

Cisco MDS 9000 Series Intelligent Storage Services Configuration Guide, Release 9.x

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Preface

This preface describes the audience, organization of, and conventions used in the Cisco MDS 9000 Series Configuration Guides. It also provides information on how to obtain related documentation, and contains the following sections:

- Audience, on page v
- Document Conventions, on page v
- Documentation Feedback, on page vii
- Related Documentation, on page vii
- Communications, Services, and Additional Information, on page vii

Audience

This publication is for network administrators who install, configure, and maintain Cisco MDS 9000 Series Switches.

Document Conventions

Command descriptions use these conventions:

Convention	Description
bold	Bold text indicates the commands and keywords that you enter literally as shown.
Italic	Italic text indicates arguments for which the user supplies the values.
[x]	Square brackets enclose an optional element (keyword or argument).
[x | y]	Square brackets enclosing keywords or arguments separated by a vertical bar indicate an optional choice.
{x | y}	Braces enclosing keywords or arguments separated by a vertical bar indicate a required choice.

Convention	Description
[x {y | z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
`variable`	Indicates a variable for which you supply values, in context where italics cannot be used.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Examples use these conventions:

Convention	Description
`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.



Warning IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to mds-docfeedback@cisco.com. We appreciate your feedback.

Related Documentation

The entire Cisco MDS 9000 Series switches documentation set is available at the following URL:

https://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/series.html

Documentation Roadmap

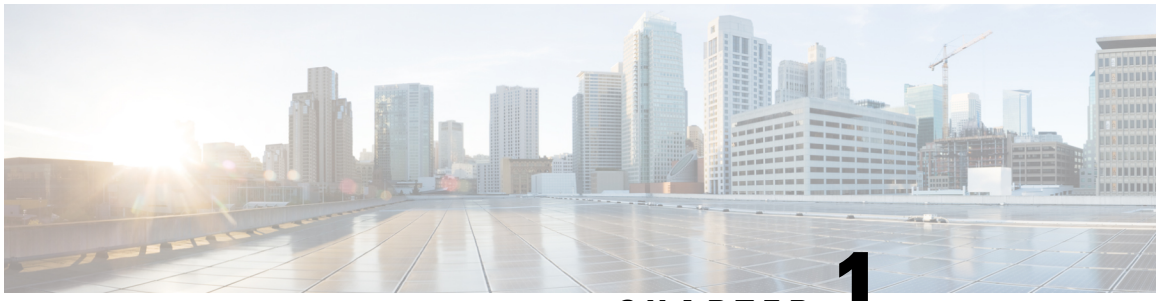
https://www.cisco.com/c/en/us/td/docs/storage/san_switches/mds9000/roadmaps/rel90.html

Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at Cisco Profile Manager.
- To get the business results you're looking for with the technologies that matter, visit Cisco Services.
- To submit a service request, visit Cisco Support.
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit Cisco DevNet.
- To obtain general networking, training, and certification titles, visit Cisco Press.
- To find warranty information for a specific product or product family, access Cisco Warranty Finder.

Cisco Bug Search Tool

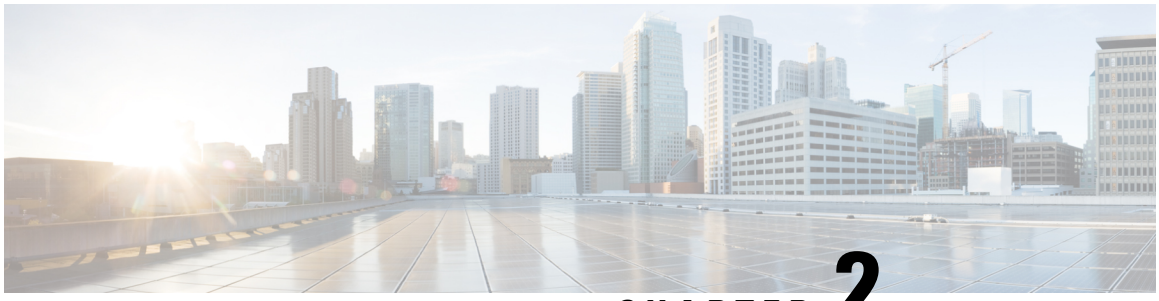
Cisco Bug Search Tool (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.



CHAPTER 1

Change Summary

There are no new features in the Cisco MDS 9000 Family NX-OS Intelligent Storage Services Configuration Guide for Cisco MDS NX-OS Release 8.1(1).



CHAPTER 2

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, on page 3
- Fibre Channel Write Acceleration, on page 3

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.

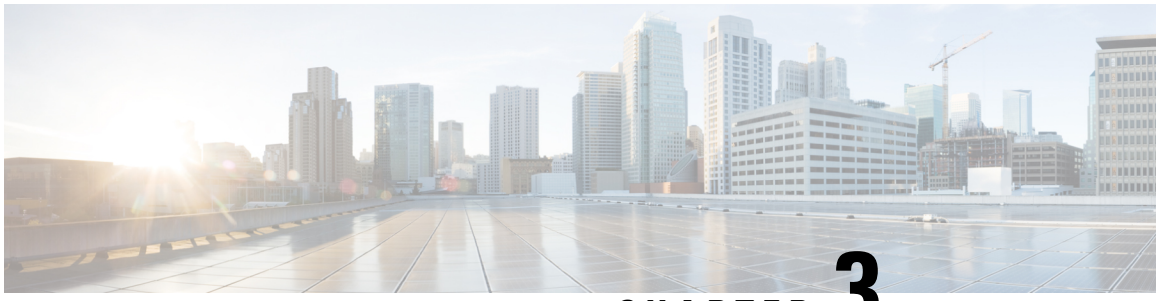
For information on configuring SCSI flow services and statistics, see

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 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, on page 5
- SCSI Flow Statistics, on page 9
- Displaying SCSI Flow Services Information, on page 11
- Default Settings, on page 13

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.

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

SUMMARY STEPS

1. switch# **config t**
2. switch(config)# **ssm enable feature scsi-flow module 2**
3. switch(config)# **no ssm enable feature scsi-flow module 2**
4. switch(config)# **no ssm enable feature scsi-flow force module 2**
5. switch(config)# **ssm enable feature scsi-flow interface fc 2/5 - 8**
6. switch(config)# **no ssm enable feature scsi-flow interface fc 2/5 - 8**
7. switch(config)# **no ssm enable feature scsi-flow force interface fc 2/5 - 8**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	switch# **config t** **Example:** `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.
Step 3	switch(config)# **no ssm enable feature scsi-flow module 2**	Disables SCSI flow services on the SSM in slot 2. The default is disabled.
Step 4	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.

	Command or Action	Purpose
Step 5	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.
Step 6	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.
Step 7	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:

SUMMARY STEPS

1. switch# **config t**
2. switch(config)# **scsi-flow distribute**
3. switch(config)# **no scsi-flow distribute**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	switch# **config t** **Example:** `switch(config)#`	Enters configuration mode.
Step 2	switch(config)# **scsi-flow distribute**	Enables SCSI flow configuration distribution through CFS. The default is enabled.
Step 3	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:

SUMMARY STEPS

1. switch# **config t**

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**
3. switch(config)# **no scsi-flow flow-id 3 initiator-vsan 2**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	switch# **config t** **Example:** `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.
Step 3	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

SUMMARY STEPS

1. switch# **config t**
2. switch(config)# **scsi-flow flow-id 3 statistics**
3. switch(config)# **no scsi-flow flow-id 3 statistics**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	switch# **config t** **Example:** `switch(config)#`	Enters configuration mode.
Step 2	switch(config)# **scsi-flow flow-id 3 statistics**	Enables statistics monitoring on SCSI flow identifier 3.
Step 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

Displaying SCSI Flow Services Information

Use the **show scsi-flow** command to display information about SCSI flow services.

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

The following example 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
```

The following example 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
```

The following example 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
```

The following example displays SCSI Flow Services Statistics for a Specific SCSI Flow Identifier:

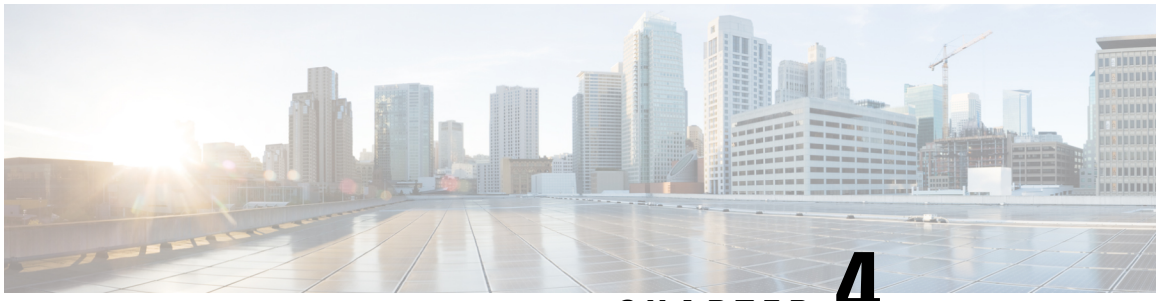
```
switch# show scsi-flow statistics flow-id 4
Stats for flow-id 4 LUN=0x0000
------------------------------
 Read Stats
  I/O Total count=2
  I/O Timeout count=0
  I/O Total block count=4
  I/O Max block count=2
  I/O Min response time=5247 usec
  I/O Max response time=10160 usec
  I/O Active Count=0
 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 1: Default Intelligent Storage Services Parameters , on page 14 lists the default settings for SCSI flow services and SCSI flow statistics parameters.

Table 1: Default Intelligent Storage Services Parameters

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



CHAPTER 4

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, on page 15
- Enabling Fibre Channel Write Acceleration, on page 16
- Displaying Fibre Channel Write Acceleration Information, on page 17
- Default Settings, on page 18

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.

Enabling Fibre Channel Write Acceleration

SUMMARY STEPS

1. switch# **config t**
2. switch(config)# **ssm enable feature scsi-flow module 2**
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**
4. switch(config)# **scsi-flow distribute**
5. switch(config)# **scsi-flow flow-id 3 write-acceleration**
6. switch(config)# **no scsi-flow flow-id 3 write-acceleration**
7. switch(config)# **scsi-flow flow-id 3 write-acceleration buffer 2048**
8. switch(config)# **no scsi-flow flow-id 3 write-acceleration buffer 1024**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	switch# **config t** **Example:** `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.

	Command or Action	Purpose
Step 5	switch(config)# **scsi-flow flow-id 3 write-acceleration**	Enables Fibre Channel write acceleration for SCSI flow identifier 3.
Step 6	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 7	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.
Step 8	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.

The following example 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
```

The following example 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 2: Default Fibre Channel Write Acceleration Parameters , on page 18 lists the default settings for Fibre Channel write acceleration parameters.

Table 2: Default Fibre Channel Write Acceleration Parameters

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