for the selected FCIP connection protocol type, use the **fcip destination config** command.

fcip *name* **destination config** {**rxtcpwinsize** | **txtcpwinsize**} *nn*

fcip *name* **destination config** **tcpport** *port-number*

fcip *name* **destination config** **batchtcp** {**yes** | **no**}

fcip *name* **destination config** {**bcouthiwater** | **burstouthiwater**} *nn*

fcip *name* **destination config** **frouthiwater** *nn*

fcip *name* **destination config** **peerneedsackhiwater** *nn*

fcip *name* **destination config** {**initialtimeout** | **maxtimeout** | **totaltimeout**} *nn*

fcip *name* **destination config** **ipprotocol** *nn*

fcip *name* **destination config** **rexmitcount** *nn*

fcip *name* **destination config** **timeoutincrement** *nn*

fcip *name* **destination config** **frinhiwater** *nn*

fcip *name* **destination config** **idlepingdelay** *nn*

fcip *name* **destination config** **pktracemask** *mask*

fcip *name* **destination config** **usebport** {**yes** | **no**}

fcip *name* **destination config** **compression** {**off** | **on**}

Syntax Description		
	<i>name</i>	The name of this FCIP instance. Valid named are <i>fcip1</i> and <i>fcip2</i> .
	rxtcpwinsize <i>nn</i>	The maximum number of outstanding bytes that can be received on a TCP connection. Valid values are 8192 to 2097152, inclusive. The default value is 262144. This configuration option applies to TCP client or TCP server connections only.
	txtcpwinsize <i>nn</i>	The maximum number of outstanding bytes that can be transmitted on a TCP connection. Valid values are 8192 to 2097152, inclusive. The default value is 2097152. This configuration option applies to TCP client or TCP server connections only.
	tcpport <i>port-number</i>	The TCP port number. The TCP server listens to this port; the TCP client connects to this port. Valid values are 0 to 65535, inclusive. The default port is 3225. This configuration option applies to TCP client or TCP server connections only.
	batchtcp yes	Batch multiple FC frames in one TCP segment. This is the default. This configuration option applies to TCP client or TCP server connections only.

batchtcp no	Do not batch multiple FC frames in one TCP segment. Each FC frame is sent in a separate TCP segment. This configuration option applies to TCP client or TCP server connections only.
bcouthiwater nn	The maximum number of bytes that can be outstanding on a raw IP connection. Valid values are from 1 to 4294967294, inclusive. The default value is 2097152. This configuration option applies to raw IP connections only.
burstouthiwater nn	The maximum number of bytes that can be transmitted on a raw IP connection. Valid values are from 1 to 4294967294, inclusive. The default value is 2097152. This configuration option applies to raw IP connections only.
frouthiwater nn	The maximum number of frames that can be outstanding on a raw IP connection. Valid values are from 1 to 4294967294, inclusive. The default value is 1024. This configuration option applies to raw IP connections only.
peerneedsackhiwater nn	The maximum number of unacknowledged frames that can exist at any given time on a raw IP connection. Valid values are from 0 to 4294967294. The default value is 16. This configuration option applies to raw IP connections only.
initialtimeout nn	The initial amount of time, in ticks, to delay before retransmitting a packet. This value is used in error recovery algorithms. Valid values are from 0 to 2147483647. The default value is 0. This configuration option applies to raw IP connections only.
maxtimeout nn	The maximum amount of time, in ticks, that can be used for any one retransmission, before the packet is discarded. This value is used in error recovery algorithms. Valid values are from 0 to 2147483647. The default value is 48 ticks. This configuration option applies to raw IP connections only. Note The default value is set to 48 ticks only if timeoutincrement , initialtimeout and totaltimeout keywords have no associated value.
totaltimeout nn	The maximum amount of time, in ticks, that a packet is kept alive, before it is discarded. This value is used in error recovery algorithms. Valid values are from 0 to 2147483647. The default value is 0. This configuration option applies to raw IP connections only.
ipprotocol nn	The value of the IP protocol used in the IP header. Valid values are from 0 to 255. The default value is 4. This configuration option applies to raw IP connections only. Note This should be a unique IP protocol value. Do not change this value to an IP protocol that is currently in use on the storage router. For example, do not change the value to the TCP protocol (6) or UDP protocol (17).
rexmitcount nn	The maximum number of times a packet can be retransmitted, before it is discarded. This value is used in error recovery algorithms. Valid values are from 1 to 2147483647. The default value is 4. This configuration option applies to raw IP connections only.

timeoutincrement <i>nn</i>	The amount of time, in ticks, to add to a packet's time out value before retransmitting the packet. This value increases the delay before the next retransmission, and is used in error recovery algorithms. Valid values are from 0 to 2147483647. The default value is 0. This configuration option applies to raw IP connections only.
frinhiwater <i>nn</i>	The maximum number of frames, received from a raw IP connection, that can be sent to the Fibre Channel (FC) interface. Valid values are from 1 to 4294967294. The default value is 688. This configuration option applies to all FCIP connection types.
idlepingdelay <i>nn</i>	The number of seconds before a keep-alive packet is sent across an idle connection. Valid values are 1 to 65535, inclusive. The default value is 60. This configuration option applies to all FCIP connection types.
pktracemask <i>mask</i>	The value of the packet trace mask, in hex. Packets are traced for debugging problems. Valid values are 0 (0x0000) to 0xffff. A value of zero disables packet tracing. The default value is 0xffff, which enables all packet tracing. This configuration option applies to all FCIP connection types.
usebport yes	Use Fibre Channel (FC) B_Port connectivity. This configuration option applies to all FCIP connection types. This is the default.
usebport no	Do not use FC B_Port connectivity. This value should only be set if the storage router is connected to another FCIP device that does not support B_Port connectivity.
compression on	Use compression on FCIP traffic to this destination. This configuration option applies to all FCIP connection types.
compression off	Do not use compression on FCIP traffic to and from this destination. This is the default. This configuration options applies to all FCIP connection types.

Defaults

The following are the default settings for all FCIP connection configuration options:

- TCP receive window size—262144 bytes
- TCP transmit window size—2097152 bytes
- TCP port number—3225
- Multiple FC frames are batched in one TCP segment.
- Maximum number of bytes outstanding on raw IP connection—2097152 bytes
- Maximum number of bytes transmitted on raw IP connection—2097152 bytes
- Maximum number of frames sent to FC interface—688 frames
- Maximum number of frames outstanding—1024 frames
- Maximum number of unacknowledged frames—16 frames
- Initial amount of delay before retransmission—0 ticks
- Maximum amount of time for retransmission—48 ticks
- Maximum amount of time a packet can be kept alive—0 ticks
- Value of IP protocol in IP header—4
- Maximum number of retransmissions—4
- The amount of time to increase the delay prior to retransmission—0 ticks

- The amount of time before a keep-alive ping is sent across an idle connection—60 seconds
- Packet trace mask—0xffff (packet tracing is enabled for all packets)
- The FCIP instance uses FC B_Port connectivity.
- FCIP compression is off.

The default error recovery algorithm for raw connection protocol uses **maxtimeout** and **rexmitcount** values (timeout = **maxtimeout** / **rexmitcount**--).

**Note**

One second is approximately 60 ticks.

Command Modes

Administrator.

Command History

Release	Modification
3.3.1	This command was introduced for the SN 5428-2.
3.4.1	The compression keyword was added and the destination <i>name</i> argument was removed.

Usage Guidelines

Each FCIP instance requires three active elements:

- The *networkif* element assigns an interface and IP address for use by the FCIP peer.
- The *destination* element assigns the peer's protocol and IP address or name.
- The device interface element associates the FCIP instance with an internal Fibre Channel interface and is automatically assigned and enabled.

An FCIP instance runs with a point-to-point connection to an FCIP instance on a peer SN 5428-2 Storage Router or MDS 9000 Series system. Each FCIP instance requires one and only one peer. Both FCIP instances must be configured to use the same connection protocol, TCP/IP or raw IP.

TCP/IP connection protocol uses the FCIP standard and TCP flow control and error recovery algorithms. FCIP, using TCP connections, allows you to configure TCP receive and transmit window sizes. Raw IP uses a proprietary protocol, but allows you to configure a wider variety of operational settings, providing more granular control over flow control and error recovery. All changes to raw IP operational parameters are applied immediately. Changes to TCP operational parameters are not applied until the FCIP instance is stopped and restarted, or the storage router is rebooted.

Raw IP connections have unique flow control settings for network transmissions and FC transmissions. The FC transmission counter (the **frinhiwater** keyword) limits the number of frames given to the FC interface for transmission. The FC frames are only acknowledged once they have been transmitted out of the storage router. The network transmissions are controlled by both a byte counter (the **burstouthiwater** keyword) and a frame counter (the **frouthiwater** keyword). FCIP will not transmit data when either counter has reached its high water mark. The data is queued until the counters have receded from their high water mark.

Raw IP uses four error recovery algorithms. These algorithms use five different operational settings, which control which error recovery algorithm is used.

- **rexmitcount**—The maximum number of times a packet can be retransmitted, before it is discarded.
- **maxtimeout**—The maximum amount of time, in ticks, that can be used for any one retransmission, before the packet is discarded.
- **timeoutincrement**—The amount of time, in ticks, to add to a packet's time out value before retransmitting the packet.
- **initialtimeout**—The initial amount of time, in ticks, to delay before retransmitting a packet.
- **totaltimeout**—The maximum amount of time, in ticks, that a packet is kept alive, before it is discarded.

The following are the available error recovery algorithms:

1. For error recovery using **maxtimeout** and **rexmitcount**:

- $\text{timeout} = \text{maxtimeout} / \text{rexmitcount}$

For example, using a **maxtimeout** value of 48 and **rexmitcount** value of 4 would result in retransmissions at 12, 16, 24 and 48 ticks. This is the default error recovery algorithm.

2. For error recovery using **timeoutincrement** and **rexmitcount**:

- $\text{timeout} += \text{timeoutincrement}$

For example, using a **timeoutincrement** value of 8 and a **rexmitcount** value of 4 would result in retransmissions at 8, 16, 24 and 32 ticks.

3. For error recovery using **timeoutincrement**, **initialtimeout** and **rexmitcount**:

- $\text{timeout} = \text{initialtimeout}$ /* initial calculation */
- $\text{timeout} = \text{timeout} * \text{timeoutincrement}$ /* subsequent calculations */

For example, using a **timeoutincrement** value of 2, an **initialtimeout** value of 8, and a **rexmitcount** of 4 would result in retransmissions at 8, 16, 32 and 64 ticks.

4. For error recovery using **totaltimeout** and **rexmitcount**:

- if (**rexmitcount** & 0x01) $\text{timeout} = ((\text{rexmitcount} - \text{remaining rexmitcount} + 1) * \text{totaltimeout}) / (\text{rexmitcount} * ((\text{rexmitcount} / 2) + (\text{rexmitcount} / 2)))$
- else $\text{timeout} = ((\text{rexmitcount} - \text{remaining rexmitcount} + 1) * \text{totaltimeout}) / (\text{rexmitcount} * ((\text{rexmitcount} * ((\text{rexmitcount} / 2) + (\text{rexmitcount} / 2))))$

For example, using a **totaltimeout** value of 48 and a **rexmitcount** value of 4 would result in retransmissions at 4, 9, 14 and 17 ticks.

By default, a raw IP connection uses the first error recovery algorithm. To use another error recovery algorithm, set the desired values for the appropriate operational settings. For example, to use the second error recovery algorithm, set the **timeoutincrement** and, optionally, the **rexmitcount**. To use the fourth error recovery algorithm, set the **totaltimeout** and, optionally, the **rexmitcount**.

Examples

The following example add the destination at IP address *10.1.40.27* to the FCIP instance named *fcip1*. The FCIP instance is configured to use TCP/IP connection protocol and will initiate the connection (TCP client). The destinations TCP receive window size is set to 1 MB.

```
[SN5428-2A]# fcip fcip1 destination tcpclient 10.1.40.27
*[SN5428-2A]# fcip fcip1 destination config rxtcpwinsize 1048576
```

Related Commands	Command	Description
	fcip	Create an FCIP instance.
	fcip destination raw	Add a peer destination to the named FCIP instance, with a connection type of raw IP.
	fcip destination tcpclient	Add a peer destination to the named FCIP instance, with a connection type of TCP/IP. The named FCIP instance initiates the TCP connection.
	fcip destination tcpserver	Add a peer destination to the named FCIP instance, with a connection type of TCP/IP. The named FCIP instance listens for the TCP connection from the named destination.
	fcip networkif	Assign a Gigabit Ethernet interface and IP address to the named FCIP instance.
	show fcip	Display configuration and operational information for the named FCIP instance.

fcip destination raw

To add a peer destination to the named FCIP instance, with a connection type of raw IP, use the **fcip destination raw** command.

```
fcip name destination raw {A.B.C.D | servername}
```

Syntax Description

<i>name</i>	The name of the FCIP instance. Valid names are <i>fcip1</i> and <i>fcip2</i> .
<i>A.B.C.D</i>	The IP address of the peer destination. <i>A.B.C.D</i> is the dotted quad notation of the IP address. The peer destination is the FCIP instance running in the partner storage router or MDS 9000 Series system.
<i>servername</i>	The name of the peer system.

Defaults

None.

Command Modes

Administrator.

Command History

Release	Modification
3.3.1	This command was introduced for the SN 5428-2.
3.4.1	The destination <i>name</i> argument was removed and the <i>servername</i> argument was added.

Usage Guidelines

Each FCIP instance requires three active elements:

- The *networkif* element assigns an interface and IP address for use by the FCIP peer.
- The *destination* element assigns the peer's protocol and IP address or name.
- The device interface element associates the FCIP instance with an internal Fibre Channel interface and is automatically assigned and enabled.

An FCIP instance runs with a point-to-point connection to an FCIP instance on a peer SN 5428-2 Storage Router or MDS 9000 Series system. Each FCIP instance requires one and only one peer. Use this command to configure a peer destination name and IP address, using raw IP as the protocol type.

The destination IP address is the Gigabit Ethernet IP address of the FCIP instance running in the peer system. Both FCIP instances must be configured to use the same connection protocol.

Raw IP uses a proprietary connection protocol, but provides more operational control over flow control and error recovery than standard TCP/IP.



Note

When configuring an FCIP instance, you must configure the network interface before you configure the peer destination and protocol.

Examples

The following example configures the FCIP instance named *fcip1* with a destination at IP address *10.1.3.47*, using raw IP connection protocol:

```
[SN5428-2A]# fcip fcip1 destination raw 10.1.3.47
```

Related Commands

Command	Description
fcip	Create an FCIP instance.
fcip destination config	Configure operational parameters for the named FCIP instance.
fcip networkif	Assign a Gigabit Ethernet interface and IP address to the named FCIP instance.
show fcip	Display configuration and operational information for the named FCIP instance.

fcip destination tcpclient

To add a peer destination to the named FCIP instance, with a connection type of TCP/IP, use the **fcip destination tcpclient** command. The named FCIP instance will initiate the TCP connection.

```
fcip name destination tcpclient {A.B.C.D | servername}
```

Syntax Description

<i>name</i>	The name of the FCIP instance. Valid names are <i>fcip1</i> and <i>fcip2</i> .
<i>A.B.C.D</i>	The IP address of the peer destination. <i>A.B.C.D</i> is the dotted quad notation of the IP address. The peer destination is the FCIP instance running in the partner storage router or MDS 9000 Series system
<i>servername</i>	The name of the peer system.

Defaults

None.

Command Modes

Administrator.

Command History

Release	Modification
3.3.1	This command was introduced for the SN 5428-2.
3.4.1	The destination <i>name</i> argument was removed and the <i>servername</i> argument was added.

Usage Guidelines

Each FCIP instance requires three active elements:

- The *networkif* element assigns an interface and IP address for use by the FCIP peer.
- The *destination* element assigns the peer's protocol and IP address or name.
- The device interface element associates the FCIP instance with an internal Fibre Channel interface and is automatically assigned and enabled.

An FCIP instance runs with a point-to-point connection to an FCIP instance on a peer SN 5428-2 Storage Router or MDS 9000 Series system. Each FCIP instance requires one and only one peer.

Use this command to configure a peer destination IP address (or name), using TCP/IP as the protocol type. When configured as a TCP client, the FCIP instance initiates the connection to the peer destination. The peer destination must be configured as a TCP server. The TCP server listens for the initial connection.



Note

The only functional difference between an FCIP instance configured as a TCP client and an FCIP instance configured as a TCP server is during the initial connection, which is initiated by the TCP client.

The destination IP address is the Gigabit Ethernet IP address of the FCIP instance running in the peer system.

TCP/IP connection protocol uses the FCIP standard and TCP flow control and error recovery algorithms. FCIP, using TCP connections, allows you to configure TCP receive and transmit window sizes.

**Note**

When configuring an FCIP instance, you must configure the network interface before you configure the peer destination and protocol.

Examples

The following example configures the FCIP instance named *fcip2* with a destination at IP address *10.1.4.32*, using TCP/IP connection protocol. The FCIP instance is configured as a TCP client, and will initiate the TCP connection to the destination.

```
[SN5428-2A]# fcip fcip2 destination tcpclient 10.1.4.32
```

Related Commands

Command	Description
fcip	Create an FCIP instance.
fcip destination config	Configure operational parameters for the named FCIP instance.
fcip networkif	Assign a Gigabit Ethernet interface and IP address to the named FCIP instance.
show fcip	Display configuration and operational information for the named FCIP instance.

fcip destination tcpserver

To add a peer destination to the named FCIP instance, with a connection type of TCP/IP, use the **fcip destination tcpserver** command. The named FCIP instance will listen for the TCP connection from the named destination.

```
fcip name destination tcpserver {A.B.C.D | servername}
```

Syntax Description	
<i>name</i>	The name of the FCIP instance. Valid names are <i>fcip1</i> and <i>fcip2</i> .
<i>A.B.C.D</i>	The IP address of the peer destination. <i>A.B.C.D</i> is the dotted quad notation of the IP address. The peer destination is the FCIP instance running in the partner storage router or MDS 9000 Series system.
<i>servername</i>	The name of the peer system.

Defaults None.

Command Modes Administrator.

Command History	Release	Modification
	3.3.1	This command was introduced for the SN 5428-2.
	3.4.1	The destination <i>name</i> argument was removed and the <i>servername</i> argument was added.

Usage Guidelines Each FCIP instance requires three active elements:

- The *networkif* element assigns an interface and IP address for use by the FCIP peer.
- The *destination* element assigns the peer's protocol and IP address or name.
- The device interface element associates the FCIP instance with an internal Fibre Channel interface and is automatically assigned and enabled.

An FCIP instance runs with a point-to-point connection to an FCIP instance on a peer SN 5428-2 Storage Router or MDS 9000 Series system. Each FCIP instance requires one and only one peer.

Use this command to configure a peer destination IP address, using TCP/IP as the protocol type. When configured as a TCP server, the FCIP instance listens for the connection from the peer destination. The peer destination must be configured as a TCP client. The TCP client initiates the TCP initial TCP connection.



Note

The only functional difference between an FCIP instance configured as a TCP client and an FCIP instance configured as a TCP server is during the initial connection, which is initiated by the TCP client.

The destination IP address is the Gigabit Ethernet IP address of the FCIP instance running in the peer system.

TCP/IP connection protocol uses the FCIP standard and TCP flow control and error recovery algorithms. FCIP, using TCP connections, allows you to configure TCP receive and transmit window sizes.

**Note**

When configuring an FCIP instance, you must configure the network interface before you configure the peer destination and protocol.

Examples

The following example configures the FCIP instance named *fcip1* with a destination at IP address *10.1.5.222*, using TCP/IP connection protocol. The FCIP instance is configured as a TCP server, and will listen for the TCP connection from the destination.

```
[SN5428-2A]# fcip fcip1 destination tcpserver 10.1.5.222
```

Related Commands

Command	Description
fcip	Create an FCIP instance.
fcip destination config	Configure operational parameters for the named FCIP instance.
fcip networkif	Assign a Gigabit Ethernet interface and IP address to the named FCIP instance.
show fcip	Display configuration and operational information for the named FCIP instance.

fcip enable

To start the named FCIP instance, use the **fcip enable** command. To stop the named FCIP instance, use the **no** form of this command.

fcip {*name* | **all**} **enable**

no fcip {*name* | **all**} **enable**

Syntax Description	
<i>name</i>	The name of the FCIP instance to be started. Valid names are <i>fcip1</i> and <i>fcip2</i> .
all	Start all FCIP instances on this storage router.

Defaults	
	None.

Command Modes	
	Administrator.

Command History	Release	Modification
	3.3.1	This command was introduced for the SN 5428-2.

Usage Guidelines	
	<p>FCIP instances are automatically started by the storage router during the creation process and when the storage router is restarted. Use this command to manually control the running state of FCIP instances.</p> <p>Use the all keyword to start all FCIP instances on the storage router. All instances previously stopped on this storage router will be restarted. This form of the command is always available; the only time the command is available for a named FCIP instance is when that FCIP instance has been previously stopped.</p>

Examples	
	<p>The following example starts the FCIP instance named <i>fcip2</i>. This instance must have been previously stopped.</p>

```
[SN5428-2A]# fcip fcip2 enable
```

The following example stops all FCIP instances running on the storage router:

```
[SN5428-2A]# no fcip all enable
```

Related Commands	Command	Description
	<code>delete fcip</code>	Delete the named FCIP instance or the specified element of the FCIP instance.
	<code>fcip</code>	Create an FCIP instance.
	<code>show fcip</code>	Display configuration and operational information for the named FCIP instance.

fcip networkif

To assign a Gigabit Ethernet interface and IP address to the named FCIP instance, use the **fcip networkif** command. The specified interface provides IP connectivity between the FCIP instance and its peer destination.

fcip name networkif {*A.B.C.D/bits* | *A.B.C.D/1.2.3.4*} [**secondary**]

Syntax Description	
<i>name</i>	Name of the FCIP instance to which you are adding the Gigabit Ethernet interface. Valid names are <i>fcip1</i> and <i>fcip2</i> .
<i>A.B.C.D/bits</i>	The IP address of the named interface. <i>A.B.C.D</i> is the dotted quad notation of the IP address. The <i>/bits</i> specifies the subnet mask in CIDR style. Note For the FCIP instance named <i>fcip1</i> , the IP address must be accessible from the Gigabit Ethernet interface, <i>ge1</i> . For the instance named <i>fcip2</i> , the IP address must be accessible from the interface <i>ge2</i> .
<i>A.B.C.D/1.2.3.4</i>	The IP address of the named interface. <i>A.B.C.D</i> is the dotted quad notation of the IP address. <i>1.2.3.4</i> is the dotted quad notation of the subnet mask.
secondary	(Optional) Indicates the specified IP address is available from both Gigabit Ethernet interfaces. If the primary interface goes down and remains down for two seconds, the specified IP address will be moved to the secondary interface.

Defaults None.

Command Modes Administrator.

Command History	Release	Modification
	3.3.1	This command was introduced for the SN 5428-2.

Usage Guidelines The specified interface IP address is configured as the destination IP address for the FCIP instance running in the peer system.

Each FCIP instance requires three active elements:

- The *networkif* element assigns an interface and IP address for use by the FCIP peer.
- The *destination* element assigns the peer's protocol and IP address or name.
- The device interface element associates the FCIP instance with an internal Fibre Channel interface and is automatically assigned and enabled.

An FCIP instance runs with a point-to-point connection to an FCIP instance on a peer SN 5428-2 Storage Router or MDS 9000 Series system. Each FCIP instance requires one and only one peer.

**Note**

Each FCIP instance must connect to a unique peer system. If you have two FCIP instances running in a single storage router, you cannot connect both instances to the same peer system.

Use this command to configure an IP address for the FCIP instance, to be used by the FCIP peer for IP connectivity. For the FCIP instance named *fcip1*, the IP address is automatically associated with the Gigabit Ethernet interface, *ge1*. For the FCIP instance named *fcip2*, the IP address is automatically associated with the Gigabit Ethernet interface, *ge2*.

When configuring an FCIP instance, you must configure the network interface before you configure the peer destination and protocol.

If the **secondary** keyword is used, both Gigabit Ethernet interfaces must be connected to the same network segment. If the primary interface goes down and remains down for two seconds, the IP address will be moved to the secondary interface.

**Note**

If you configure a Gigabit Ethernet IP address with a secondary interface, all Gigabit Ethernet IP addresses on the same subnet must also be configured with the same secondary interface.

You can configure two FCIP instances on a single storage router to use the same network interface. You must fully configure one FCIP instance, and then configure a second FCIP instance without configuring a network interface. The second FCIP instance will use the same network interface as configured for the first instance. The two FCIP instances should use different connection protocols, or if both are configured as TCP servers, each FCIP instance must use a unique TCP port number.

Examples

The following command adds the IP address 10.1.10.128/24, to the FCIP instance named *fcip2*. This IP address will automatically be associated with the Gigabit Ethernet interface, *ge2*.

```
[SN5428-2A]# fcip fcip2 networkif 10.1.10.128/24
```

The following command adds the IP address 10.1.30.128, with a netmask of 255.255.255.0, to the FCIP instance *fcip1*. This IP address is automatically associated with the Gigabit Ethernet interface, *ge1*. If the primary interface is not available, the IP address will be moved to the secondary Gigabit Ethernet interface, *ge2*. The Gigabit Ethernet interfaces must be connected to the same network.

```
[SN5428-2A]# fcip fcip1 networkif 10.1.30.128/255.255.255.0 secondary
```

The following set of commands configures the FCIP instance named *fcip1*, adds the network IP address 10.1.40.42/24, and configures the destination with a TCP client connection type. The second FCIP instance, *fcip2*, is configured with a destination and a TCP server connection type. Both FCIP instances will use the 10.1.40.42/24 network interface.

```
[SN5428-2A]# fcip fcip1
* [SN5428-2A] fcip fcip1 networkif 10.1.40.42/24
* [SN5428-2A] fcip fcip1 destination tcpclient 10.1.1.144
* [SN5428-2A] fcip fcip2
* [SN5428-2A] fcip fcip2 destination tcpserver 10.1.5.73
```

Related Commands	Command	Description
	fcip	Create an FCIP instance.
	fcip destination config	Configure operational parameters for the named FCIP instance.
	fcip destination raw	Add a peer destination to the named FCIP instance, with a connection type of raw IP.
	fcip destination tcpclient	Add a peer destination to the named FCIP instance, with a connection type of TCP/IP. The named FCIP instance initiates the TCP connection.
	fcip destination tcpserver	Add a peer destination to the named FCIP instance, with a connection type of TCP/IP. The named FCIP instance listens for the TCP connection from the named destination.
	show fcip	Display configuration and operational information for the named FCIP instance.

fcswitch beacon enable

To enable all Fibre Channel port Logged-In (LOG) LEDs to flash, use the **fcswitch beacon enable** command. To disable LOG LED flashing, use the **no** form of this command.

fcswitch beacon enable

no fcswitch beacon enable

Syntax Description This command has no arguments or keywords.

Defaults Beacon flashing is disabled, by default. See the appropriate *Cisco Storage Router Hardware Installation Guide* for your storage router model for default LOG LED indication descriptions.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines Use this command to assist in locating a physical unit. This command is primarily used for troubleshooting purposes.

Examples The following example causes all Fibre Channel port LOG LEDs on the storage router to flash:

```
[SN5428-2A]# fcswitch beacon enable
```

Related Commands	Command	Description
	show debug fcswitch	Display internal Fibre Channel interface parameters.
	show fcswitch	Display global configuration information for storage router FC interfaces.

fswitch devlog

To specify the logging parameters for the storage router's integrated Fibre Channel (FC) switch component development log file, use the **fswitch devlog** command.

```
fswitch devlog components component1 [component2...]
```

```
fswitch devlog level notification-level
```

Syntax Description

components <i>component1</i> <i>[component2...]</i>	At least one of the components described in Table 6-1 .
level <i>notification-level</i>	Limit logging to messages of a specified level or lower. See Table 6-2 in the Usage Guidelines section for a list of valid names that can be used for the <i>notification-level</i> argument.

Defaults

No components or notification level are configured. Development logging for the storage router's integrated FC switch component is disabled.

Command Modes

Administrator.

Command History

Release	Modification
2.5.1	This command was introduced for the SN 5428.
3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines

The **fswitch devlog** command is designed for debug purposes, and should be used under the guidance of a Cisco Technical Support professional.

After logging is enabled, use this command to limit the amount of information recorded in the switch development log by component and by notification level. To stop all logging for all components, set the notification level to **none**. Use the **fswitch devlog enable** command to enable development logging.

Table 6-1 *fswitch devlog components*

Component	Description
Cmon	Monitors internal chassis components and applications.
Diag	Handles online testing and other diagnostic tasks.
Ds	Data services repository for all switch data.
Fc2	Class 2 frame handler.
MgmtApp	Manages the user interface and internal configuration for the switch.

Table 6-1 *fcswitch devlog components (continued)*

Component	Description
PortApp	Manages the switch ports.
Swb	Software bus internal process communications mechanism.
Util	Utility message interpreter for handling legacy user interfaces.

Table 6-2 *fcswitch devlog notification-level*

Notification Level	Description
Critical	Log all messages from the selected components (critical, warning and informational).
Warn	Log all warning and informational messages for the selected components.
Info	Log informational messages only for the selected components.
None	Log no messages. This setting stops switch development logging.

Examples

The following example limits the switch development log file to informational messages only from the management application and the class 2 frame handler:

```
[SN5428-2A]# fcswitch devlog components MgmtApp Fc2
[SN5428-2A]# fcswitch devlog level info
```

The following example stops all switch devlog logging:

```
[SN5428-2A]# fcswitch devlog level none
```

Related Commands

Command	Description
clear fcswitch	Clear the switch log files of all entries or clear stored zoning configuration information.
fcswitch devlog enable	Enable development logging for the integrated FC switch component.
fcswitch log interface	Restrict the integrated FC switch logging to information related to a specific FC interface.
show debug fcswitch	Display internal FC interface parameters, including switch log entries.

fswitch devlog enable

To start development logging for the storage router's integrated Fibre Channel (FC) switch component, use the **fswitch devlog enable** command. To stop development logging, use the **no** form of this command.

fswitch devlog enable

no fswitch devlog enable

Syntax Description This command has no arguments or keywords.

Defaults Development logging is stopped.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines The **fswitch devlog enable** command is designed for debug purposes, and should be used under the guidance of a Cisco Technical Support professional.

Examples The following example starts development logging for the FC switch component and limits the switch development log file to informational messages only from the management application and the class 2 frame handler:

```
[SN5428-2A]# fswitch devlog components MgmtApp Fc2
[SN5428-2A]# fswitch devlog level info
[SN5428-2A]# fswitch devlog enable
```

Related Commands	Command	Description
	clear fswitch	Clear the switch log files of all entries or clear stored zoning configuration information.
	fswitch devlog	Specify logging parameters for the switch development log file.
	fswitch log interface	Restrict the integrated FC switch logging to information related to a specific FC interface.
	show debug fswitch	Display internal FC interface parameters, including switch log entries.

fcswitch diag

To set all Fibre Channel (FC) interfaces into diagnostic mode for testing purposes, use the **fcswitch diag** command.

fcswitch diag

Syntax Description This command has no arguments or keywords.

Defaults None.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines Use this command to change all FC interfaces to diagnostic mode prior to performing internal or external loopback testing on individual FC interfaces.

- Use the **fcswitch enable** command to reenable all FC interfaces. An FC interface must be enabled to run online loopback tests or to allow access to storage targets.
- Use the **no fcswitch enable** command to disable all FC interfaces. When you are ready to allow access to the storage targets, you can enable all FC interfaces at once via the **fcswitch enable** command, or enable individual interfaces via the **interface fc? enable** command.

Examples The following example sets all FC interfaces into a diagnostic state and then performs an internal loopback test on the FC interface named *fc6*:

```
[SN5428-2A]# fcswitch diag
[SN5428-2A]# interface fc6 loopback internal
```

Related Commands	Command	Description
	fcswitch enable	Enable all FC interfaces.
	interface fc? diag	Set the named FC interface into diagnostic mode for testing purposes.
	interface fc? enable	Enable the named FC interface.
	interface fc? loopback	Initiate a loopback test on the named FC interface.
	show fcswitch	Display global configuration information for storage router FC interfaces.

fcswitch domainid

To set the storage router's domain ID for switched zoned fabric to a unique value, and to prevent the FC fabric from changing that domain ID, use the **fcswitch domainid** command. To disable the lock and allow the domain ID to be changed by the switched zoned fabric, use the **no** form of this command.

fcswitch domainid {*domain-id*} [**force**]

fcswitch domainid lock enable

no fcswitch domainid lock enable

Syntax Description

<i>domain-id</i>	The domain identification number associated with the storage router.
force	(Optional) Suppress warning prompts and messages.
lock enable	Keywords used to disallow changes to the domain ID from the switched zoned fabric.

Defaults

The default domain ID for fabric zoning is 1. The domain ID can be changed by the switched zoned fabric, by default.

Command Modes

Administrator.

Command History

Release	Modification
2.5.1	This command was introduced for the SN 5428.
3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines

Use this command to set the storage router's domain identification number for switched zoned fabric to a unique value or to prevent changes to that value by the zoned fabric. Domain IDs allow fabrics to be segmented into different areas.

Domain IDs must be unique among all switch elements within a fabric. If there is a domain ID conflict, the expansion ports (ports operating as E_Ports) on the two conflicting elements are disabled, isolating the Interswitch Link (ISL).

If you are planning to connect to a switched zoned fabric via one or more FC interfaces, complete the appropriate zoning configuration for the storage router, as described in the appropriate *Cisco Storage Router Software Configuration Guide* for your storage router model.



Note

Changing the domain ID in an operational fabric may cause traffic disruption. All ports operating as E_Ports should be inactive or disabled prior to changing the domain ID.

Examples

The following example sets the switched zoned fabric domain ID for the storage router to 42:

```
[SN5428-2A]# fswitch domainid 42
*** Warning: Changing domain ID in an operational fabric will cause traffic disruption
Do you want to continue? [(yes/no (no))] yes
```

The following example sets the switched zoned fabric domain ID for the storage router to 5 and enables the lock, which prevents the domain ID from being changed by the zoned fabric.

```
[SN5428-2A]# fswitch domainid 5
*** Warning: Changing domain ID in an operational fabric will cause traffic disruption
Do you want to continue? [(yes/no (no))] yes
[SN5428-2A]# fswitch domainid lock enable
```

Related Commands

Command	Description
fswitch enable	Enable all FC interfaces.
fswitch interop-credit	Set the data buffer credit capacity for all FC ports.
fswitch zoning autosave	Configure the storage router to participate in FC switched zones.
fswitch zoning default	Select the level of communication between the storage router and devices in the fabric where there is no active zone set.
fswitch zoning merge	Set zoning merge compliance.
interface fc? diag	Set the named FC interface into diagnostic mode for testing purposes.
interface fc? enable	Enable the named FC interface.
interface fc? loopback	Initiate a loopback test on the named FC interface.
show fswitch	Display global configuration information for storage router FC interfaces.
show fswitch eport	Display FSPF protocol information.

fswitch dstov

To specify the amount of time the storage router is to wait for Fibre Channel (FC) Distributed Services, use the **fswitch dstov** command.

fswitch dstov {*nn* | **default**}

Syntax Description		
<i>nn</i>		The Distributed Services timeout value, in milliseconds.
default		Keyword, indicating the storage router is to wait 5000 milliseconds for Fibre Channel Distributed Services.

Defaults The default Distributed Services timeout value is 5000 milliseconds.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines Use this command to specify the length of time the storage router should wait for FC Distributed Services, such as the Management Server or Name Server, before returning an error.

Use the **default** keyword to return the Distributed Services timeout value to 5000 milliseconds.

Examples The following example sets the Distributed Services timeout value to 7500 milliseconds:

```
[SN5428-2A]# fswitch dstov 7500
```

The following example resets the Distributed Services timeout value to the default of 5000 milliseconds:

```
[SN5428-2A]# fswitch dstov default
```

Related Commands	Command	Description
	fswitch edtov	Specify an error detect timeout value for all Fibre Channel interfaces.
	fswitch enable	Enable all FC interfaces.
	fswitch fstov	Specify the fabric stability timeout value.
	fswitch ratov	Specify a Fibre Channel resource allocation timeout value for the storage router.
	show fswitch	Display global configuration information for storage router FC interfaces.

fswitch edtov

To specify an error detect timeout value for all Fibre Channel (FC) interfaces, use the **fswitch edtov** command.

fswitch edtov {*nn* | **default**}

Syntax Description	<i>nn</i>	The amount of time a port is to wait for errors to clear, in milliseconds.
	default	Keyword, indicating the port is to wait 2000 milliseconds for errors to clear.

Defaults The default error detect timeout value is 2000 milliseconds.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines The error detect timeout value is the amount of time the FC port is to wait for all errors to clear. This value applies to all FC interfaces in the storage router.

Error detect timeout values should be the same for all storage routers or switches in the fabric.

Examples The following example sets the error detect timeout value to 4000 milliseconds:

```
[SN5428-2A] # fswitch edtov 4000
```

The following example resets the error detect timeout value to the default of 2000 milliseconds:

```
[SN5428-2A] # fswitch edtov default
```

Related Commands	Command	Description
	fswitch dstov	Specify the amount of time the storage router is to wait for Fibre Channel Distributed Services.
	fswitch enable	Enable all FC interfaces.
	fswitch fstov	Specify the fabric stability timeout value.
	fswitch ratov	Specify a Fibre Channel resource allocation timeout value for the storage router.
	show fswitch	Display global configuration information for storage router FC interfaces.

fswitch enable

To enable all Fibre Channel (FC) interfaces, use the **fswitch enable** command. To disable all FC interfaces, use the **no** form of this command.

fswitch enable

no fswitch enable

Syntax Description This command has no arguments or keywords.

Defaults All FC interfaces are enabled, by default.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines An FC interface must be enabled to allow access to storage targets or perform online loopback testing. Use this command to enable all FC interfaces at one time.

If you experience problems with FC storage, use the **no** form of this command to quickly disable all FC interfaces at once.

Examples The following example enables all FC interfaces and then performs an online loopback test for the FC interface named *fc6*:

```
[SN5428-2A] # fswitch enable
[SN5428-2A] # interface fc6 loopback online
```

The following example disables all FC interfaces.

```
[SN5428-2A] # no fswitch enable
```

Related Commands	Command	Description
	fswitch diag	Set all FC interfaces into diagnostic mode for testing purposes.
	interface fc? diag	Set the named FC interface into diagnostic mode for testing purposes.
	interface fc? enable	Enable the named FC interface.
	interface fc? loopback	Initiate a loopback test on the named FC interface.
	show fswitch	Display global configuration information for storage router FC interfaces.
	show fswitch eport	Display FSPF protocol information.

fcswitch fstov

To specify the fabric services timeout value, use the **fcswitch fstov** command.

fcswitch fstov {*nn* | **default**}

Syntax Description		
<i>nn</i>	The amount of time the storage router is to wait for fabric services, in milliseconds.	
default	Keyword, indicating the storage router will wait for 1000 milliseconds for fabric services.	

Defaults The default fabric stability timeout value is 1000 milliseconds.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines Use this command to specify the number of milliseconds the storage router will wait for fabric services.

Examples The following example sets the fabric services timeout value to 5000 milliseconds:

```
[SN5428-2A]# fcswitch fstov 5000
```

The following example resets the fabric services timeout value to the default of 1000 milliseconds:

```
[SN5428-2A]# fcswitch fstov default
```

Related Commands	Command	Description
	fcswitch dstov	Specify the amount of time the storage router is to wait for Fibre Channel Distributed Services.
	fcswitch edtov	Specify an error detect timeout value for all Fibre Channel interfaces.
	fcswitch enable	Enable all FC interfaces.
	fcswitch ratov	Specify a Fibre Channel resource allocation timeout value for the storage router.
	show fcswitch	Display global configuration information for storage router FC interfaces.

fswitch interop-credit

To set the buffer-to-buffer credit value for all Fibre Channel (FC) ports, use the **fswitch interop-credit** command.

fswitch interop-credit *credit*

Syntax Description

<i>credit</i>	The data buffer credit capacity, also known as the buffer-to-buffer credit value. The <i>credit</i> variable is an integer between 0 and 255 inclusive. The default value is 12.
---------------	--

Defaults

The data buffer credit capacity is 12, by default.

Command Modes

Administrator.

Command History

Release	Modification
2.5.1	This command was introduced for the SN 5428.
3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines

Use this command to set the data buffer credit capacity for all the storage router FC ports. The port buffer credit is used to determine how many maximum sized frames can be sent to a recipient before the sending port must wait for an acknowledgement. When the acknowledgement is received, the sending port can continue by sending the next frame. Port buffer credits are required when buffer-to-buffer flow control is in use. Buffer-to-buffer flow control occurs between directly connected FC ports.

The data buffer credit capacity must be the same for all switches across the fabric, and should be set to the lowest system-wide setting.

Examples

The following example sets the data buffer credit capacity to 15:

```
[SN5428-2A]# fswitch interop-credit 15
```

Related Commands	Command	Description
	fswitch domainid	Set the domain ID for the storage router, to be used for FC switched fabric zoning.
	fswitch enable	Enable all FC interfaces.
	fswitch zoning autosave	Configure the storage router to participate in FC switched zones.
	fswitch zoning default	Select the level of communication between the storage router and devices in the fabric where there is no active zone set.
	fswitch zoning merge	Set zoning merge compliance.
	interface fc? diag	Set the named FC interface into diagnostic mode for testing purposes.
	interface fc? enable	Enable the named FC interface.
	interface fc? loopback	Initiate a loopback test on the named FC interface.
	show fswitch	Display global configuration information for storage router FC interfaces.

fswitch log interface

To restrict the storage router's integrated Fibre Channel (FC) switch logging to information related to a specific FC interface, use the **fswitch log interface** command.

fswitch log interface {*if-name* | **default**}

Syntax Description	<i>if-name</i>	The name of the FC interface for which you are setting this parameter. Valid values are fc1 through fc8. When you type the interface fc? command, the CLI lists the interfaces available. You cannot specify a nonexistent interface.
	default	Enable logging for all FC interfaces.

Defaults None.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines The **fswitch log interface** command is designed for debug purposes, and should be used under the guidance of a Cisco Technical Support professional.

Examples The following example restricts logging for the integrated FC switch to information associated with *fc3*:

```
[SN5428-2A]# fswitch log interface fc3
```

Related Commands	Command	Description
	clear fswitch	Clear the switch log files of all entries or clear stored zoning configuration information.
	fswitch devlog	Specify logging parameters for the switch development log file.
	fswitch devlog enable	Enable development logging for the integrated FC switch component
	fswitch syslog	Specify logging parameters for the switch system log file.
	fswitch syslog enable	Enable system logging for the integrated FC switch component.
	show debug fswitch	Display internal FC interface parameters, including switch log entries.

fswitch ratov

To specify a Fibre Channel (FC) resource allocation timeout value for the storage router, use the **fswitch ratov** command.

fswitch ratov {*nn* | **default**}

Syntax Description		
<i>nn</i>		The amount of time the storage router is to wait to allow two FC ports to allocate enough resources to establish a link.
default		Keyword, indicating the storage router is to wait up to 10000 milliseconds to allow two FC ports to allocate enough resources to establish a link.

Defaults The default resource allocation timeout value is 10000 milliseconds.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines The resource allocation timeout value is the amount of time the storage router is to wait to allow two FC ports to allocate sufficient resources to establish a link.

Resource allocation timeout values should be the same for all storage routers or switches in the fabric.

Examples The following example sets the resource allocation timeout value to 9000 milliseconds:

```
[SN5428-2A]# fswitch ratov 9000
```

The following example resets the resource allocation timeout value to the default of 10000 milliseconds:

```
[SN5428-2A]# fswitch ratov default
```

Related Commands	Command	Description
	fswitch dstov	Specify the amount of time the storage router is to wait for Fibre Channel Distributed Services.
	fswitch edtov	Specify an error detect timeout value for all Fibre Channel interfaces.
	fswitch enable	Enable all FC interfaces.
	fswitch fstov	Specify the fabric stability timeout value.
	show fswitch	Display global configuration information for storage router FC interfaces.

fswitch syslog

To specify the logging parameters for the storage router's integrated Fibre Channel (FC) switch component system log file, use the **fswitch syslog** command.

```
fswitch syslog components component1 [component2...]
```

```
fswitch syslog level notification-level
```

Syntax Description	components	At least one of the components described in Table 6-3 .
	<i>component1</i> <i>[component2...]</i>	
	level <i>notification-level</i>	Limit logging to messages of a specified level or lower. See Table 6-4 in the Usage Guidelines section for a list of valid names that can be used for the <i>notification-level</i> argument.

Defaults All components log information into the storage router's integrated FC switch component system log, by default. The default notification level is *critical*.

Command Modes Administrator.

Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines Use this command to limit the amount of information recorded in the switch system log by component and by notification level. To stop all logging for all components, set the notification level to **none**.

Table 6-3 *fswitch syslog components*

Component	Description
Blade	Monitors modular circuit boards.
Chassis	Monitors chassis hardware components.
Eport	Monitors all Fibre Channel interfaces where the port is operating as an expansion port (E_Port).
NameServer	Monitors name server events.
MgmtServer	Monitors management server status.
Other	Monitors miscellaneous events.
Port	Monitors all port events.

Table 6-3 *fcswitch syslog components (continued)*

Component	Description
Switch	Monitors switch management events.
Zoning	Monitors zoning conflict events.

Table 6-4 *fcswitch syslog notification level*

Notification Level	Description
Critical	Log all messages from the selected components (critical, warning and informational).
Warn	Log all warning and informational messages for the selected components.
Info	Log informational messages only for the selected components.
None	Log no messages. This setting stops switch system logging.

Examples

The following example limits the switch system log file to informational messages only for name server, management server, port and switch management events:

```
[SN5428-2A]# fcswitch syslog components NameServer MgmtServer Port Switch
[SN5428-2A]# fcswitch syslog level info
```

The following example stops all switch syslog logging:

```
[SN5428-2A]# fcswitch syslog level none
```

Related Commands

Command	Description
clear fcswitch	Clear the switch log files of all entries or clear stored zoning configuration information.
fcswitch log interface	Restrict the integrated FC switch logging to information related to a specific FC interface.
fcswitch syslog enable	Enable system logging for the integrated FC switch component.
show debug fcswitch	Display internal FC interface parameters, including switch log entries.

fcswitch syslog enable

To start system logging for the storage router's integrated Fibre Channel (FC) switch component, use the **fcswitch syslog enable** command. To stop system logging, use the **no** form of this command.

fcswitch syslog enable

no fcswitch syslog enable

Syntax Description

This command has no arguments or keywords.

Defaults

System logging for the integrated FC switch component is started, by default.

Command Modes

Administrator.

Command History

Release	Modification
2.5.1	This command was introduced for the SN 5428.
3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines

The **fcswitch syslog enable** command is designed for debug purposes, and should be used under the guidance of a Cisco Technical Support professional.

Examples

The following example stops system logging for the integrated FC switch component. When system logging is started, logging will continue based on the existing component and notification level settings.

```
[SN5428-2A]# no fcswitch syslog enable
```

Related Commands

Command	Description
clear fcswitch	Clear the switch log files of all entries or clear stored zoning configuration information.
fcswitch log interface	Restrict the integrated FC switch logging to information related to a specific FC interface.
fcswitch syslog	Specify logging parameters for the switch system log file.
show debug fcswitch	Display internal FC interface parameters, including switch log entries.

fswitch zoning autosave

To enable the storage router to automatically save zoning changes received from switches in the fabric, use the **fswitch zoning autosave** command. To prevent the storage router from saving zoning changes, use the **no** form of this command.

fswitch zoning autosave enable

no fswitch zoning autosave enable

Syntax Description

autosave enable	Enables the storage router to save zoning changes received from switches in the fabric to non-volatile memory. This is the default.
------------------------	---

Defaults

The storage router saves zoning changes by default.

Command Modes

Administrator.

Command History

Release	Modification
2.5.1	This command was introduced for the SN 5428.
3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines

By default, the storage router can merge into existing FC switched fabric zones and participate in the zoning. Use the **no** form of this command, in conjunction with the **fswitch domainid** command with the **lock** keyword to prevent the storage router from participating in FC switched fabric zones.

Examples

The following example prevents the storage router from participating in FC switched fabric zones. The first command prevents the storage router from saving zoning changes received from switches in the fabric, and the second command locks the domain ID, preventing the FC switched fabric from making changes to that value.

```
[SN5428-2A]# no fswitch zoning autosave enable
[SN5428-2A]# fswitch domainid lock enable
```

Related Commands	Command	Description
	clear fcswitch	Clear the switch log files of all entries or clear stored zoning configuration information.
	fcswitch domainid	Set the domain ID for the storage router, to be used for FC switched fabric zoning.
	fcswitch enable	Enable all FC interfaces.
	fcswitch interop-credit	Set the data buffer credit capacity for all FC ports.
	fcswitch zoning default	Select the level of communication between the storage router and devices in the fabric where there is no active zone set.
	fcswitch zoning merge	Set zoning merge compliance.
	interface fc? diag	Set the named FC interface into diagnostic mode for testing purposes.
	interface fc? enable	Enable the named FC interface.
	interface fc? loopback	Initiate a loopback test on the named FC interface.
	show fcswitch	Display global configuration information for storage router FC interfaces.
	zone	Create a Fibre Channel fabric zone.
	zoneset	Create a Fibre Channel fabric zone set.
	zoneset enable	Activate a zone set.

fcswitch zoning default

To select the level of communication between the storage router and devices in the fabric when there is no active zone set, use the **fcswitch zoning default** command.

fcswitch zoning default {all | none}

Syntax Description

default all	Enables the storage router to communicate with all switches and other devices in the fabric when there is no active zone set. This is the default.
default none	When there is no active zone set, the storage router cannot communicate with any other switch or device in the fabric.

Defaults

If there is no active zone set, the storage router can communicate with all switches and other devices in the fabric, by default.

Command Modes

Administrator.

Command History

Release	Modification
2.5.1	This command was introduced for the SN 5428.
3.2.1	This command was introduced for the SN 5428-2.

Usage Guidelines

By default, the storage router can merge into existing FC switched fabric zones and participate in the zoning. Use this command to isolate the storage router and prevent communication with any switch or other device in the fabric, if there is no active zone set.

Before changing the default behavior, disconnect any ISL links to other fabric entities to prevent unintended disruption of fabric traffic.

Examples

The following example prevents the storage router from communicating with switches and all other devices in the fabric, if there is no active zone set:

```
[SN5428-2A]# fcswitch zoning default none
```

Related Commands	Command	Description
	clear fcswitch	Clear the switch log files of all entries or clear stored zoning configuration information.
	fcswitch domainid	Set the domain ID for the storage router, to be used for FC switched fabric zoning.
	fcswitch enable	Enable all FC interfaces.
	fcswitch interop-credit	Set the data buffer credit capacity for all FC ports.
	fcswitch zoning autosave	Enable the storage router to save zoning changes received from switches in the fabric.
	fcswitch zoning merge	Set zoning merge compliance.
	interface fc? diag	Set the named FC interface into diagnostic mode for testing purposes.
	interface fc? enable	Enable the named FC interface.
	interface fc? loopback	Initiate a loopback test on the named FC interface.
	show fcswitch	Display global configuration information for storage router FC interfaces.
	zone	Create a Fibre Channel fabric zone.
	zoneset	Create a Fibre Channel fabric zone set.
	zoneset enable	Activate a zone set.

fcswitch zoning merge

To set zoning merge compliance, use the **fcswitch zoning merge** command.

fcswitch zoning merge sw2

Syntax Description	sw2	Indicates the fabric includes only FC-SW-2 compliant switches. A merge may only occur of active zoning information, ensuring all switches have identical active zone sets. This is the default.
Defaults	The storage router is FC-SW-2 compliant, and is configured to participate in a fabric with only FC-SW-2 compliant switches by default.	
Command Modes	Administrator.	
Command History	Release	Modification
	2.5.1	This command was introduced for the SN 5428.
	3.2.1	This command was introduced for the SN 5428-2.
Usage Guidelines	By default, the storage router can merge into existing FC switched fabric zones and participate in the zoning. All switches in a fabric should be set to the same merge mode to prevent switches from becoming isolated from each other. By default, the storage router supports the FC-SW-2 compliant merge mode.	
Examples	The following example sets the merge mode for participation in a fabric with FC-SW-2 compliant switches: [SN5428-2A]# fcswitch zoning merge sw2	

Related Commands	Command	Description
	clear fcswitch	Clear the switch log files of all entries or clear stored zoning configuration information.
	fcswitch domainid	Set the domain ID for the storage router, to be used for FC switched fabric zoning.
	fcswitch enable	Enable all FC interfaces.
	fcswitch interop-credit	Set the data buffer credit capacity for all FC ports.
	fcswitch zoning autosave	Enable the storage router to save zoning changes received from switches in the fabric.
	fcswitch zoning default	Select the level of communication between the storage router and devices in the fabric where there is no active zone set.
	interface fc? diag	Set the named FC interface into diagnostic mode for testing purposes.
	interface fc? enable	Enable the named FC interface.
	interface fc? loopback	Initiate a loopback test on the named FC interface.
	show fcswitch	Display global configuration information for storage router FC interfaces.
	zone	Create a Fibre Channel fabric zone.
	zoneset	Create a Fibre Channel fabric zone set.
	zoneset enable	Activate a zone set.

