Cisco MDS 9000 Family NX-OS Intelligent Storage Services Configuration Guide

Cisco MDS NX-OS Release 6.2(1)
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Cisco MDS 9000 Family NX-OS Intelligent Storage Services Configuration Guide

CONTENTS

New and Changed Information

As of Cisco MDS NX-OS Release 5.0, software configuration information is available in new feature-specific configuration guides for the following information:

- System management
- Interfaces
- Fabric
- Quality of service
- Security
- IP services
- High availability and redundancy

The information in these new guides previously existed in the *Cisco MDS 9000 Family CLI Configuration Guide* and in the *Cisco MDS 9000 Family Fabric Manager Configuration Guide*. Those configuration guides remain available on Cisco.com and should be used for all software releases prior to MDS NX-OS Release 4.2(1). Each guide addresses the features introduced in or available in a particular release. Select and view the configuration guide that pertains to the software installed in your switch.

For a complete list of document titles, see the list of Related Documentation in the "Preface."

To find additional information about Cisco MDS NX-OS Release 6.2(1), see the *Cisco MDS 9000 Family Release Notes* available at the following Cisco Systems website:

http://www.cisco.com/en/US/products/ps5989/prod_release_notes_list.htm

About this Guide

The information in the new *Cisco MDS 9000 NX-OS Intelligent Storage Services Configuration Guide* previously existed in Part 7: Intelligent Storage Services of the *Cisco MDS 9000 Family CLI Configuration Guide.*

There are no new or changed CLI features for intelligent storage services in MDS NX-OS Release 6.2(1).

Preface

This preface describes the audience, organization, and conventions of the *Cisco MDS 9000 Family NX-OS Intelligent Storage Services Configuration Guide*. It also provides information on how to obtain related documentation.

Audience

This guide is for experienced network administrators who are responsible for configuring and maintaining the Cisco MDS 9000 Family of multilayer directors and fabric switches.

Organization

This document is organized as follows:

Chapter	Title	Description
Chapter 1	Intelligent Storage Services Overview	Provides an overview of the Intelligent Storage Services supported by the Cisco NX-OS software.
Chapter 2	Configuring SCSI Flow Services and Statistics	Describes the SCSI flow services and SCSI flow statistics, the Intelligent Storage Services.
Chapter 3	Configuring Fibre Channel Write Acceleration	Describes Fibre Channel Write Acceleration support and configuration.

Document Conventions

Command descriptions use these conventions:

boldface font	Commands and keywords are in boldface.
italic font	Arguments for which you supply values are in italics.
[ ]	Elements in square brackets are optional.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.

Screen examples use these conventions:

`screen font`	Terminal sessions and information the switch displays are in screen font.
`boldface screen font`	Information you must enter is in boldface screen font.
italic screen font	Arguments for which you supply values are in italic screen font.
`< >`	Nonprinting characters, such as passwords, are in angle brackets.
`[ ]`	Default responses to system prompts are in square brackets.
`!, #`	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

This document uses the following conventions:

Note Means reader *take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Related Documentation

The documentation set for the Cisco MDS 9000 Family includes the following documents. To find a document online, use the Cisco MDS NX-OS Documentation Locator at:

http://www.cisco.com/en/US/docs/storage/san_switches/mds9000/roadmaps/doclocater.htm

Release Notes

- *Cisco MDS 9000 Family Release Notes for Cisco MDS NX-OS Releases*
- *Cisco MDS 9000 Family Release Notes for MDS SAN-OS Releases*
- *Cisco MDS 9000 Family Release Notes for Storage Services Interface Images*
- *Cisco MDS 9000 Family Release Notes for Cisco MDS 9000 EPLD Images*

Regulatory Compliance and Safety Information

- *Regulatory Compliance and Safety Information for the Cisco MDS 9000 Family*

Compatibility Information

- *Cisco Data Center Interoperability Support Matrix*
- *Cisco MDS 9000 NX-OS Hardware and Software Compatibility Information and Feature Lists*
- *Cisco MDS NX-OS Release Compatibility Matrix for Storage Service Interface Images*

- *Cisco MDS 9000 Family Switch-to-Switch Interoperability Configuration Guide*
- *Cisco MDS NX-OS Release Compatibility Matrix for IBM SAN Volume Controller Software for Cisco MDS 9000*
- *Cisco MDS SAN-OS Release Compatibility Matrix for VERITAS Storage Foundation for Networks Software*

Hardware Installation

- *Cisco MDS 9500 Series Hardware Installation Guide*
- *Cisco MDS 9200 Series Hardware Installation Guide*
- *Cisco MDS 9100 Series Hardware Installation Guide*
- *Cisco MDS 9124 and Cisco MDS 9134 Multilayer Fabric Switch Quick Start Guide*

Software Installation and Upgrade

- *Cisco MDS 9000 NX-OS Release 4.1(x) and SAN-OS 3(x) Software Upgrade and Downgrade Guide*
- *Cisco MDS 9000 Family Storage Services Interface Image Install and Upgrade Guide*
- *Cisco MDS 9000 Family Storage Services Module Software Installation and Upgrade Guide*

Cisco NX-OS

- *Cisco MDS 9000 Family NX-OS Licensing Guide*
- *Cisco MDS 9000 Family NX-OS Fundamentals Configuration Guide*
- *Cisco MDS 9000 Family NX-OS System Management Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Interfaces Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Fabric Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Quality of Service Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Security Configuration Guide*
- *Cisco MDS 9000 Family NX-OS IP Services Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Intelligent Storage Services Configuration Guide*
- *Cisco MDS 9000 Family NX-OS High Availability and Redundancy Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Inter-VSAN Routing Configuration Guide*

Command-Line Interface

- *Cisco MDS 9000 Family Command Reference*

Intelligent Storage Networking Services Configuration Guides

- *Cisco MDS 9000 I/O Acceleration Configuration Guide*

- *Cisco MDS 9000 Family SANTap Deployment Guide*
- *Cisco MDS 9000 Family Data Mobility Manager Configuration Guide*
- *Cisco MDS 9000 Family Storage Media Encryption Configuration Guide*
- *Cisco MDS 9000 Family Secure Erase Configuration Guide*
- *Cisco MDS 9000 Family Cookbook for Cisco MDS SAN-OS*

Troubleshooting and Reference

- *Cisco NX-OS System Messages Reference*
- *Cisco MDS 9000 Family NX-OS Troubleshooting Guide*
- *Cisco MDS 9000 Family NX-OS MIB Quick Reference*
- *Cisco MDS 9000 Family NX-OS SMI-S Programming Reference*

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation, as an RSS feed and deliver content directly to your desktop using a reader application. The RSS feeds are a free service.

Intelligent Storage Services Overview

The Cisco MDS 9000 NX-OS software supports intelligent storage services that enable efficient storage area network administration. Intelligent storage services are features that are available on the Storage Services Module (SSM) such as the Small Computer System Interface (SCSI) flow services, SCSI flow statistics, and Fibre Channel Write Acceleration (FC-WA).

These features identify the SCSI I/O flow for a specified initiator-target pair. This information is used by the FC-WA feature to gather advanced I/O statistics for a specified initiator-target pair. The FC-WA feature decreases the latency of an I/O over long distances. The advanced I/O statistics that are collected can be used to evaluate the storage performance for the initiator-target pair.

This chapter includes the following sections:

SCSI

The Small Computer System Interface (SCSI) feature offers a better utilization of the storage network resources and eliminate the need for separate parallel WAN and MAN infrastructure. Users can connect hosts to storage networks on exisiting IP networks. Since this feature utilizes the TCP/IP for data transfer, the data is existing IP- based host connections such as Ethernet.

The chapters in this guide describe the following features:

- SCSI Flow Services—A SCSI flow service used by a SCSI initiator and a target. The SCSI flow services provide enhanced features for SCSI flows, such as write acceleration and flow monitoring for statistics gathering on an SSM.
- SCSI Flow Statistics—These are the statistics that can be collected for any combination of a SCSI initiator and a target. Statistics that be collected include SCSI reads, SCSI writes, SCSI commands, and error statistics.

For information on configuring SCSI flow services and statistics, see Chapter 2, “Configuring SCSI Flow Services and Statistics.”

Fibre Channel Write Acceleration

Fibre Channel Write Acceleration (FC-WA) minimizes application latency or reduces transactions per second over long distances. For synchronous data replication, FC-WA increases the distance of replication or reduces effective latency to improve performance. To take advantage of this feature, both the initiator and target devices must be directly attached to an SSM.

For information on configuring Fibre Channel Write Acceleration, see Chapter 3, “Configuring Fibre Channel Write Acceleration.”

Configuring SCSI Flow Services and Statistics

This chapter describes the Intelligent Storage Services features, SCSI flow services, and SCSI flow statistics, which are supported on the Storage Services Module (SSM).

This chapter includes the following sections:

SCSI Flow Services

An SCSI initiator and target combination is an SCSI flow. SCSI flow services provide enhanced features for SCSI flows, such as write acceleration and flow monitoring for statistics obtained on an SSM.

This section includes the following topics:

About SCSI Flow Services

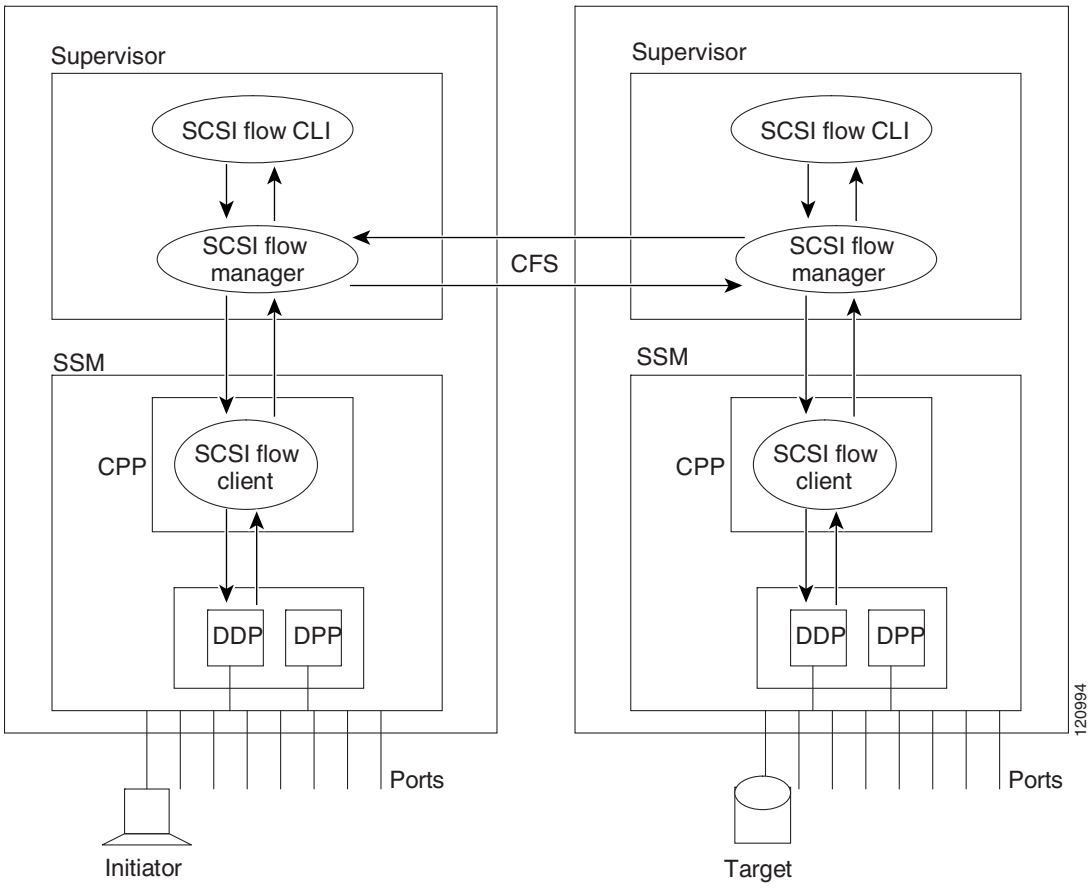
The SCSI flow services functional architecture consists of the following components:

- SCSI flow manager (SFM) on the supervisor—The SFM resides on a supervisor module and handles the configuration of SCSI flows, validating them and relaying configuration information to the appropriate SSM. It also handles any dynamic changes to the status of the SCSI flow due to external events and registers changes that occur due to various operations.
- SCSI flow configuration CLI on the supervisor—The SFCC resides on the CPP of the SSM. It receives flow configuration requests from the SFM, programs the DPP corresponding to the initiator and target port interfaces, and responds to the SFM with the status of the configuration request.
- SCSI flow configuration client on the Control Path Processor (CPP) of an SSM.

- SCSI flow feature set support on the Data Path Processor (DPP) of an SSM—The DPP on the SSM examines all the messages between the initiator and target and provides SCSI flow features, such as Fibre Channel write acceleration and statistics monitoring.

Figure 2-1 shows an example of the SCSI flow services functional architecture.

Figure 2-1 SCSI Flow Services Functional Architecture



Note The SCSI target and initiator must be connected to different SSMs on different switches.

Note For statistics monitoring, the target device is not required to be connected to an SSM.

SCSI Flow Manager

The SCSI flow manager (SFM) resides on a supervisor module and handles the configuration of SCSI flows, validating them and relaying configuration information to the appropriate SSM. It also handles any dynamic changes to the status of the SCSI flow due to external events. The SFM registers events resulting from operations, such as port up or down, VSAN suspension, and zoning that affects the SCSI flow status, and updates the flow status and configuration accordingly.

The SFM on the initiator communicates to its peer on the target side using Cisco Fabric Services (CFS). Peer communication allows the initiator SFM to validate target parameters and program information on the target side.

SCSI Flow Configuration Client

A SCSI flow configuration client (SFCC) resides on the CPP of the SSM. It receives flow configuration requests from the SFM, programs the DPP corresponding to the initiator and target port interfaces, and responds to the SFM with the status of the configuration request.

SCSI Flow Data Path Support

The DPP on the SSM examines all the messages between the initiator and target and provides SCSI flow features such as Fibre Channel write acceleration and statistics monitoring.

SCSI Flow Services Configuration

A SCSI flow specification consists of the following attributes:

- SCSI flow identifier
- VSAN identifier
- SCSI initiator port WWN
- SCSI target port WWN
- Flow feature set consisting of Fibre Channel Write Acceleration and statistics monitoring.

The SCSI flow specification is a distributed configuration because the SCSI initiator and the target might be physically connected to SSMs on two different switches located across the fabric. The configuration does not require information to identify either the switch name or the SSM slot location for either the initiator or the target. The manual SCSI flow configuration is performed only at the initiator side. This simplifies the configuration process. The initiator switch sends the configuration to the SFM on the target switch using CFS. No SCSI flow configuration is necessary on the target switch.

About Intelligent Storage Services

Intelligent Storage Services are features supported on the Storage Services Module (SSM). Intelligent Storage Services supported in Cisco MDS SAN-OS Release 2.0(2b) and later, or Cisco NX-OS 4.1.(1) include the following:

- SCSI flow services
- SCSI flow statistics

In Cisco MDS SAN-OS Release 2.1(1a) or later, or Cisco NX-OS 4.1(1), you can provision a subset of the ports for an SSM feature. The port range must be a multiple of four (for example fc4/1 through fc4-12).You can enable SCSI flow services either on the entire SSM or on groups of four interfaces.

Enabling SCSI flow services on interfaces has the following restrictions:

- The fewest number of interfaces that you can enable is four. You can specify fc1 through fc4, but not fc1 through fc2.

- The first interface in the group must be 1, 5, 9, 13, 17, 21, 25, or 29. You can specify fc5 through fc8, but not fc7 through fc10.
- The groups of four interfaces do not need to be consecutive. You can specify fc1 through fc8 and fc17 through fc20.

Note Fibre Channel Write Acceleration can only be provisioned on the entire SSM, not a group of interfaces on the SSM.

Enabling SCSI Flow Services

To enable SCSI flow services, follow these steps:

	Command	Purpose
Step 1	`switch# config t` `switch(config)#`	Enters configuration mode.
Step 2	`switch(config)# ssm enable feature scsi-flow module 2`	Enables SCSI flow services on the SSM in slot 2.
	`switch(config)# no ssm enable feature scsi-flow module 2`	Disables SCSI flow services on the SSM in slot 2. The default is disabled.
	`switch(config)# no ssm enable feature scsi-flow force module 2`	Forces the switch to disable SCSI flow services on the SSM in slot 2. The default is disabled.
Step 3	`switch(config)# ssm enable feature scsi-flow interface fc 2/5 - 8`	Enables SCSI flow services on interface 5 through 8 on the SSM in slot 2. **Note** Interfaces must be specified in multiples of four beginning at ports 1, 5, 9, 13, 17, 21, 25, and 29.
	`switch(config)# no ssm enable feature scsi-flow interface fc 2/5 - 8`	Disables SCSI flow services on interface 5 through 8 on the SSM in slot 2. The default is disabled.
	`switch(config)# no ssm enable feature scsi-flow force interface fc 2/5 - 8`	Forces the switch to disable SCSI flow services on the interface 5 through 8 on the SSM in slot 2.

Enabling SCSI Flow Configuration Distribution

To enable SCSI flow configuration distribution using CFS, follow these steps:

	Command	Purpose
Step 1	`switch# config t` `switch(config)#`	Enters configuration mode.
Step 2	`switch(config)# scsi-flow distribute`	Enables SCSI flow configuration distribution through CFS. The default is enabled.
	`switch(config)# no scsi-flow distribute`	Disables CFS distribution for SCSI flow configuration.

Configuring SCSI Flow Identifiers

A SCSI flow identifier is unique on a switch such as VSAN identifiers and is chosen by the user. To configure a SCSI flow identifier, follow these steps:

	Command	Purpose
Step 1	`switch# config t` `switch(config)#`	Enters configuration mode.
Step 2	`switch(config)# scsi-flow flow-id 3 initiator-vsan 2 initiator-pwwn 21:00:00:e0:8b:07:5f:aa target-vsan 4 target-pwwn 2a:20:00:05:30:00:77:e0`	Configures SCSI flow identifier 3 using the pWWNs of the initiator and the target. The flow identifier range is 1 to 65535.
	`switch(config)# no scsi-flow flow-id 3 initiator-vsan 2`	Removes SCSI flow identifier 3.

SCSI Flow Statistics

This section includes the following topics:

About SCSI Flow Statistics

The statistics that can be collected for SCSI flows include the following:

- SCSI reads
  - Number of I/Os
  - Number of I/O blocks
  - Maximum I/O blocks
  - Minimum I/O response time
  - Maximum I/O response time
- SCSI writes
  - Number of I/Os
  - Number of I/O blocks
  - Maximum I/O blocks
  - Minimum I/O response time
  - Maximum I/O response time
- Other SCSI commands (not read or write)
  - Test unit ready
  - Report LUN
  - Inquiry
  - Read capacity
  - Mode sense

  - Request sense
- Errors
  - Number of timeouts
  - Number of I/O failures
  - Number of various SCSI status events
  - Number of various SCSI sense key errors or events

To take advantage of this feature, only the initiator must be directly attached to an SSM.

Note The SCSI flow statistics feature requires the Enterprise Package license installed only on the initiator switches.

Note For SCSI flow statistics, the initiator must connect to an SSM on a Cisco MDS switch while the target can connect to any other switch in the fabric. The SCSI flow initiator and target cannot connect to the same switch.

Configuring SCSI Flow Statistics

This section includes the following topics:

Enabling SCSI Flow Statistics

To enable SCSI flow statistics monitoring, follow these steps:

	Command	Purpose
Step 1	`switch# config t` `switch(config)#`	Enters configuration mode.
Step 2	`switch(config)# scsi-flow flow-id 3 statistics`	Enables statistics monitoring on SCSI flow identifier 3.
	`switch(config)# no scsi-flow flow-id 3 statistics`	Disables statistics monitoring on SCSI flow identifier 3. The default is disabled.

Clearing SCSI Flow Statistics

Use the c**lear device-name statistics flow-id** command to clear SCSI flow statistics (for debugging purposes):

```
switch# clear scsi-flow statistics flow-id 3
```

Displaying SCSI Flow Services Information

Use the **show scsi-flow** command to display information about SCSI flow services (see Example 2-1 to Example 2-5).

Example 2-1 Displays Applications Provisioned on an SSM

```
switch# show ssm provisioning
Module   Ports       Application        Provisioning Status
--------------------------------------------------------
   4      1-32           scsi-flow            success
```

Example 2-2 Displays SCSI Flow Services Configuration for All SCSI Flow Identifiers

```
switch# show scsi-flow
Flow Id: 3
        Initiator VSAN: 101
        Initiator WWN: 21:00:00:e0:8b:05:76:28
        Target VSAN: 102
        Target WWN: 21:00:00:20:37:38:7f:7d
        Target LUN: ALL LUNs
        Flow Verification Status:
        ------------------------
           Initiator Verification Status:   success
           Target Verification Status:      success
           Initiator Linecard Status:       success
           Target Linecard Status:          success
        Feature Status:
        ---------------
          Write-Acceleration enabled
            Write-Acceleration Buffers: 1024
            Configuration Status:  success
          Statistics enabled
            Configuration Status:  success

Flow Id: 4
        Initiator VSAN: 101
        Initiator WWN: 21:00:00:e0:8b:05:76:28
        Target VSAN: 102
        Target WWN: 21:00:00:20:37:38:a7:89
        Target LUN: ALL LUNs
        Flow Verification Status:
        ------------------------
           Initiator Verification Status:   success
           Target Verification Status:      success
           Initiator Linecard Status:       success
           Target Linecard Status:          success
        Feature Status:
        ---------------
          Write-Acceleration enabled
            Write-Acceleration Buffers: 1024
            Configuration Status:  success
```

Example 2-3 Displays SCSI Flow Services Configuration for a Specific SCSI Flow Identifier

```
switch# show scsi-flow flow-id 3
Flow Id: 3
        Initiator VSAN: 101
        Initiator WWN: 21:00:00:e0:8b:05:76:28
        Target VSAN: 102
```

```
        Target WWN: 21:00:00:20:37:38:7f:7d
        Target LUN: ALL LUNs
        Flow Verification Status:
        -------------------------
           Initiator Verification Status:   success
           Target Verification Status:      success
           Initiator Linecard Status:       success
           Target Linecard Status:          success
        Feature Status:
        ---------------
          Write-Acceleration enabled
            Write-Acceleration Buffers: 1024
            Configuration Status:  success
          Statistics enabled
            Configuration Status:  success
```

Example 2-4 Displays SCSI Flow Services Statistics for All SCSI Flow Identifiers

```
switch# show scsi-flow statistics

Stats for flow-id 4 LUN=0x0000
------------------------------
 Read Stats
  I/O Total count=2
  I/O Timeout count=0
  I/O Total block count=4
  I/O Max block count=2
  I/O Min response time=5247 usec
  I/O Max response time=10160 usec
  I/O Active Count=0

 Write Stats
  I/O Total count=199935
  I/O Timeout count=0
  I/O Total block count=12795840
  I/O Max block count=64
  I/O Min response time=492 usec
  I/O Max response time=10056529 usec
  I/O Active Count=16

 Non Read-Write Stats
  Test Unit Ready=4
  Report LUN=38
  Inquiry=50
  Read Capacity=3
  Mode Sense=0
  Request Sense=0

 Total Stats
  Rx Frame Count=3792063
  Rx Frame Byte Count=6549984752
  Tx Frame Count=3792063
  Tx Frame Byte Count=6549984752

 Error Stats
  SCSI Status Busy=0
  SCSI Status Reservation Conflict=0
  SCSI Status Task Set Full=0
  SCSI Status ACA Active=0
  Sense Key Not Ready=0
  Sense Key Medium Error=0
  Sense Key Hardware Error=0
```

```
  Sense Key Illegal Request=0
  Sense Key Unit Attention=28
  Sense Key Data Protect=0
  Sense Key Blank Check=0
  Sense Key Copy Aborted=0
  Sense Key Aborted Command=0
  Sense Key Volume Overflow=0
  Sense Key Miscompare=0
```

Example 2-5 Displays SCSI Flow Services Statistics for a Specific SCSI Flow Identifier

```
switch# show scsi-flow statistics flow-id 4

Stats for flow-id 4 LUN=0x0000
------------------------------
 Read Stats
  I/O Total count=2
  I/O Timeout count=0
  I/O Total block count=4
  I/O Max block count=2
  I/O Min response time=5247 usec
  I/O Max response time=10160 usec
  I/O Active Count=0

 Write Stats
  I/O Total count=199935
  I/O Timeout count=0
  I/O Total block count=12795840
  I/O Max block count=64
  I/O Min response time=492 usec
  I/O Max response time=10056529 usec
  I/O Active Count=16

 Non Read-Write Stats
  Test Unit Ready=4
  Report LUN=38
  Inquiry=50
  Read Capacity=3
  Mode Sense=0
  Request Sense=0

 Total Stats
  Rx Frame Count=3792063
  Rx Frame Byte Count=6549984752
  Tx Frame Count=3792063
  Tx Frame Byte Count=6549984752

 Error Stats
  SCSI Status Busy=0
  SCSI Status Reservation Conflict=0
  SCSI Status Task Set Full=0
  SCSI Status ACA Active=0
  Sense Key Not Ready=0
  Sense Key Medium Error=0
  Sense Key Hardware Error=0
  Sense Key Illegal Request=0
  Sense Key Unit Attention=28
  Sense Key Data Protect=0
  Sense Key Blank Check=0
  Sense Key Copy Aborted=0
  Sense Key Aborted Command=0
  Sense Key Volume Overflow=0
  Sense Key Miscompare=0
```

Default Settings

Table 2-1 lists the default settings for SCSI flow services and SCSI flow statistics parameters.

Table 2-1 Default Intelligent Storage Services Parameters

Parameters	Default
SCSI flow services	Disabled
SCSI flow services distribution	Enabled
SCSI flow statistics	Disabled

Configuring Fibre Channel Write Acceleration

This chapter describes the Fibre Channel Write Acceleration(FC-WA) feature, including how to enable the feature on Cisco NX-OS.

This chapter includes the following sections:

About Fibre Channel Write Acceleration

Fibre Channel Write Acceleration minimizes application latency or reduces transactions per second over long distances. For synchronous data replication, Fibre Channel Write Acceleration increases the distance of replication or reduces effective latency to improve performance. With this feature you can also configure the buffer count and change the number of 2-KB buffers reserved on the target side DPP for a SCSI flow.

To take advantage of this feature, both the initiator and target devices must be directly attached to an SSM.

The Fibre Channel Write Acceleration feature also allows the configuration of the buffer count. You can change the number of 2-KB buffers reserved on the target side DPP for a SCSI flow.

You can estimate the number of buffers to configure using the following formula:

(Number of concurrent SCSI writes * size of SCSI writes in bytes) / FCP data frame size in bytes

For example, HDS TrueCopy between HDS 9970s uses 1-KB FCP data frames. You perform an initial synchronization for a 16-LUN TrueCopy group with 15 tracks, or 768-KB per LUN, which requires approximately 16*(768*1024)/1024 or 12248 write buffers.

Note The Fibre Channel write acceleration feature requires the Enterprise Package license installed on both the initiator and target switches.

Note The initiator and target cannot connect to the same Cisco MDS switch. Fibre Channel write acceleration requires that the initiator and target must each connect to an SSM module installed on different Cisco MDS switches.

Write Acceleration

To enable Fibre Channel Write Acceleration, and optionally modify the number of write acceleration buffers, follow these steps:

	Command	Purpose
Step 1	`switch# config t` `switch(config)#`	Enters configuration mode.
Step 2	`switch(config)# ssm enable feature scsi-flow module 2`	Enables SCSI flow services on the SSM in slot 2. **Note** Fibre Channel Write Acceleration can only be configured on all interfaces on the SSM, not on groups of interfaces.
Step 3	`switch(config)# scsi-flow flow-id 3 initiator-vsan 2 initiator-pwwn 21:00:00:e0:8b:07:5f:aa target-vsan 4 target-pwwn 2a:20:00:05:30:00:77:e0`	Configures SCSI flow identifier 3 using the pWWNs of the initiator and the target. The flow identifier range is 1 to 65535.
Step 4	`switch(config)# scsi-flow distribute`	Enables CFS distribution for the SCSI flow. **Note** No CFS configuration commit operation is required for SCSI flow. The SCSI flow manager uses CFS for target validation.
Step 5	`switch(config)# scsi-flow flow-id 3 write-acceleration`	Enables Fibre Channel write acceleration for SCSI flow identifier 3.
	`switch(config)# no scsi-flow flow-id 3 write-acceleration`	Disables SCSI flow write acceleration for SCSI flow identifier 3. The default is disabled.
Step 6	`switch(config)# scsi-flow flow-id 3 write-acceleration buffer 2048`	Enables Fibre Channel write acceleration for SCSI flow identifier 3 and sets the number of buffers to 2048. The range is 1 to 40000.
	`switch(config)# no scsi-flow flow-id 3 write-acceleration buffer 1024`	Reverts to the default number of write acceleration buffers. The default is 1024.

Displaying Fibre Channel Write Acceleration Information

Use the **show scsi-flow** command to display information about the status of the Fibre Channel write acceleration configuration (see Example 3-1 and Example 3-2).

Example 3-1 Displays Fibre Channel Write Acceleration Configuration for All SCSI Flow Identifiers

```
switch# show scsi-flow
Flow Id: 3
        Initiator VSAN: 101
```

```
        Initiator WWN: 21:00:00:e0:8b:05:76:28
        Target VSAN: 102
        Target WWN: 21:00:00:20:37:38:7f:7d
        Target LUN: ALL LUNs
        Flow Verification Status:
        -------------------------
           Initiator Verification Status:   success
           Target Verification Status:      success
           Initiator Linecard Status:       success
           Target Linecard Status:          success
        Feature Status:
        ---------------
          Write-Acceleration enabled
            Write-Acceleration Buffers: 1024
            Configuration Status:  success
          Statistics enabled
            Configuration Status:  success

Flow Id: 4
        Initiator VSAN: 101
        Initiator WWN: 21:00:00:e0:8b:05:76:28
        Target VSAN: 102
        Target WWN: 21:00:00:20:37:38:a7:89
        Target LUN: ALL LUNs
        Flow Verification Status:
        -------------------------
           Initiator Verification Status:   success
           Target Verification Status:      success
           Initiator Linecard Status:       success
           Target Linecard Status:          success
        Feature Status:
        ---------------
          Write-Acceleration enabled
            Write-Acceleration Buffers: 1024
            Configuration Status:  success
          Statistics enabled
            Configuration Status:  success
```

Example 3-2 Displays Fibre Channel Write Acceleration Configuration for a Specific SCSI Flow Identifier

```
switch# show scsi-flow flow-id 3
Flow Id: 3
        Initiator VSAN: 101
        Initiator WWN: 21:00:00:e0:8b:05:76:28
        Target VSAN: 102
        Target WWN: 21:00:00:20:37:38:7f:7d
        Target LUN: ALL LUNs
        Flow Verification Status:
        -------------------------
           Initiator Verification Status:   success
           Target Verification Status:      success
           Initiator Linecard Status:       success
           Target Linecard Status:          success
        Feature Status:
        ---------------
          Write-Acceleration enabled
            Write-Acceleration Buffers: 1024
            Configuration Status:  success
          Statistics enabled
            Configuration Status:  success
```

Default Settings

Table 3-1 lists the default settings for Fibre Channel write acceleration parameters.

Table 3-1 Default Fibre Channel Write Acceleration Parameters

Parameters	Default
Fibre Channel write acceleration	Disabled
Fibre Channel write acceleration buffers	1024

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