

Linux iSCSI Host to MDS/IPS–8 Configuration Example

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Introduction

Cisco's iSCSI drivers, which reside on the server, are a key component of an iSCSI solution. These iSCSI drivers intercept SCSI commands, encapsulate them into IP packets, and redirect them to the Cisco SN 5420, Cisco SN 5428, Cisco SN 5428–2, or Cisco MDS/IPS–8. This document provides sample configurations for Linux iSCSI host to MDS/IPS–8.

Before You Begin

Conventions

Cisco MDS 9000 that is used in this document refers to any Fibre Channel (FC) switch product in the MDS 9000 family (MDS 9506, MDS 9509, MDS 9216). IPS blade refers to IP Storage Services Module. For more information on document conventions, see the Cisco Technical Tips Conventions.

Prerequisites

- Before you start making your iSCSI configuration on the MDS 9000 you need to install iSCSI driver that is compatible to your Linux version. The most current version of the driver can be found at the Cisco iSCSI Driver for Linux (registered customers only) page on Cisco.com. The README.txt file is included in the driver zip(tar) file. The README contains information about the license agreement, driver installation and configuration instructions, and a technical overview of the driver architecture.
- The operating system requirements and patch requirements are described in the *System Requirements* section of the Cisco iSCSI Driver for Linux Release Notes.

Components Used

The information in this document is based on the software and hardware versions below.

- Linux Server

```
[root@sse-andres sbin]# uname -a
Linux sse-andres 2.4.18-3smp #1 SMP Thu Apr 18 07:27:31 EDT 2002 i686
Cisco-iscsi-3.4.0.4 has been used.
[root@sse-andres sbin]# iscsi-ls
```

```
*****
Cisco iSCSI Driver Version ... 3.4.0.4 (27-Aug-2003 )
*****
```

- Cisco MDS 9216 with Software Version 1.1(1a)

```
vatican# sh module
Mod  Ports  Module-Type          Model                Status
---  -
1    16     1/2 Gbps FC/Supervisor DS-X9216-K9-SUP     active *
2     8     IP Storage Module     DS-X9308-SMIP       ok

Mod  Sw          Hw          World-Wide-Name(s) (WWN)
---  -
1    1.1(1a)    1.0         20:01:00:0c:30:57:5e:c0 to 20:10:00:0c:30:57:5e:c0
2    1.1(1a)    0.2         20:41:00:0c:30:57:5e:c0 to 20:48:00:0c:30:57:5e:c0

Mod  MAC-Address(es)          Serial-Num
---  -
1    00-0b-be-f8-7f-00 to 00-0b-be-f8-7f-04  JAB070804Q3
2    00-05-30-00-a8-56 to 00-05-30-00-a8-62  JAB070205AM
```

* this terminal session

```
Vatican# sh ver
Cisco Storage Area Networking Operating System (SAN-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2003 by Cisco Systems, Inc. All rights reserved.
The copyright for certain works contained herein are owned by
Andiamo Systems, Inc. and/or other third parties and are used and
distributed under license.
```

```
Software
  BIOS:          version 1.0.7
  loader:        version 1.0(3a) [last : 1.1(0.133c)]
  kickstart:     version 1.1(1a)
  system:        version 1.1(1a)
```

```
  BIOS compile time:      03/20/03
  kickstart image file is: bootflash:/k111a
  kickstart compile time: 6/12/2003 14:00:00
  system image file is:   bootflash:/s111a
  system compile time:    6/12/2003 14:00:00
```

Hardware

RAM 963108 kB

```
bootflash: 500736 blocks (block size 512b)
slot0:      0 blocks (block size 512b)
```

```
vatican uptime is 7 days 1 hours 18 minute(s) 42 second(s)
```

```
Last reset at 955065 usecs after Wed Sep 10 08:13:50 2003
```

```
Reason: Reset Requested by CLI command reload
```

```
System version: 1.1(2)
```

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Background Theory

The IPS module provides IP hosts access to FC storage devices. The IPS module is DS-X9308-SMIP. It provides transparent SCSI routing. IP hosts using iSCSI protocol can transparently access iSCSI targets on the FC network. The IP host sends SCSI commands encapsulated in iSCSI Protocol Data Units (PDUs) to a MDS 9000 IPS port over a TCP/IP connection. On the IPS module, connectivity is provided in the form of Gigabit Ethernet interfaces that are appropriately configured. The IPS module enables you to create virtual iSCSI targets and maps them to physical FC targets available in the FC SAN. It presents the FC targets to IP hosts as if the physical targets were attached to the IP network.

Each iSCSI host that requires access to storage via the IPS module needs to have a compatible iSCSI driver installed. Using the iSCSI protocol, the iSCSI driver allows an iSCSI host to transport SCSI requests and responses over an IP network. From the perspective of a host operating system, the iSCSI driver appears to be a SCSI transport driver similar to a FC driver for a peripheral channel in the host. From the perspective of the storage device, each IP host appears as a FC host.

Routing SCSI from the IP host to the FC storage device consists of the following main actions:

- Transporting iSCSI requests and responses over an IP network between hosts and the IPS module.
- Routing SCSI requests and responses between hosts on an IP network and the FC storage device (converting iSCSI to FCP and vice versa). This routing is performed by the IPS module.
- Transporting FCP requests or responses between the IPS module and FC storage devices.

The IPS module does not import FC targets to iSCSI by default. Either dynamic or static mapping must be configured before the IPS module makes FC targets available to iSCSI initiators. When both are configured, statically mapped FC targets have a configured name. In this configuration you will see an example of static mapping. With dynamic mapping, each time the iSCSI host connects to the IPS module a new FC N port is created and the nWWNs and pWWNs allocated for this N port may be different. Use the static mapping method if you need to obtain the same nWWNs and pWWNs for the iSCSI host each time it connects to the IPS module. Static mapping can be used on the IPS module to access intelligent FC storage arrays that have access control and LUN mapping/masking configuration based on the initiator's pWWNs and/or nWWNs.

You can control access to each statically-mapped iSCSI target by specifying a list of IPS ports on which it will be advertised and specifying a list of iSCSI initiator node names allowed to access it. FC zoning-based access control and iSCSI-based access control are the two mechanisms by which access control can be provided for iSCSI. Both methods can be used simultaneously. In this configuration default zoning has been permitted for specific VSAN. IPS modules use both iSCSI node name-based and FC zoning-based access control lists to enforce access control during iSCSI discovery and iSCSI session creation.

- **iSCSI discovery:** When an iSCSI host creates an iSCSI discovery session and queries for all iSCSI targets, the IPS module returns only the list of iSCSI targets this iSCSI host is allowed to access based on the access control policies.

- **iSCSI session creation:** When an IP host initiates an iSCSI session, the IPS module verifies if the specified iSCSI target (in the session login request) is a static mapped target, and if true, verifies if the IP host's iSCSI node name is allowed to access the target. If the IP host does not have access, its login is rejected.

The IPS module, then creates a FC virtual N port (the N port may already exist) for this IP host and does a FC name server query for the FCID of the FC target pWWN that is being accessed by the IP host. It uses the IP host virtual N port's pWWN as the requester of the name server query. Thus, the name server does a zone-enforced query for the pWWN and responds to the query. If the FCID is returned by the name server, then the iSCSI session is accepted. Otherwise, the login request is rejected.

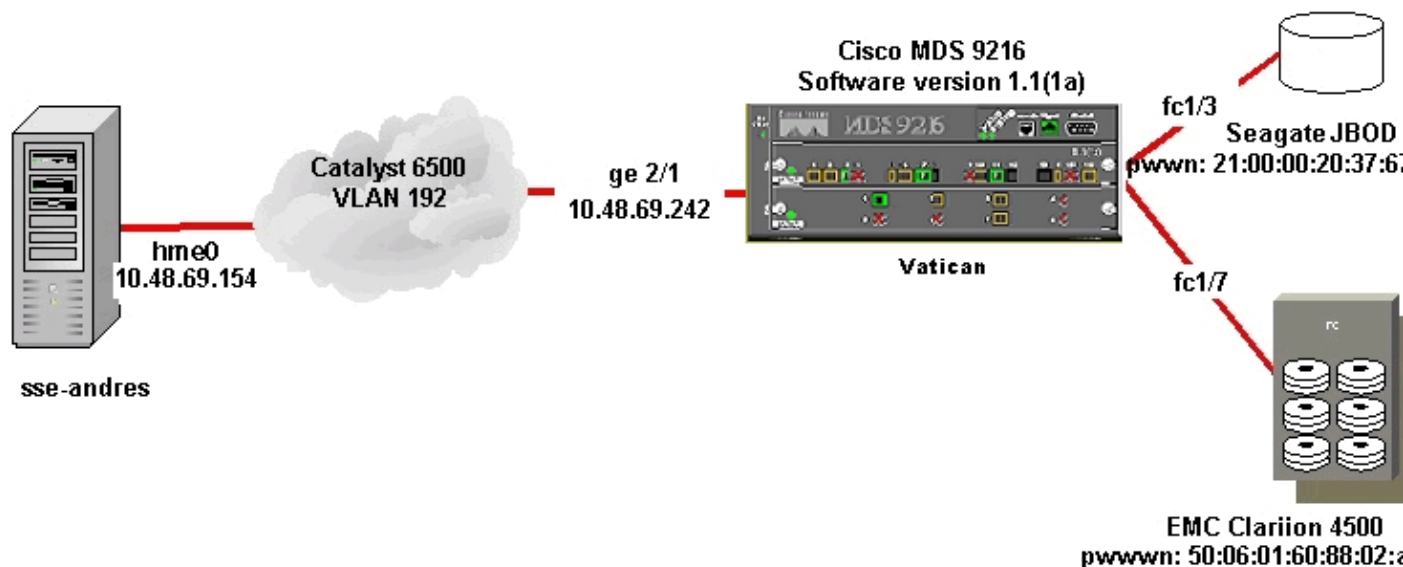
Configure

In this section, you are presented with the information to configure the MDS 9216 and Cisco iSCSI Driver for Linux.

Note: To find additional information on the commands used in this document, use the Cisco MDS 9000 Family Command Reference and Cisco MDS 9000 Family Software Configuration Guide.

Network Diagram

This document uses the network setup shown in the diagram below.



Configurations

This document uses the configurations shown below.

- sse-andres (Linux version 2.4.18-3)
- Vatican (MDS 9216)

sse-andres (Linux version 2.4.18-3)

On the Linux host, **iscsi.conf** needs to be modified.

```
[root@sse-andres etc]# cat /etc/iscsi.conf
```

```

# iSCSI configuration file - see iscsi.conf(5)

# Authentication Settings
# -----
# You may configure a default Username and Password to use for CHAP
# authentication by specifying the Global username and password parameters
# in the format as mentioned below. These entries will need to precede any
# "DiscoveryAddress" entries if authentication needs to be enabled for all the
# iSCSI targets.
#
# Example:
#
#Username=alice
#Password=nty57nbe
# or
#OutgoingUsername=alice
#OutgoingPassword=nty57nbe
#
# The "OutgoingUsername" will specify the username to be sent to the target
# for login authentication. The "OutgoingPassword" is the CHAP secret password
# to be used when sending challenge responses to the target.
#
# You may configure CHAP authentication settings that will apply to every
# target discovered at a particular address by adding "OutgoingUsername=u"
# and "OutgoingPassword=p" entries indented below the "DiscoveryAddress"
# entry they apply to.
#
# Example:
#
#DiscoveryAddress=192.168.10.94
DiscoveryAddress=10.48.69.242
Continuous=yes

!--- Configure the IP address of the GE interface that accepts iSCSI request from your host.

# LUN Settings
# -----
# The LUN settings can be specified per TargetName or for all the targets
# whose TargetNames are mentioned in the configuration file. If no TargetName
# is present in the configuration file, the lun(s) will be configured for
# all the available iSCSI targets.
# The LUN settings can be specified in the following 3 formats:-
# LUN=<lun_number>
# LUNs=<lun_range>
# LUNs=<lun_list>
#
# The range of luns to be configured can be specified using a hyphen. A comma
# separated list of luns can also be used.
# Example:
#
#LUN=35
#LUNs=39-47
#LUNs=200,49,0,31
LUNs=0-255

#
# LUNs can be configured per TargetName as mentioned in the format below.
#
#TargetName=iqn.1987-05.com.cisco:00.0d1d898e8d66.t0
# LUNs=39-47

# Continuous Discovery settings
# -----
# You can configure discovery session to be kept open by setting
# "Continuous" key to "yes" (default setting). Set Continuous=no to close

```

```

# the discovery session, once the discovery is over.
#
#Continuous=yes
#Continuous=no
#
# This parameter can be specified per DiscoveryAddress configuration.
#
#DiscoveryAddress=10.77.13.52
# Continuous=yes

[root@sse-andres iscsi]# cat /var/lib/iscsi/bindings
# iSCSI bindings, file format version 1.0.
# NOTE: this file is automatically maintained by the iSCSI daemon.
# You should not need to edit this file under most circumstances.
# If iSCSI targets in this file have been permanently deleted, you
# may wish to delete the bindings for the deleted targets.
#
# Format:
# bus target iSCSI
# id id TargetName
#
0 0 seagate
0 1 clariion-lun-3-4-5
[root@sse-andres iscsi]#

!--- The iSCSI driver discovery daemon process looks up each discovered target
!--- in the /var/lib/iscsi/bindings file. If an entry exists in the file for the
!--- target, the corresponding SCSI target ID is assigned to the target. If
!--- no entry exists for the target, the smallest available SCSI target ID
!--- is assigned and an entry is written to the /var/lib/iscsi/bindings file for
!--- this target.

!--- Note that the /var/lib/iscsi/bindings file will permanently contain entries
!--- for all iSCSI targets ever logged into from this host. If a target is
!--- no longer available to a host, you can manually edit the file and remove
!--- entries so that the obsolete target no longer consumes a SCSI target ID.
!--- If you know the iSCSI target name of a target in advance, and you want
!--- it to be assigned a particular SCSI target ID, you can add an entry
!--- manually. You should stop the iSCSI driver before editing the
!--- /var/lib/iscsi/bindings file.

!--- To manually start the iSCSI driver, enter /etc/init.d/iscsi start

!--- To manually stop the iSCSI driver, enter /etc/init.d/iscsi stop

```

Vatican (Cisco MDS 9216)

```

....
vsan database
vsan 555

!--- Vsan 555 has been used for iSCSI targets.
....
vsan database
vsan 555 interface fc1/3
vsan 555 interface fc1/7
....

boot system bootflash:/s111a
boot kickstart bootflash:/k111a

```

```
ip domain-name cisco.com
ip name-server 144.254.10.123
ip default-gateway 10.48.69.129
ip route 10.48.69.154 255.255.255.255 10.48.69.200
iscsi authentication none

ip routing

iscsi initiator ip-address 10.48.69.154
vsan 555

!--- Identifies the iSCSI initiator based on the IP address ande.
!--- Virtual N port is created for each NIC or network interface.

!--- Vsan 555 has been used for iSCSI targets, configure initiator IP address.
!--- Targets via Vsan 555 are accesible by iSCSI initiators.

iscsi virtual-target name seagate
pWWN 21:00:00:20:37:67:f7:a2 fc-lun 0000 iscsi-lun 0000
initiator ip address 10.48.69.154 permit

!--- Create a static iSCSI virtual target for LUN 3, 4, 5 of Clariion.

iscsi virtual-target name clariion-lun-3-4-5
pWWN 50:06:01:60:88:02:a8:2b fc-lun 0003 iscsi-lun 0003
pWWN 50:06:01:60:88:02:a8:2b fc-lun 0004 iscsi-lun 0004
pWWN 50:06:01:60:88:02:a8:2b fc-lun 0005 iscsi-lun 0005
advertise interface GigabitEthernet2/1
initiator ip address 10.48.69.154 permit
...
switchname vatican

....
zone default-zone permit vsan 555
....
interface GigabitEthernet2/1
ip address 10.48.69.242 255.255.255.192
iscsi authentication none
no shutdown

....
interface fcl/3
switchport mode FL
switchport trunk mode off
no shutdown
....
interface fcl/7
switchport mode F
switchport trunk mode off
no shutdown

interface mgmt0
ip address 10.48.69.157 255.255.255.192

interface iscsi2/1
no shutdown
```

Verify

This section provides information you can use to confirm your configuration is working properly.

- **netstat -n** – verifies the TCP connections on Linux host.
- **iscsi-ls** – shows the devices currently available; use the iscsi-ls utility on the Linux host.
- **show zone status** – displays Zone information.
- **show fcns database vsan 555** – displays Name Server information for a specific VSAN.
- **show flogi database vsan 555** – displays FLOGI Server information for a specific VSAN.
- **show vsan membership** – display interface information for different VSANs.
- **show iscsi initiator detail** – display iSCSI initiator information.
- **show iscsi initiator iscsi-session detail** – displays detailed information for iSCSI initiator session.
- **show iscsi initiator fcp-session detail** – displays detailed information for iSCSI initiator FCP session.
- **show ips stats tcp interface gigabitethernet 2/1 detail** – displays TCP statistics for specific GE interface.
- **show iscsi virtual-target configured** – displays iSCSI virtual targets that has been configured on the MDS 9000.
- **show iscsi initiator configured** – displays iSCSI initiators that have been configured on the MDS 9000.
- **show ips arp interface gigabitethernet 2/1** – displays IPS arp information for specific GE interface.
- **show scsi-target devices vsan 555** – displays SCSI devices for specific VSAN(for mapping FC-LUNs to iSCSI-LUNs).
- **show int iscsi 2/1** – displays iSCSI interfaces.
- **show iscsi stats iscsi 2/1** – displays iSCSI statistics.
- **show int gigabitethernet 2/1** – displays GE interface.
- **show ip route** – displays IP route information.

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

Troubleshooting Procedure

Below is troubleshooting information relevant to this configuration.

- Displays from sse-andres
- Displays from Vatican (Cisco MDS 9216)

Displays from sse-andres

```
[root@sse-andres init.d]# ./iscsi stop
Stopping iSCSI: sync umount sync iscsi

[root@sse-andres sbin]# pwd
/usr/local/sbin

[root@sse-andres sbin]# iscsi-ls
*****
Cisco iSCSI Driver Version ... 3.4.0.4 (27-Aug-2003 )
*****
```



```
[root@sse-andres init.d]# ./iscsi start
Name and location of the bindings file is changed to /var/lib/iscsi/bindings
Starting iSCSI: iscsi iscsid fsck/mount
```

```
[root@sse-andres sbin]# netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address Foreign Address State
tcp 0 0 10.48.69.154:37402 10.48.69.242:3260 ESTABLISHED
tcp 0 0 10.48.69.154:37403 10.48.69.242:3260 ESTABLISHED
tcp 0 0 10.48.69.154:37401 10.48.69.242:3260 ESTABLISHED
```

!--- After adding the clariion-lun-3-4-5 virtual target on the MDS 9216.

```
bindings
[root@sse-andres iscsi]# cat bindings
# iSCSI bindings, file format version 1.0.
# NOTE: this file is automatically maintained by the iSCSI daemon.
# You should not need to edit this file under most circumstances.
# If iSCSI targets in this file have been permanently deleted, you
# may wish to delete the bindings for the deleted targets.
#
# Format:
# bus target iSCSI
#
# id id TargetName
#
0 0 seagate
0 1 clariion-lun-3-4-5
[root@sse-andres iscsi]#
```

!--- To see the devices currently available, issue the iscsi-ls command.

```
[root@sse-andres sbin]# iscsi-ls
*****
Cisco iSCSI Driver Version ... 3.4.0.4 (27-Aug-2003 )
*****
TARGET NAME : seagate
TARGET ALIAS :
HOST NO : 1
BUS NO : 0
TARGET ID : 0
DISCOVERY ADDRESS : 10.48.69.242:3260
SESSION ESTABLISHED AT : Tue Sep 16 16:41:01 2003
NO. OF PORTALS : 1
TARGET ADDRESS 1 : 10.48.69.242:3260,128
SESSION ID : ISID 00023d000001 TSID 80
*****
TARGET NAME : clariion-lun-3-4-5
TARGET ALIAS :
HOST NO : 1
BUS NO : 0
TARGET ID : 1
DISCOVERY ADDRESS : 10.48.69.242:3260
SESSION ESTABLISHED AT : Tue Sep 16 16:41:03 2003
NO. OF PORTALS : 1
TARGET ADDRESS 1 : 10.48.69.242:3260,128
SESSION ID : ISID 00023d000001 TSID 80
*****
[root@sse-andres sbin]#
```

```
[root@sse-andres sbin]# iscsi-ls -l
*****
Cisco iSCSI Driver Version ... 3.4.0.4 (27-Aug-2003 )
*****
TARGET NAME : seagate
```

```
TARGET ALIAS :
HOST NO : 1
BUS NO : 0
TARGET ID : 0
DISCOVERY ADDRESS : 10.48.69.242:3260
SESSION ESTABLISHED AT : Wed Sep 17 12:28:18 2003
NO. OF PORTALS : 1
TARGET ADDRESS 1 : 10.48.69.242:3260,128
SESSION ID : ISID 00023d000001 TSID 80
```

DEVICE DETAILS :

```
LUN ID : 0
Vendor: SEAGATE Model: ST318203FC Rev: 0004
Type: Direct-Access ANSI SCSI revision: 02
*****
TARGET NAME : clariion-lun-3-4-5
TARGET ALIAS :
HOST NO : 1
BUS NO : 0
TARGET ID : 1
DISCOVERY ADDRESS : 10.48.69.242:3260
SESSION ESTABLISHED AT : Wed Sep 17 12:28:19 2003
NO. OF PORTALS : 1
TARGET ADDRESS 1 : 10.48.69.242:3260,128
SESSION ID : ISID 00023d000001 TSID 80
```

DEVICE DETAILS :

```
LUN ID : 3
Vendor: DGC Model: RAID 0 Rev: 0632
Type: Direct-Access ANSI SCSI revision: 04
LUN ID : 4
Vendor: DGC Model: RAID 0 Rev: 0632
Type: Direct-Access ANSI SCSI revision: 04
LUN ID : 5
Vendor: DGC Model: RAID 0 Rev: 0632
Type: Direct-Access ANSI SCSI revision: 04
*****
```

[root@sse-andres sbin]#

```
[root@sse-andres sbin]# iscsi-ls -t seagate
*****
Cisco iSCSI Driver Version ... 3.4.0.4 (27-Aug-2003 )
*****
TARGET NAME : seagate
TARGET ALIAS :
HOST NO : 1
BUS NO : 0
TARGET ID : 0
DISCOVERY ADDRESS : 10.48.69.242:3260
SESSION ESTABLISHED AT : Tue Sep 16 16:41:02 2003
NO. OF PORTALS : 1
TARGET ADDRESS 1 : 10.48.69.242:3260,128
SESSION ID : ISID 00023d000001 TSID 80
*****
```

[root@sse-andres sbin]#

[root@sse-andres sbin]# **fdisk -l**

Disk /dev/sda: 255 heads, 63 sectors, 4420 cylinders
Units = cylinders of 16065 * 512 bytes

```
Device Boot Start End Blocks Id System
/dev/sdal * 1 13 104391 83 Linux
```

```
/dev/sda2 14 267 2040255 82 Linux swap
/dev/sda3 268 4420 33358972+ 83 Linux
```

```
Disk /dev/sdb: 64 heads, 32 sectors, 17366 cylinders
Units = cylinders of 2048 * 512 bytes
```

```
Device Boot Start End Blocks Id System
```

```
Disk /dev/sdc: 64 heads, 32 sectors, 2047 cylinders
Units = cylinders of 2048 * 512 bytes
```

```
Device Boot Start End Blocks Id System
/dev/sdc1 1 2048 2096451 42 SFS
Partition 1 does not end on cylinder boundary:
phys=(260, 254, 63) should be (260, 63, 32)
```

```
Disk /dev/sdd: 64 heads, 32 sectors, 1023 cylinders
Units = cylinders of 2048 * 512 bytes
```

```
Device Boot Start End Blocks Id System
```

```
Disk /dev/sde: 64 heads, 32 sectors, 1023 cylinders
Units = cylinders of 2048 * 512 bytes
```

```
Device Boot Start End Blocks Id System
[root@sse-andres sbin]#
```

```
[root@sse-andres log]# pwd
/var/log/messages
```

```
Sep 16 16:40:20 sse-andres kernel: iSCSI: driver shutdown killing all sessions
Sep 16 16:40:21 sse-andres kernel: iSCSI: driver shutdown killing timer 19252
Sep 16 16:40:21 sse-andres kernel: iSCSI: driver shutdown waiting for timer to terminate
Sep 16 16:40:21 sse-andres kernel: iSCSI: driver shutdown complete at 35634430
Sep 16 16:41:01 sse-andres iscsid[19603]: version 3.4.0.4 (27-Aug-2003)
Sep 16 16:41:01 sse-andres iscsid[19603]: INBP boot check returned this_is_inbp_boot = 0
Sep 16 16:41:01 sse-andres kernel: iSCSI: bus 0 target 0 = seagate
Sep 16 16:41:01 sse-andres kernel: iSCSI: bus 0 target 0 portal 0 = address 10.48.69.242 port 3260
Sep 16 16:41:01 sse-andres kernel: iSCSI: bus 0 target 0 trying to establish session c2582000 to address 10.48.69.242 port 3260 group 128
Sep 16 16:41:01 sse-andres kernel: iSCSI: bus 0 target 0 established session c2582000 #1, portal 10.48.69.242 port 3260 group 128
Sep 16 16:41:01 sse-andres kernel: scsi singledevice 1 0 0 0
Sep 16 16:41:01 sse-andres kernel: Vendor: SEAGATE Model: ST318203FC Rev: 0004
Sep 16 16:41:01 sse-andres kernel: Type: Direct-Access ANSI SCSI revision: 02
Sep 16 16:41:01 sse-andres kernel: Attached scsi disk sdb at scsil, channel 0, id 0, lun 0
Sep 16 16:41:01 sse-andres kernel: iSCSI: bus 0 target 1 = clariion-lun-3-4-5
Sep 16 16:41:01 sse-andres kernel: iSCSI: bus 0 target 1 portal 0 = address 10.48.69.242 port 3260
Sep 16 16:41:01 sse-andres kernel: SCSI device sdb: 35566480 512-byte hdwr sectors (18210 MB)
Sep 16 16:41:01 sse-andres kernel: sdb:
```

Displays from Vatican (Cisco MDS 9216)

```
vatican# show zone status
VSAN: 1 default-zone: permit distribute: active only Interop: Off
Full Zoning Database :
  Zonesets:0 Zones:0 Aliases: 0
Active Zoning Database :
  Database Not Available
Status:

VSAN: 555 default-zone: permit distribute: active only Interop: Off
```

```
Full Zoning Database :
  Zonesets:0 Zones:0 Aliases: 0
Active Zoning Database :
  Database Not Available
Status: Default zoning policy changed to permit at Thu Sep 11 14:26:07 2003
```

```
!--- VSAN 555 has been used for this configuration, default-zone
!--- behavior has been set to permit.
```

```
vatican# sh flogi database vsan 555
```

```
-----
INTERFACE VSAN FCID PORT NAME NODE NAME
-----
```

```
fc1/3 555 0x6b00e8 21:00:00:20:37:67:f7:a2 20:00:00:20:37:67:f7:a2
fc1/7 555 0x6b0100 50:06:01:60:88:02:a8:2b 50:06:01:60:11:02:a8:2b
iscsi2/1 555 0x6b0103 20:03:00:0c:30:57:5e:c2 20:02:00:0c:30:57:5e:c2
```

```
Total number of flogi = 3.
```

```
vatican# sh fcns da vsan 555
```

```
VSAN 555:
```

```
-----
FCID TYPE PWWN (VENDOR) FC4-TYPE:FEATURE
-----
```

```
0x6b00e8 NL 21:00:00:20:37:67:f7:a2 (Seagate) scsi-fcp:target
0x6b0100 N 50:06:01:60:88:02:a8:2b (Clariion) scsi-fcp:target
0x6b0103 N 20:03:00:0c:30:57:5e:c2 (Cisco) scsi-fcp:init isc..w
```

```
Total number of entries = 3
```

```
!--- FCID 0x6b0103 is the virtual N port(HBA) for the iSCSI host.
```

```
vatican# show fcns database detail vsan 555
```

```
-----
VSAN:555 FCID:0x6b00e8
-----
```

```
port-wwn (vendor) :21:00:00:20:37:67:f7:a2 (Seagate)
node-wwn :20:00:00:20:37:67:f7:a2
class :3
node-ip-addr :0.0.0.0
ipa :ff ff ff ff ff ff ff ff
fc4-types:fc4_features:scsi-fcp:target
symbolic-port-name :
symbolic-node-name :
port-type :NL
port-ip-addr :0.0.0.0
fabric-port-wwn :20:03:00:0c:30:57:5e:c0
hard-addr :0x000000
-----
```

```
VSAN:555 FCID:0x6b0100
-----
```

```
port-wwn (vendor) :50:06:01:60:88:02:a8:2b (Clariion)
node-wwn :50:06:01:60:11:02:a8:2b
class :3
node-ip-addr :0.0.0.0
ipa :ff ff ff ff ff ff ff ff
fc4-types:fc4_features:scsi-fcp:target
symbolic-port-name :
symbolic-node-name :
port-type :N
port-ip-addr :0.0.0.0
fabric-port-wwn :20:07:00:0c:30:57:5e:c0
hard-addr :0x000000
-----
```

VSAN:555 FCID:0x6b0103

port-wwn (vendor) :20:03:00:0c:30:57:5e:c2 (Cisco)
node-wwn :20:02:00:0c:30:57:5e:c2
class :2,3
node-ip-addr :10.48.69.154
ipa :ff ff ff ff ff ff ff ff
fc4-types:fc4_features:scsi-fcp:init iscsi-gw
symbolic-port-name :
symbolic-node-name :10.48.69.154
port-type :N
port-ip-addr :0.0.0.0
fabric-port-wwn :20:41:00:0c:30:57:5e:c0
hard-addr :0x000000

Total number of entries = 3

vatican# **show iscsi initiator detail**

iSCSI Node name is 10.48.69.154
iSCSI Initiator name: iqn.1987-05.com.cisco:01.2079ebcbfce
iSCSI alias name: sse-andres
Node WWN is 20:02:00:0c:30:57:5e:c2 (dynamic)
Member of vsans: 555
Number of Virtual n_ports: 1

Virtual Port WWN is 20:03:00:0c:30:57:5e:c2 (dynamic)
Interface iSCSI 2/1, Portal group tag is 0x80
VSAN ID 555, FCID 0x6b0103
2 FC sessions, 2 iSCSI sessions
iSCSI session details
Target: seagate
Statistics:
PDU: Command: 52, Response: 52
Bytes: TX: 65688, RX: 0
Number of connection: 1
TCP parameters
Local 10.48.69.242:3260, Remote 10.48.69.154:37738
Path MTU: 1500 bytes
Retransmission timeout: 300 ms
Round trip time: Smoothed 3 ms, Variance: 5
Advertized window: Current: 142 KB, Maximum: 142 KB, Scale: 3
Peer receive window: Current: 576 KB, Maximum: 576 KB, Scale: 4
Congestion window: Current: 10 KB
Target: clariion-lun-3-4-5
Statistics:
PDU: Command: 79, Response: 79
Bytes: TX: 115000, RX: 0
Number of connection: 1
TCP parameters
Local 10.48.69.242:3260, Remote 10.48.69.154:37739
Path MTU: 1500 bytes
Retransmission timeout: 300 ms
Round trip time: Smoothed 4 ms, Variance: 6
Advertized window: Current: 192 KB, Maximum: 192 KB, Scale: 3
Peer receive window: Current: 576 KB, Maximum: 576 KB, Scale: 4
Congestion window: Current: 10 KB

FCP Session details
Target FCID: 0x6b00e8 (S_ID of this session: 0x6b0103)
pWWN: 21:00:00:20:37:67:f7:a2, nWWN: 20:00:00:20:37:67:f7:a2
Session state: LOGGED_IN
1 iSCSI sessions share this FC session
Target: seagate
Negotiated parameters
RcvDataFieldSize 1392 our_RcvDataFieldSize 1392
MaxBurstSize 0, EMPD: FALSE

Random Relative Offset: FALSE, Sequence-in-order: Yes
Statistics:
PDU: Command: 0, Response: 52
Target FCID: 0x6b0100 (S_ID of this session: 0x6b0103)
pWWN: 50:06:01:60:88:02:a8:2b, nWWN: 50:06:01:60:11:02:a8:2b
Session state: LOGGED_IN
1 iSCSI sessions share this FC session
Target: clariion-lun-3-4-5
Negotiated parameters
RcvDataFieldSize 1024 our_RcvDataFieldSize 1392
MaxBurstSize 0, EMPD: FALSE
Random Relative Offset: FALSE, Sequence-in-order: Yes
Statistics:
PDU: Command: 0, Response: 79

vatican# **show iscsi initiator iscsi-session detail**

iSCSI Node name is 10.48.69.154
iSCSI Initiator name: iqn.1987-05.com.cisco:01.2079ebcbfce
iSCSI alias name: sse-andres
Node WWN is 20:02:00:0c:30:57:5e:c2 (dynamic)
Member of vsans: 555
Number of Virtual n_ports: 1

Virtual Port WWN is 20:03:00:0c:30:57:5e:c2 (dynamic)
Interface iSCSI 2/1, Portal group tag is 0x80
VSAN ID 555, FCID 0x6b0103
2 FC sessions, 2 iSCSI sessions
iSCSI session details
Target: seagate
Statistics:
PDU: Command: 52, Response: 52
Bytes: TX: 65688, RX: 0
Number of connection: 1
TCP parameters
Local 10.48.69.242:3260, Remote 10.48.69.154:37738
Path MTU: 1500 bytes
Retransmission timeout: 300 ms
Round trip time: Smoothed 3 ms, Variance: 4
Advertized window: Current: 142 KB, Maximum: 142 KB, Scale: 3
Peer receive window: Current: 576 KB, Maximum: 576 KB, Scale: 4
Congestion window: Current: 10 KB
Target: clariion-lun-3-4-5
Statistics:
PDU: Command: 79, Response: 79
Bytes: TX: 115000, RX: 0
Number of connection: 1
TCP parameters
Local 10.48.69.242:3260, Remote 10.48.69.154:37739
Path MTU: 1500 bytes
Retransmission timeout: 300 ms
Round trip time: Smoothed 4 ms, Variance: 5
Advertized window: Current: 192 KB, Maximum: 192 KB, Scale: 3
Peer receive window: Current: 576 KB, Maximum: 576 KB, Scale: 4
Congestion window: Current: 10 KB

vatican# **show iscsi initiator fcp-session detail**

iSCSI Node name is 10.48.69.154
iSCSI Initiator name: iqn.1987-05.com.cisco:01.2079ebcbfce
iSCSI alias name: sse-andres
Node WWN is 20:02:00:0c:30:57:5e:c2 (dynamic)
Member of vsans: 555
Number of Virtual n_ports: 1

Virtual Port WWN is 20:03:00:0c:30:57:5e:c2 (dynamic)

Interface iSCSI 2/1, Portal group tag is 0x80
VSAN ID 555, FCID 0x6b0103
2 FC sessions, 2 iSCSI sessions

FCP Session details

Target FCID: 0x6b00e8 (S_ID of this session: 0x6b0103)
pWWN: 21:00:00:20:37:67:f7:a2, nWWN: 20:00:00:20:37:67:f7:a2
Session state: LOGGED_IN

1 iSCSI sessions share this FC session

Target: seagate

Negotiated parameters

RcvDataFieldSize 1392 our_RcvDataFieldSize 1392

MaxBurstSize 0, EMPD: FALSE

Random Relative Offset: FALSE, Sequence-in-order: Yes

Statistics:

PDU: Command: 0, Response: 52

Target FCID: 0x6b0100 (S_ID of this session: 0x6b0103)

pWWN: 50:06:01:60:88:02:a8:2b, nWWN: 50:06:01:60:11:02:a8:2b

Session state: LOGGED_IN

1 iSCSI sessions share this FC session

Target: clariion-lun-3-4-5

Negotiated parameters

RcvDataFieldSize 1024 our_RcvDataFieldSize 1392

MaxBurstSize 0, EMPD: FALSE

Random Relative Offset: FALSE, Sequence-in-order: Yes

Statistics:

PDU: Command: 0, Response: 79

vatican# show ips stats tcp interface gigabitethernet 2/1 detail

TCP Statistics for port GigabitEthernet2/1

TCP send stats

43984 segments, 4563280 bytes

23363 data, 20571 ack only packets

29 control (SYN/FIN/RST), 0 probes, 28 window updates

3 segments retransmitted, 144 bytes

3 retransmitted while on ethernet send queue, 1 packets split

0 delayed acks sent

TCP receive stats

62083 segments, 20548 data packets in sequence, 997148 bytes in sequence

1504 predicted ack, 20303 predicted data

0 bad checksum, 0 multi/broadcast, 0 bad offset

0 no memory drops, 0 short segments

0 duplicate bytes, 0 duplicate packets

0 partial duplicate bytes, 0 partial duplicate packets

0 out-of-order bytes, 1 out-of-order packets

0 packet after window, 0 bytes after window

0 packets after close

21696 acks, 4562950 ack bytes, 0 ack toomuch, 19373 duplicate acks

0 ack packets left of snd_una, 5 non-4 byte aligned packets

19282 window updates, 0 window probe

745 pcb hash miss, 478 no port, 6 bad SYN, 0 paws drops

TCP Connection Stats

0 attempts, 35 accepts, 35 established

33 closed, 13 drops, 0 conn drops

3 drop in retransmit timeout, 10 drop in keepalive timeout

0 drop in persist drops, 0 connections drained

TCP Miscellaneous Stats

21105 segments timed, 21685 rtt updated

15 retransmit timeout, 1 persist timeout

19448 keepalive timeout, 19437 keepalive probes

TCP SACK Stats

0 recovery episodes, 0 data packets, 0 data bytes

0 data packets retransmitted, 0 data bytes retransmitted

0 connections closed, 0 retransmit timeouts

TCP SYN Cache Stats

37 entries, 35 connections completed, 0 entries timed out

```
0 dropped due to overflow, 2 dropped due to RST
0 dropped due to ICMP unreachable, 0 dropped due to bucket overflow
0 abort due to no memory, 1 duplicate SYN, 183 no-route SYN drop
0 hash collisions, 0 retransmitted
```

TCP Active Connections

```
Local Address Remote Address State Send-Q Recv-Q
10.48.69.242:3260 10.48.69.154:37737 ESTABLISH 0 0
10.48.69.242:3260 10.48.69.154:37738 ESTABLISH 0 0
10.48.69.242:3260 10.48.69.154:37739 ESTABLISH 0 0
0.0.0.0:3260 0.0.0.0:0 LISTEN 0 0
```

vatican# show iscsi virtual-target configured

```
target: clariion-lun-3-4-5
* Port WWN 50:06:01:60:88:02:a8:2b
Configured node
No. of LU mapping: 3
iSCSI LUN: 0003, FC LUN: 0003
iSCSI LUN: 0004, FC LUN: 0004
iSCSI LUN: 0005, FC LUN: 0005
No. of advertised interface: 1
GigabitEthernet 2/1
No. of initiators permitted: 2
initiator 10.48.69.154/32 is permitted
initiator 10.61.80.53/32 is permitted
all initiator permit is disabled
```

target: seagate

```
* Port WWN 21:00:00:20:37:67:f7:a2
Configured node
No. of LU mapping: 1
iSCSI LUN: 0000, FC LUN: 0000
No. of initiators permitted: 1
initiator 10.48.69.154/32 is permitted
all initiator permit is disabled
```

vatican# show iscsi initiator configured

```
iSCSI Node name is 10.48.69.238
Member of vsans: 1016

iSCSI Node name is 10.48.69.239
Member of vsans: 1016

iSCSI Node name is 100.100.100.10
Member of vsans: 600
No. of PWWN: 1
Port WWN is 20:03:00:0c:30:6c:24:42

iSCSI Node name is 10.48.69.154
Member of vsans: 555
```

vatican# show ips arp interface gigabitethernet 2/1

```
Protocol Address Age (min) Hardware Addr Type Interface
Internet 10.48.69.200 0 0008.e21e.c7bc ARPA GigabitEthernet2/1
Internet 10.48.69.201 5 0202.3d30.45c9 ARPA GigabitEthernet2/1
Internet 10.48.69.206 8 0202.3d30.45ce ARPA GigabitEthernet2/1
Internet 10.48.69.209 5 0009.7c60.561f ARPA GigabitEthernet2/1
Internet 10.48.69.226 6 0060.08f6.bcl1a ARPA GigabitEthernet2/1
Internet 10.48.69.229 3 0800.209e.edab ARPA GigabitEthernet2/1
Internet 10.48.69.230 3 0001.0349.ff13 ARPA GigabitEthernet2/1
Internet 10.48.69.231 5 0002.b3c1.7dab ARPA GigabitEthernet2/1
Internet 10.48.69.232 8 0003.4796.34c3 ARPA GigabitEthernet2/1
Internet 10.48.69.233 0 0010.4200.7d5b ARPA GigabitEthernet2/1
Internet 10.48.69.235 11 0800.20b6.6559 ARPA GigabitEthernet2/1
Internet 10.48.69.238 10 0030.6e1b.6f51 ARPA GigabitEthernet2/1
```



```
Internet 10.48.69.239 2 0030.6e1c.a00b ARPA GigabitEthernet2/1
Internet 10.48.69.241 0 000b.cdaf.b4c3 ARPA GigabitEthernet2/1
Internet 10.48.69.248 6 0202.3d30.45f8 ARPA GigabitEthernet2/1
Internet 10.48.69.252 2 0202.3d30.45fc ARPA GigabitEthernet2/1
Internet 10.10.2.28 9 0202.3d0a.021c ARPA GigabitEthernet2/1
```

```
vatican# vatican# show scsi-targe devices vsan 555
```

```
-----
VSAN FCID PWWN VENDOR MODEL REV
-----
```

```
555 0x6b00e8 21:00:00:20:37:67:f7:a2 SEAGATE ST318203FC 0004
555 0x6b0100 50:06:01:60:88:02:a8:2b DGC RAID 0 0632
```

```
vatican# sh int iscsi 2/1
```

```
iscsi2/1 is up
Hardware is GigabitEthernet
Port WWN is 20:41:00:0c:30:57:5e:c0
Admin port mode is ISCSI
Port mode is ISCSI
Speed is 1 Gbps
iSCSI initiator is identified by name
Number of iSCSI session: 3, Number of TCP connection: 3
Configured TCP parameters
Local Port is 3260
PMTU discover is enabled, reset timeout is 3600 sec
Keepalive-timeout is 60 sec
Minimum-retransmit-time is 300 ms
Max-retransmissions 4
Sack is disabled
Maximum allowed bandwidth is 500000 kbps
Minimum available bandwidth is 500000 kbps
Estimated round trip time is 10000 usec
5 minutes input rate 16 bits/sec, 2 bytes/sec, 0 frames/sec
5 minutes output rate 16 bits/sec, 2 bytes/sec, 0 frames/sec
iSCSI statistics
Input 17258 packets, 841000 bytes
Command 717 pdus, Data-out 0 pdus, 0 bytes
Output 19951 packets, 4216300 bytes
Response 711 pdus (with sense 12), R2T 0 pdus
Data-in 2687 pdus, 3246192 bytes
```

```
vatican# sh ip route
```

```
Codes: C - connected, S - static
```

```
Default gateway is 10.48.69.129
```

```
S 10.48.69.154 via 10.48.69.200, gigabitethernet2-1
S 10.61.80.53 via 10.48.69.200, gigabitethernet2-1
C 10.48.69.192/26 is directly connected, gigabitethernet2-1
C 10.48.69.128/26 is directly connected, mgmt0
```

```
vatican# sh ips ip route interface gigabitethernet 2/1
```

```
Codes: C - connected, S - static
```

```
No default gateway
```

```
S 10.61.80.53/32 via 10.48.69.200, GigabitEthernet2/1
S 10.48.69.154/32 via 10.48.69.200, GigabitEthernet2/1
C 10.48.69.192/26 is directly connected, GigabitEthernet2/1
```

```
vatican# sh ip route ?
```

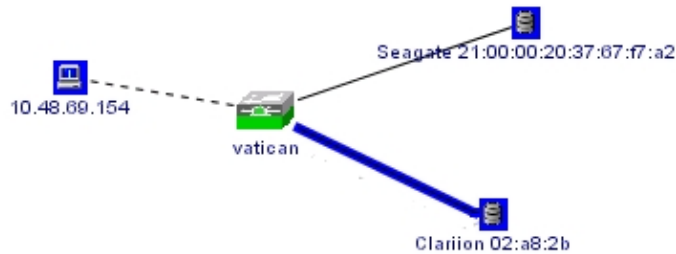
```
configured Show the IP routes configured on the system
```

```
<cr> Carriage Return
```

Fabric Manager and Device Manager Displays

This section provides screen captures from MDS Fabric Manager 1.1(2) and Device Manager 1.1.(2).

Topology diagram from the Fabric Manager



Select **FC-LUNs** to display the pWWNs, LUN IDs, and capacity of your LUNs from the Device Manager.

vatican - LUN

Discover Targets LUNs

VsanId, Port WWN	Id	Capacity (M...	SerialNum
555, Seagate 21:00:00:20:3...	0x0	18210	LRE809150000703...
555, Clariion 50:06:01:60:88:...	0x0	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x1	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x2	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x3	2147	f60004202091
555, Clariion 50:06:01:60:88:...	0x4	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x5	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x6	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x7	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x8	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x9	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0xa	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0xb	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0xc	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0xd	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0xe	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0xf	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x10	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x11	1074	f60004202091
555, Clariion 50:06:01:60:88:...	0x20	5369	f60004202091
555, Clariion 50:06:01:60:88:...	0x21	3221	f60004202091
666, Clariion 50:06:01:68:88:...	0x0	0	f60004202091
666, Clariion 50:06:01:68:88:...	0x1	0	f60004202091
666, Clariion 50:06:01:68:88:...	0x2	0	f60004202091
666, Clariion 50:06:01:68:88:...	0x3	0	f60004202091
666, Clariion 50:06:01:68:88:...	0x4	0	f60004202091
666, Clariion 50:06:01:68:88:...	0x5	0	f60004202091

Refresh Help Close

41 row(s)

Select **IP-iSCSI** to display the iSCSI sessions from Device Manager.

vatican - iSCSI

Initiators Targets Sessions Sessions Detail Session Statistics

Type	Direction	Initiator			Target		
		Name or IpAddress	Alias	Id	Name	Alias	Id
discovery	inbound	10.48.69.154	sse-andres	00:02:3d:00:00:01			128
normal	inbound	10.48.69.154	sse-andres	00:02:3d:00:00:01	seagate		128
normal	inbound	10.48.69.154	sse-andres	00:02:3d:00:00:01	clariion-lun-3-4-5		128

Connection... Refresh Help Close

Data retrieved at 10:53:16

Related Information

- [Cisco iSCSI Software Downloads](#)
- [Release Notes for Cisco Linux iSCSI Driver](#)
- [Technical Support & Documentation – Cisco Systems](#)

