CHAPTER 35

Configuring iSCSI

Cisco MDS 9000 Family IP storage (IPS) services extend the reach of Fibre Channel SANs by using open-standard, IP-based technology. The switch allows IP hosts to access Fibre Channel storage using the iSCSI protocol.

Note The iSCSI feature is specific to the IPS module and is available in Cisco MDS 9200 Switches or Cisco MDS 9500 Directors.

The Cisco MDS 9216I switch and the 14/2 Multiprotocol Services (MPS-14/2) module also allow you to use Fibre Channel, FCIP, and iSCSI features. The MPS-14/2 module is available for use in any switch in the Cisco MDS 9200 Series or Cisco MDS 9500 Series.

For information on configuring Gigabit Ethernet interfaces, see the "Configuring Gigabit Ethernet Interfaces" section on page 37-4.

This chapter includes the following sections:

- About iSCSI, page 35-1
- Configuring iSCSI, page 35-3
- iSCSI High Availability, page 35-38

  iSCSI Authentication Setup Guidelines and Scenarios, page 35-45

  About iSCSI Storage Name Services, page 35-58

  About iSNS Client Functionality, page 35-59

  Creating an iSNS Client Profile, page 35-59

  About iSNS Server Functionality, page 35-62

  Configuring iSNS Servers, page 35-63

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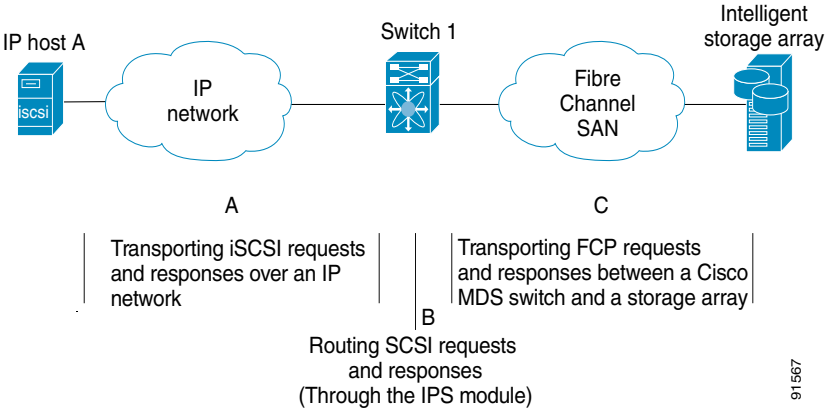
About iSCSI

The iSCSI feature consists of routing iSCSI requests and responses between iSCSI hosts in an IP network and Fibre Channel storage devices in the Fibre Channel SAN that are accessible from any Fibre Channel interface of the Cisco MDS 9000 Family switch (see Figure 35-1).

Figure 35-1 Transporting iSCSI Requests and Responses for Transparent iSCSI Routing

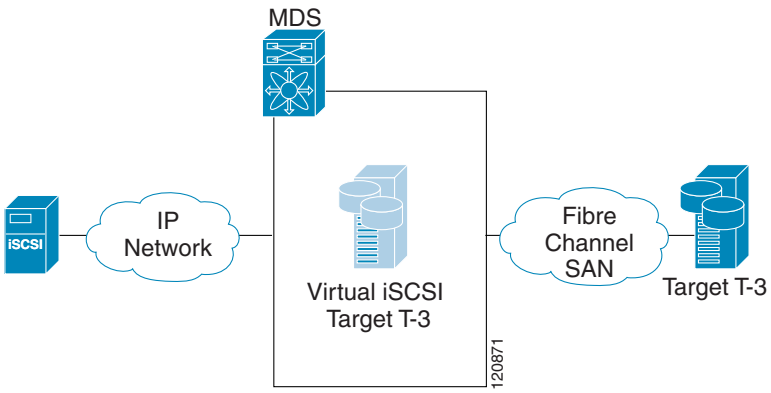


Each iSCSI host that requires access to storage through the IPS module or MPS-14/2 module needs to have a compatible iSCSI driver installed. (The Cisco.com website at http://www.cisco.com/cgi-bin/tablebuild.pl/sn5420-scsi provides a list of compatible drivers). Using the iSCSI protocol, the iSCSI driver allows an iSCSI host to transport SCSI requests and responses over an IP network. From the host operating system perspective, the iSCSI driver appears to be a SCSI transport driver similar to a Fibre Channel driver in the host.

The IPS module or MPS-14/2 module provides transparent SCSI routing. IP hosts using the iSCSI protocol can transparently access targets on the Fibre Channel network. Figure 35-1 provides an example of a typical configuration of iSCSI hosts connected to an IPS module or MPS-14/2 module via the IP network access Fibre Channel storage on the Fibre Channel SAN.

The IPS module or MPS-14/2 module create a separate iSCSI SAN view and Fibre Channel SAN view. For the iSCSI SAN view, the IPS module or MPS-14/2 module create iSCSI virtual targets and then maps them to physical Fibre Channel targets available in the Fibre Channel SAN. They present the Fibre Channel targets to IP hosts as if the physical iSCSI targets were attached to the IP network (see Figure 35-2).

Figure 35-2 iSCSI SAN View—iSCSI virtual targets



Fibre Channel SAN View—iSCSHI Host as an HBA

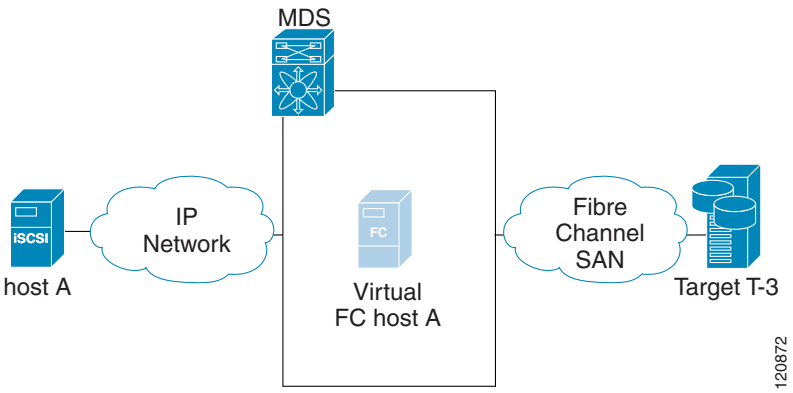
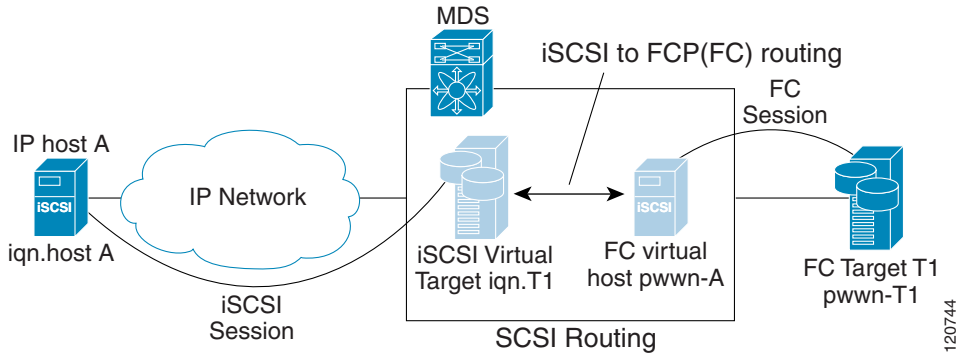


Figure 35-4 iSCSI to FCP (Fibre Channel) Routing



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

The iSCSI requests and responses are transported over an IP network between the hosts and the IPS module or MPS-14/2 module.

The SCSI requests and responses are routed between the hosts on an IP network and the Fibre Channel storage device (converting iSCSI to FCP and vice versa). The IPS module or MPS-14/2 module performs this conversion and routing.

The FCP requests or responses are transported between the IPS module or MPS-14/2 module and the Fibre Channel storage devices.

FCP (the Fibre Channel equivalent of iSCSI) carries SCSI commands over a Fibre Channel SAN. Refer to the IETF standards for IP storage at http://www.ietf.org for information on the iSCSI protocol.

Configuring iSCSI

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- Presenting iSCSI Hosts as Virtual Fibre Channel Hosts, page 35-10

  iSCSI Access Control, page 35-19

  iSCSI Session Authentication, page 35-22

  iSCSI Immediate Data and Unsolicited Data Features, page 35-25

  iSCSI Interface Advanced Features, page 35-26

  Displaying iSCSI Information, page 35-29

Enabling iSCSI

To use the iSCSI feature, you must explicitly enable iSCSI on the required switches in the fabric. By default, this feature is disabled in all switches in the Cisco MDS 9000 Family.

To enable iSCSI on any participating switch, follow these steps:

	Command	Purpose
Step 1		
Step 2		

Caution When you disable this feature, all related configurations are automatically discarded.

Creating iSCSI Interfaces

Step 1

```
switch# config terminal
switch(config)# interface gigabitethernet 2/1
switch(config-if)# no shutdown
```

Step 2

```
    exit
interface iscsi 2/1
    no shutdown
```

Presenting Fibre Channel Targets as iSCSI Targets

- Dynamic mapping—automatically maps all the Fibre Channel target devices/ports as iSCSI devices. Use this mapping to create automatic iSCSI target names.
- Static mapping—Manually create iSCSI target devices and map them to the whole Fibre Channel target port or a subset of Fibre Channel LUNs. With this mapping, you must specify unique iSCSI target names.

  Static mapping should be used when iSCSI hosts should be restricted to subsets of LUs in the Fibre Channel targets and/or iSCSI access control is needed (see the "iSCSI Access Control" section on page 35-19). Also, static mapping allows configuration of transparent failover if the LUs of the Fibre Channel targets are reachable by redundant Fibre Channel ports (see the "Transparent Target Failover" section on page 35-38).

The IPS module or MPS-14/2 module does not import Fibre Channel targets to iSCSI by default. Either dynamic or static mapping must be configured before the IPS module or MPS-14/2 module makes Fibre Channel targets available to iSCSI initiators.

Dynamic Mapping

The iSCSI target node name is created automatically using the iSCSI qualified name (IQN) format. The iSCSI qualified name is restricted to a maximum name length of 223 alphanumeric characters and a minimum length of 16 characters.

The IPS module or MPS-14/2 module creates an IQN formatted iSCSI target node name using the following conventions because the name must be unique in the SAN:

- IPS Gigabit Ethernet ports that are not part of a VRRP group or PortChannel use this format:

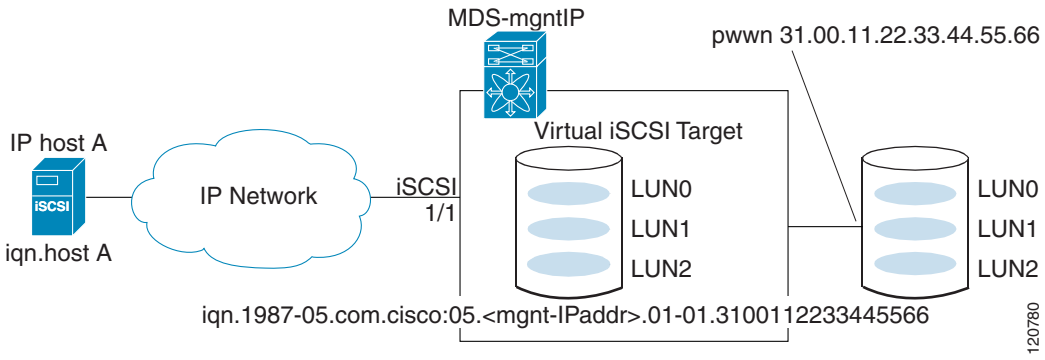
```
iqn.1987-05.com.cisco:05.<mgmt-ip-address>.<slot#>-<port#>-<sub-intf#>.<Target-pWWN>
```

```
iqn.1987-05.com.cisco:05.vrrp-<vrrp-ID#>-<vrrp-IP-addr>.<Target-pWWN>
```

```
iqn.1987-02.com.cisco:02.<mgmt-ip-address>.pc-<port-ch-sub-intf#>.<Target-pWWN>
```

iqn.1987-05.com.cisco:05.<*MDS_switch_management_IP_address*>.01-01.3100112233445566 (see Figure 35-5).

Dynamic Target Mapping

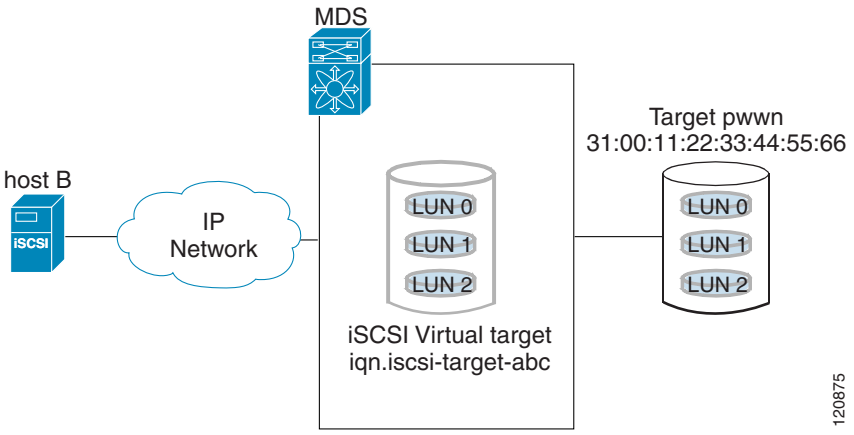


iscsi import target fc	

Static Mapping

You can manually (statically) create an iSCSI target by assigning a user-defined unique iSCSI node name to it. The iSCSI qualified name is restricted to a minimum length of 16 characters and a maximum of 223 characters. A statically mapped iSCSI target can either map the whole Fibre Channel target port (all LUNs in the target port mapped to the iSCSI target), or it can contain one or more LUs from a Fibre Channel target port (see Figure 35-1).

Figure 35-6 Statically Mapped iSCSI Targets



	Command	Purpose
Step 1		
Step 2	`iscsi virtual-target name iqn.iscsi-target-abc`	
Step 3	`pWWN 31:00:11:22:33:44:55:66`	virtual target. One iSCSI target cannot contain more than one Fibre Channel target port. Do not specify the LUN if you wish to map the whole Fibre Channel target to an iSCSI target. All Fibre Channel target LUNs are exposed to iSCSI.
	`pWWN 31:00:11:22:33:44:55:66 fc-lun 0x1 iscsi-lun 0x1`	Maps a virtual target using LUN mapping options. Use this LUN option to map different Fibre Channel LUNs to different iSCSI virtual targets. The CLI interprets the LUN identifier value as a hexadecimal value whether or not the **0x**

Tip

Note

Advertising Static iSCSI Targets

	Command	Purpose
Step 1	`switch(config-iscsi-tgt)#` **`interface GigabitEthernet 2/5`**	
	`no advertise` `interface GigabitEthernet 2/5`	

iSCSI Virtual Target Configuration Examples

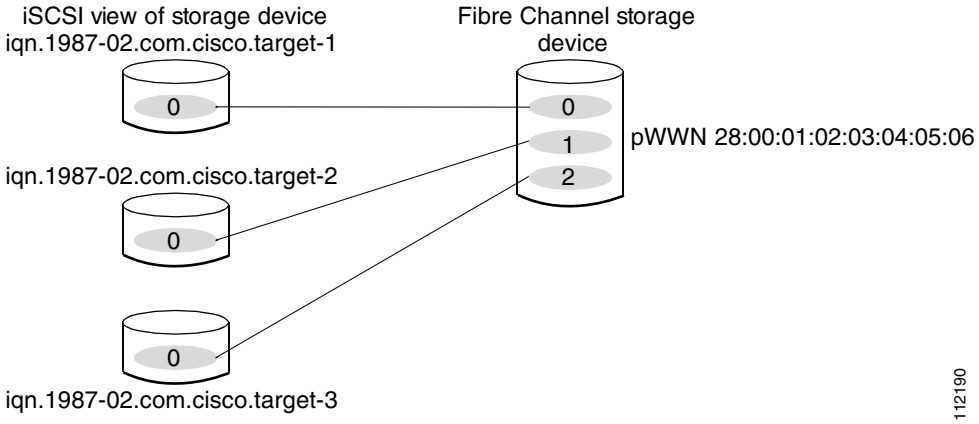
Example 1

Figure 35-7 Assigning iSCSI Node Names

```
pWWN 28:00:01:02:03:04:05:06
```

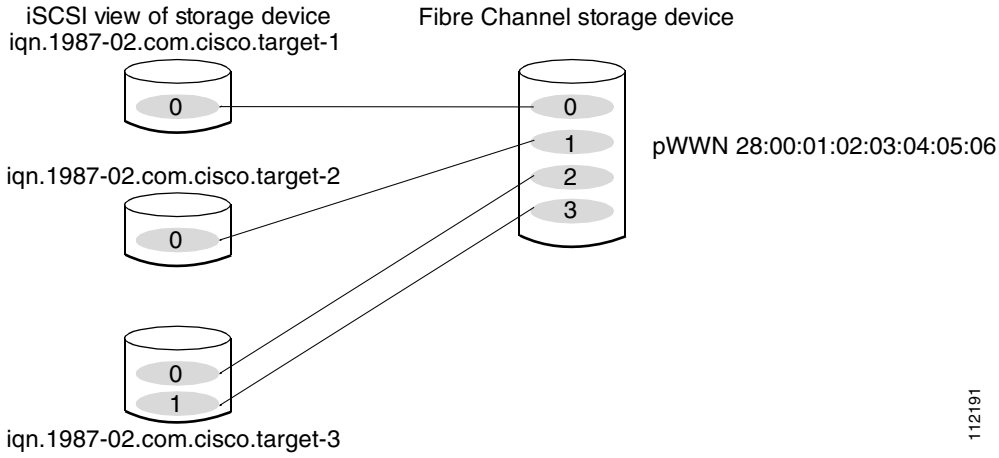
Example 2

Figure 35-8 Mapping LUNs to a iSCSI Node Name



Example 3

Figure 35-9 Mapping LUNs to Multiple iSCSI Node Names



Presenting iSCSI Hosts as Virtual Fibre Channel Hosts

Initiator Identification

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	Command	Purpose
Step 1		
Step 2		
Step 3		

Initiator Presentation Modes

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  to Fibre Channel, each host can have different zoning or LUN access control on the Fibre Channel storage device.

- In proxy-initiator mode, there is only one virtual Fibre Channel host per one IPS port and all iSCSI hosts use that to access Fibre Channel targets. In a scenario where the Fibre Channel storage device requires explicit LUN access control for every host, the static configuration for each iSCSI initiator can be overwhelming. In such case, using the proxy-initiator mode simplifies the configuration.

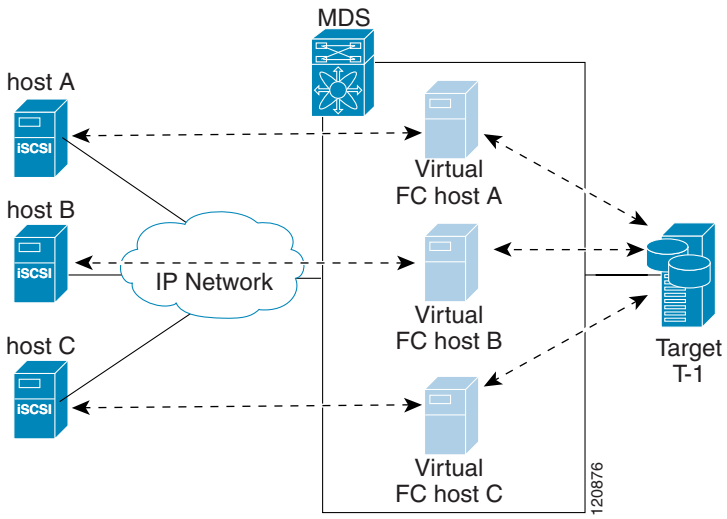
The Cisco MDS switches support the following iSCSI session limits:

- The maximum number of iSCSI sessions on a switch is 5000.
- The maximum number of iSCSI sessions per IPS port in transparent initiator mode is 500.
- The maximum number of iSCSI sessions per IPS port in proxy initiator mode is 250.
- The maximum number of concurrent iSCSI sessions allowed per port is 10.

Note If more than 10 iSCSI sessions try to come up simultaneously on a port, the initiator receives a temporary error and later retries to create a session.

Transparent Initiator Mode

Figure 35-10 Virtual Host HBA Port



-
-
- SCSI_FCP in the FC-4 type field of the name server

  Initiator flag in the FC-4 feature of the name server

  Vendor-specific iSCSI GW flag in the FC-4 type field to identify the N-port device as a iSCSI gateway device in the NS.

When all the iSCSI sessions from the iSCSI host are terminated, the IPS modules or MPS-14/2 modules perform an explicit Fabric logout (FLOGO) to remove the virtual N-port device from the Fibre Channel SAN (this indirectly de-registers the device from the Fibre Channel Name Server).

For every iSCSI session from the host to the iSCSI virtual target there is a corresponding Fibre Channel session to the real Fibre Channel target. In Figure 35-10, there are three iSCSI hosts and all three of them connect to the same Fibre Channel target. There is one Fibre Channel session from each of the three virtual Fibre Channel hosts to the target.

iSCSI Initiator Idle Timeout

WWN Assignment for iSCSI Initiators

An iSCSI host is mapped to an N port's WWNs by one of the following mechanisms:

- Dynamic mapping (default)
- Static mapping

Dynamic Mapping

The WWNs are allocated from the MDS switch's WWN pool. The WWN mapping to the iSCSI host is maintained as long as the iSCSI host has at least one iSCSI session to the IPS port. When all iSCSI sessions from the host are terminated and the IPS module or MPS-14/2 module performs an FLOGO for the virtual N port of the host, the WWNs are released back to the switch's Fibre Channel WWN pool. These addresses are then available for assignment to other iSCSI hosts requiring access to the Fibre Channel Fabric.

Dynamic mapping is the default mode of operation.

Static Mapping

-
-

Tip **system-assign**

name

Command	Purpose
Step 1	
Step 2	
`iqn.1987-02.com.cisco.initiator`	
`no iscsi initiator name iqn.1987-02.com.cisco.initiator`	

ip-address

`config terminal`	
`iscsi initiator ip-address 10.50.0.0`	
`no iscsi initiator ip-address 10.50.0.0`	

`static nWWN system-assign`	
`static nWWN 20:00:00:05:30:00:59:11`	
`static pWWN system-assign 2`	
`static pWWN 21:00:00:20:37:73:3b:20`	

Making the Dynamic Initiator WWN Mapping Static

	Command	Purpose
Step 1		
Step 2s		
Step 3		Returns to EXEC mode.
Step 4		

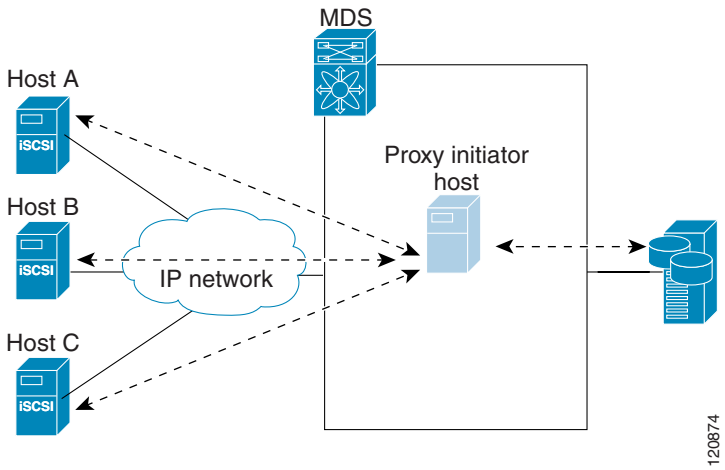
Checking for WWN Conflicts

install all

	Command	Purpose
Step 1		
Step 1	**iscsi duplicate-wwn-check** List of Potential WWN Conflicts: ------------------------------ Node : iqn.test-local-nwwn:1-local-pwwn:1 nWWN : 22:03:00:0d:ec:02:cb:02 pWWN : 22:04:00:0d:ec:02:cb:02	
	switch(config)#	
	switch(config-iscsi-init)#	
	switch(config-iscsi-init)#	

Proxy-Initiator Mode

Multiplexing IPS Ports



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

	Command	Purpose
Step 3		
Step 4		

VSAN Membership for iSCSI

-
-

VSAN Membership for iSCSI Hosts

	Command	Purpose
Step 1		
Step 2		
Step 3		Note

Note

VSAN Membership for iSCSI Interfaces

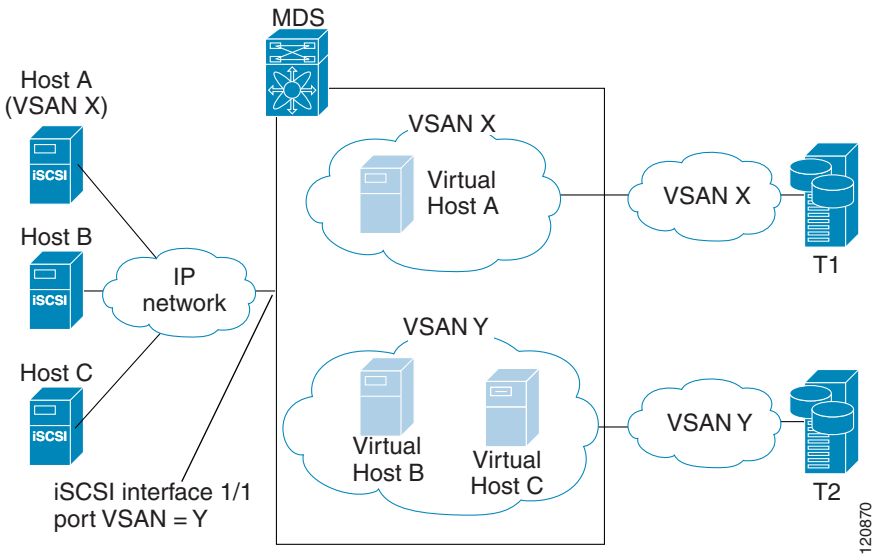
Tip

no iscsi interface vsan-membership

	Command	Purpose
Step 1		
Step 2		
Step 3		
Step 4		

Example of VSAN membership for iSCSI devices

-
-
-



Advanced VSAN membership for iSCSI hosts

iSCSI Access Control

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Fibre Channel Zoning Based Access Control

devices. Zoning is the standard access control mechanism for Fibre Channel devices which is applied within the context of a VSAN. Fibre Channel zoning has been extended to support iSCSI devices and their extension has the advantage of having a uniform, flexible access control mechanism across the whole SAN.

Common mechanisms of identifying members in Fibre Channel Zone are the following (see Chapter 19, "Configuring and Managing Zones" for details of Fibre Channel Zoning):

- Fibre Channel device pWWN
- Interface and Switch WWN. Device connecting via that interface is within the zone:

In the case of iSCSI, behind an iSCSI interface multiple iSCSI devices may be connected. Interface based zoning may not be useful because all the iSCSI devices behind the interface will automatically be within the same zone.

In transparent initiator mode (where one Fibre Channel virtual N port is created for each iSCSI host as described in the "Transparent Initiator Mode" section on page 35-11) if an iSCSI host has static WWN mapping then the standard Fibre Channel deice pWWN-based zoning membership mechanism can be used.

Zoning membership mechanism has been enhanced to add iSCSI devices to zones based on the following:

- IP address/mask (IP subnet)
- Symbolic-node-name (IQN)

For iSCSI hosts that do not have a static WWN mapping, the feature allows the IP address or iSCSI node name to be specified as zone members. Note that iSCSI hosts that have static WWN mapping can also use these features. IP address based zone membership allows multiple devices to be specified in one command by providing the subnet mask.

Note In proxy initiator mode, all iSCSI devices connecting to an IPS port gain access to the Fibre Channel fabric via a single virtual Fibre Channel N port. Thus, zoning based on the iSCSI node name or IP address will not have any effect. If zoning based on pWWN is used then all iSCSI devices connecting to that IPS port will be put in the same zone. To implement individual initiator access control in proxy initiator mode, configure a iSCSI ACL on the virtual target (see the "iSCSI ACL Based Access Control" section on page 35-21).

To add an iSCSI initiator to the zone database, follow these steps:

	Command	Purpose
Step 1		Enters configuration mode.
Step 2	**zone name iSCSIzone vsan 1** switch(config-zone)	
	switch(config-zone)# **member symbolic-nodename iqn.1987-02.com.cisco.initiator1**	
	switch(config-zone)# **no member symbolic-nodename iqn.1987-02.com.cisco.init1**	
	switch(config-zone)# **member ip-address 10.50.1.1**	
	switch(config-zone)# **no member ip-address 10.50.1.1**	
	switch(config-zone)# **member pwwn 20:00:00:05:30:00:59:11**	
	switch(config-zone)# **no member pwwn 20:00:00:05:30:00:59:11**	

iSCSI ACL Based Access Control

-
-
-

Note

	Command	Purpose
Step 1		
Step 2		
Step 3		
Step 4		

Enforcing Access Control

-

-

its login is rejected. If the iSCSI host is allowed, it validates if the virtual Fibre Channel N port used by the iSCSI host and the Fibre Channel target mapped to the static iSCSI virtual target are in the same Fibre Channel zone.

If the iSCSI target is an auto-generated iSCSI target, then the IPS module or MPS-14/2 module extracts the WWN of the Fibre Channel target from the iSCSI target name and verifies if the initiator and the Fibre Channel target is in the same Fibre Channel zone or not. If they are, then access is allowed.

The IPS module or MPS-14/2 module uses the Fibre Channel virtual N port of the iSCSI host and does a zone-enforced name server query for the Fibre Channel target WWN. If the FCID is returned by the name server, then the iSCSI session is accepted. Otherwise, the login request is rejected.

The IPS module or MPS-14/2 module supports iSCSI authentication mechanism to authenticate iSCSI hosts that request access to storage. By default, IPS module or MPS-14/2 modules allow CHAP or None authentication of iSCSI initiators. If authentication should always be used, you must configure the switch to allow only CHAP authentication.

For CHAP username or secret validation you can use any method supported and allowed by the Cisco MDS AAA infrastructure (see Chapter 28, “Configuring RADIUS and TACACS+”). AAA authentication supports RADIUS, TACACS+, or local authentication device.

The **aaa authentication iscsi** command enables aaa authentication for the iSCSI host and specifies the method to use.

To configure AAA authentication for an iSCSI user, follow these steps:

	Enters configuration mode.
iscsi default group RadServerGrp	
aaa authentication iscsi default group TacServerGrp	
aaa authentication iscsi default local	

You can configure iSCSI CHAP or None authentication at both the global level and at each interface level.

The authentication for a Gigabit Ethernet interface or subinterface overrides the authentication method configured at the global level.

If CHAP authentication should always be used, issue the **iscsi authentication chap** command at either the global level or at a per-interface level. If authentication should not be used at all, issue the **iscsi authentication none** command.

To configure the authentication mechanism for iSCSI, follow these steps:

config t	
iscsi authentication chap	

To configure the authentication mechanism for iSCSI sessions to a particular interface, follow these steps:

config t	
interface GigabitEthernet 2/1.100	
iscsi authentication none	

See the "Configuring User Accounts" section on page 26-10 to create the local password database. To create new users in the local password database for the iSCSI initiator, the iSCSI keyword is mandatory.

	Command	Purpose
Step 1		
Step 2		

Restricting iSCSI Initiator Authentication

	Command	Purpose
Step 1		
Step 2		
Step 3		Tip

Mutual CHAP Authentication

	Command	Purpose
Step 1		

Step 2	
!@*asdsfsdfjh!@df	(!@*asdsfsdfjh!@df) for all initiators.
username user1 password 0 abcd12AAA	Configures the switch user account (user1) along with a password (abcd12AAA) specified in clear text (indicated by 0—default) for all initiators. The password is limited to 64 characters.
no iscsi authentication username testuser	Removes the global configuration for all initiators.

config t	Enters configuration mode.
iscsi initiator name iqn.1987-02.com.cisco.initiator	Configures an iSCSI initiator using the iSCSI name of the initiator node.
mutual-chap username testuser password abc123	Configures the switch user account (user1) along with a password (abcd12AAA) specified in clear text (default). The password is limited to 64 characters.
mutual-chap username user1 password 7 !@*asdsfsdfjh!@df	Configures the switch user account (user1) along with the encrypted password (specified by 7) (!@*asdsfsdfjh!@df).
mutual-chap username user1 password 0 abcd12AAA	Configures the switch user account (user1) along with a password (abcd12AAA) specified in clear text (indicated by 0—default). The password is limited to 64 characters.
no mutual-chap username testuser	Removes the switch authentication configuration.

show running-config **show iscsi global**
show running-config **show iscsi initiator configured**
)

iSCSI Immediate Data and Unsolicited Data Features

These two features help reduce I/O time for small write commands because it removes one round-trip between the initiator and the target for the R2T PDU. As an iSCSI target, the MDS switch allows up to 64 KB of unsolicited data per command. This is controlled by the FirstBurstLength parameter during iSCSI login negotiation phase.

If an iSCSI initiator supports immediate data and unsolicited data features, these features are automatically enabled on the MDS switch with no configuration required.

iSCSI Interface Advanced Features

	Enters configuration mode.
	Selects the iSCSI interface on the switch.

iSCSI Listener Port

TCP Tuning Parameters

-

  defaults are max-bandwidth = 1G, min-available-bandwidth = 70 Mbps, and round-trip-time =1 ms.), buffer size (default send buffer size for iSCSI is 4096 KB), window congestion (enabled by default and the default burst size is 50 KB), and maximum delay jitter (enabled by default and the default time is 500 microseconds.).

  See the "Minimum Retransmit Timeout" section on page 33-8, "Keepalive Timeout" section on page 33-8, "Maximum Retransmissions" section on page 33-9, "Path MTUs" section on page 33-9, "Monitoring Congestion" section on page 33-10 and "Estimating Maximum Jitter" section on page 33-11.

QoS

	Configure the differentiated services code point (DSCP) value of 3 to be applied to all outgoing IP packets in this iSCSI interface. The valid range for the iSCSI DSCP value is from 0 to 63.
	Reverts the switch to its factory default (marks all packets with DSCP value 0).

iSCSI Routing Modes

Each mode negotiates different operational parameters, has different advantages and disadvantages, and is suitable for different usages.

Pass-thru mode

In pass-thru mode, the port on the IPS module or MPS 14/2 module converts and forwards read data frames from the Fibre Channel target to the iSCSI host frame-by-frame without buffering. This means that one data-in frame received is immediately sent out as one iSCSI data-in PDU.

In the opposite direction, the port on the IPS module or MPS 14/2 module limits the maximum size of iSCSI write data-out PDU that the iSCSI host can send to the maximum data size that the Fibre Channel target specifies that it can receive. The result is one iSCSI data-out PDU received sent out as one Fibre Channel data frame to the Fibre Channel target.

The absence of buffering in both directions leads to an advantage of lower forwarding latency. However, a small maximum data segment length usually results in lower data transfer performance from the host due to a higher processing overhead by the host system. Another benefit of this mode is iSCSI data digest can be enabled. This helps protect the integrity of iscsi data carried in the PDU over what TCP checksum offers.

Store-and-forward mode (default)

In store-and-forward mode, the port on the IPS module or MPS 14/2 module assembles all the Fibre Channel data frames of an exchange to build one large iSCSI data-in PDU before forwarding it to the iSCSI client.

In the opposite direction, the port on the IPS module or MPS 14/2 module does not impose a small data segment size on the host so the iSCSI host can send an iSCSI data-out PDU of any size (up to 256 KB). The port then waits until the whole iSCSI data-out PDU is received before it converts, or splits, the PDU, and forwards Fibre Channel frames to the Fibre Channel target.

The advantage of this mode is higher data transfer performance from the host. The disadvantages are higher transfer latency and that the iSCSI data digest (CRC) cannot be used.

The store-and-forward mode is the default forwarding mode.

Cut-through mode

Cut-through mode improves the read operation performance over store-and-forward mode. The port on the IPS module or MPS 14/2 module achieves this by forwarding each Fibre Channel data-in frame to the iSCSI host as it is received without waiting for the whole exchange complete. There is no difference for write data-out operations from store-and-forward mode.

Figure 35-13 compares the messages exchanged by the iSCSI routing modes.

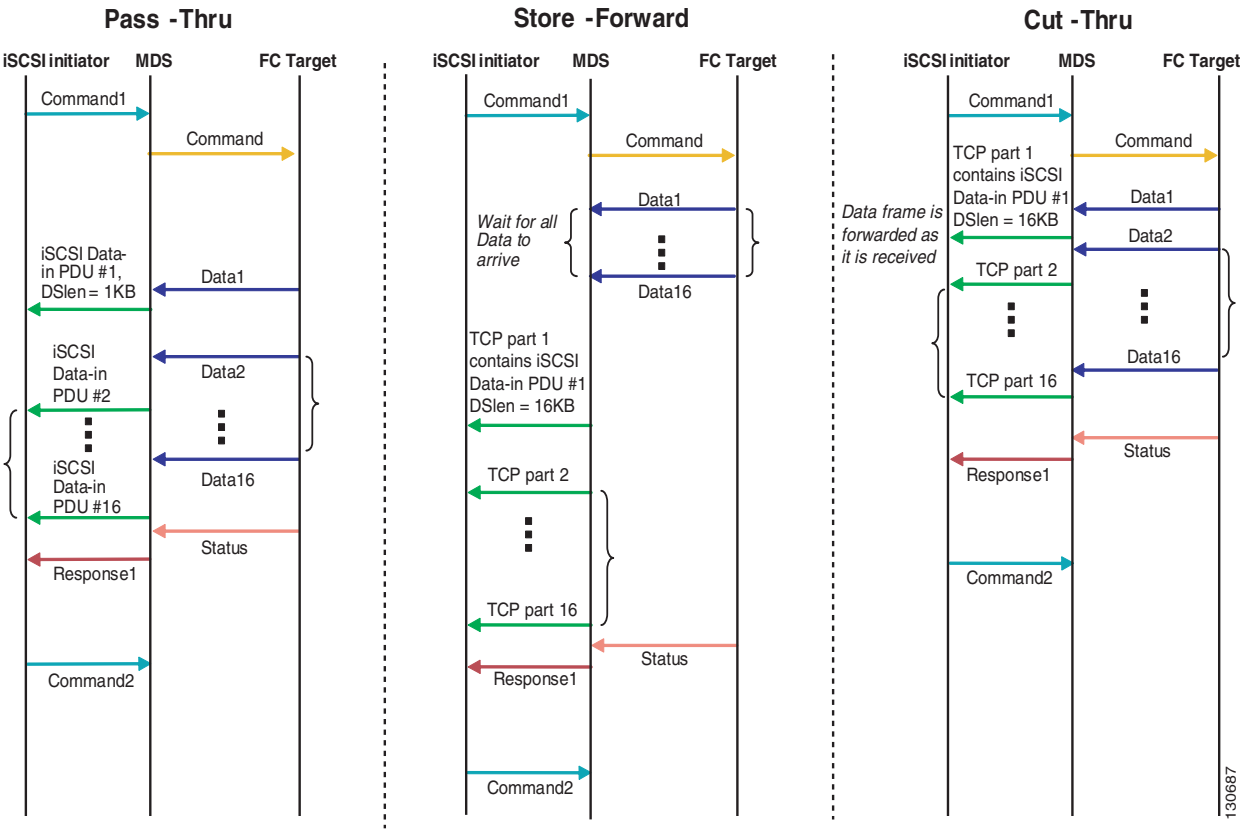


Table 35-1 compares the advantages and dissuasiveness of the different iSCSI routing modes.

Mode	Advantages	Disadvantages

switch(config-if)#	⚠
switch(config-if)#	

Displaying iSCSI Information

Displaying iSCSI Interfaces

Example 35-1 Displays the iSCSI Interface Information

```
iscsi4/1 is up
    Hardware is GigabitEthernet
    Port WWN is 20:cf:00:0c:85:90:3e:80
    Admin port mode is ISCSI
    Port mode is ISCSI
    Speed is 1 Gbps
    iSCSI initiator is identified by name
    Number of iSCSI session: 0 (discovery session: 0)
    Number of TCP connection: 0
    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 enabled
        QOS code point is 0
        Maximum allowed bandwidth is 1000000 kbps
        Minimum available bandwidth is 70000 kbps
        Estimated round trip time is 1000 usec
        Send buffer size is 4096 KB
        Congestion window monitoring is enabled, burst size is 50 KB
        Configured maximum jitter is 500 us
    Forwarding mode: store-and-forward
    TMF Queueing Mode : disabled
    Proxy Initiator Mode : disabled
    5 minutes input rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
    5 minutes output rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
    iSCSI statistics
      Input 0 packets, 0 bytes
        Command 0 pdus, Data-out 0 pdus, 0 bytes
      Output 0 packets, 0 bytes
        Response 0 pdus (with sense 0), R2T 0 pdus
```

```
        Data-in 0 pdus, 0 bytes
```

```
switch#
iscsi2/1
    5 minutes input rate 704 bits/sec, 88 bytes/sec, 1 frames/sec
    5 minutes output rate 704 bits/sec, 88 bytes/sec, 1 frames/sec
    iSCSI statistics
      974756 packets input, 142671620 bytes
        Command 2352 pdus, Data-out 44198 pdus, 92364800 bytes, 0 fragments, unsolicited 0
bytes
```

```
        show iscsi stats iscsi 2/1 detail
```

```
  FCP Forward:
```

```
  Xfer_rdy:1804 (Rcvd:1804)
  Data-In:90453 (Rcvd:90463), 92458248 bytes
  Response:2352 (Rcvd:2362), with sense 266
  TMF Resp:0


  Login:attempt:13039, succeed:110, fail:12918, authen fail:0
  Rcvd:NOP-Out:914582, Sent:NOP-In:914582
        NOP-In:0, Sent:NOP-Out:0
        TMF-REQ:0, Sent:TMF-RESP:0
        Text-REQ:18, Sent:Text-RESP:27

                                Bad header digest:0









  Sent:PLOGI:10, Rcvd:PLOGI_ACC:10, PLOGI_RJT:0
        PRLI:10, Rcvd:PRLI_ACC:10, PRLI_RJT:0, Error:0, From initiator:0
        LOGO:4, Rcvd:LOGO_ACC:0, LOGO_RJT:0
        PRLO:4, Rcvd:PRLO_ACC:0, PRLO_RJT:0
        ABTS:0, Rcvd:ABTS_ACC:0
        TMF REQ:0
        Self orig command:10, Rcvd:data:10, resp:10
  Rcvd:PLOGI:156, Sent:PLOGI_ACC:0, PLOGI_RJT:156
        LOGO:0, Sent:LOGO_ACC:0, LOGO_RJT:0
        PRLI:8, Sent:PRLI_ACC:8, PRLI_RJT:0
        PRLO:0, Sent:PRLO_ACC:0, PRLO_RJT:0
        ADISC:0, Sent:ADISC_ACC:0, ADISC_RJT:0
        ABTS:0


  Command:Target down 0, Task in progress 0, LUN map fail 0
           CmdSeqNo not in window 0, No Exchange ID 0, Reject 0
           No task:0
  Data-Out:0, Data CRC Error:0
  TMF-Req:0, No task:0
  Unsolicited data:0, Immediate command PDU:0

  Xfer_rdy:0, Data-In:0, Response:0

Buffer Stats:
  Buffer less than header size:0, Partial:45231, Split:322
  Pullup give new buf:0, Out of contiguous buf:0, Unaligned m_data:0
```

```
                            <----------------------------Proxy initiator is enabled
nWWN is 28:00:00:05:30:00:a7:a1  (system-assigned)<----System-assigned nWWN
pWWN is 28:01:00:05:30:00:a7:a1  (system-assigned)<---- System-assigned pWWN
```

```
show interface iscsi 4/2
```

```
nWWN is 11:11:11:11:11:11:11:11 (manually-configured)<----User-assigned nWWN
pWWN is 22:22:22:22:22:22:22:22 (manually-configured)<----User-assigned pWWN
```

Displaying Global iSCSI Information

Displays the Current Global iSCSI Configuration and State

Example 35-7 Displays Brief Information of All iSCSI Sessions

```
    Target VT1
    VSAN 1, ISID 00023d000046, Status active, no reservation

  Session #3
    Target VT2
    VSAN 1, ISID 00023d000048, Status active, no reservation

Initiator 10.10.100.199
  Initiator name iqn.1987-05.com.cisco.01.7e3183ae458a94b1cd6bc168cba09d2e
  Session #1
    Target VT2
    VSAN 1, ISID 246700000000, Status active, no reservation

  Session #2
    Target VT1
    VSAN 1, ISID 246b00000000, Status active, no reservation

  Session #3
    Target iqn.1987-05.com.cisco:05.switch.04-01.2100002037a6be32
    VSAN 1, ISID 246e00000000, Status active, no reservation
```

```
switch# show iscsi session initiator 10.10.100.199 target VT1
```

show iscsi session initiator 10.10.100.199 target VT1 detail

```
    DataSeqInOrder No, InitialR2T Yes, ImmediateData No
    Registered LUN 0, Mapped LUN 0
    Stats:
      PDU: Command: 38, Response: 38
      Bytes: TX: 8712, RX: 0
    Number of connection: 1
    Connection #1
      Local IP address: 10.10.100.200, Peer IP address: 10.10.100.199
      CID 0, State: LOGGED_IN
      StatSN 62, ExpStatSN 0
      MaxRecvDSLength 1024, our_MaxRecvDSLength 1392
      CSG 3, NSG 3, min_pdu_size 48 (w/ data 48)
      AuthMethod none, HeaderDigest None (len 0), DataDigest None (len 0)
      Version Min: 2, Max: 2
      FC target: Up, Reorder PDU: No, Marker send: No (int 0)
      Received MaxRecvDSLen key: No
```

```
switch#
iSCSI Node name is iqn.1987-05.com.cisco:02.3021b0f2fda0.avanti12-w2k
    Initiator ip addr (s): 10.10.100.116
    iSCSI alias name: AVANTI12-W2K
    Node WWN is 22:01:00:05:30:00:10:e1 (configured)
    Member of vsans: 1, 2, 10
    Number of Virtual n_ports: 1
    Virtual Port WWN is 22:04:00:05:30:00:10:e1 (configured)
      Interface iSCSI 4/1, Portal group tag: 0x180
      VSAN ID 1, FCID 0x6c0202
      VSAN ID 2, FCID 0x6e0000
      VSAN ID 10, FCID 0x790000
```

```
iSCSI Node name is 10.10.100.199
    iSCSI Initiator name: iqn.1987-05.com.cisco.01.7e3183ae458a94b1cd6bc168cba09d2e
    iSCSI alias name: oasis-qa
    Node WWN is 22:03:00:05:30:00:10:e1 (configured)
    Member of vsans: 1, 5
    Number of Virtual n_ports: 1
    Virtual Port WWN is 22:00:00:05:30:00:10:e1 (configured)
      Interface iSCSI 4/1, Portal group tag: 0x180
      VSAN ID 5, FCID 0x640000
      VSAN ID 1, FCID 0x6c0203



switch#
iSCSI Node name is iqn.1987-05.com.cisco:02.3021b0f2fda0.avanti12-w2k
    Initiator ip addr (s): 10.10.100.116
    iSCSI alias name: AVANTI12-W2K
    Node WWN is 22:01:00:05:30:00:10:e1 (configured)
    Member of vsans: 1, 2, 10
    Number of Virtual n_ports: 1

    Virtual Port WWN is 22:04:00:05:30:00:10:e1 (configured)
      Interface iSCSI 4/1, Portal group tag is 0x180
      VSAN ID 1, FCID 0x6c0202
      1 FC sessions, 1 iSCSI sessions
      iSCSI session details
        Target: VT1
          Statistics:
            PDU: Command: 0, Response: 0
            Bytes: TX: 0, RX: 0
            Number of connection: 1
          TCP parameters
            Local 10.10.100.200:3260, Remote 10.10.100.116:4190
            Path MTU: 1500 bytes
            Retransmission timeout: 310 ms
            Round trip time: Smoothed 160 ms, Variance: 38
            Advertized window: Current: 61 KB, Maximum: 62 KB, Scale: 0
            Peer receive window: Current: 63 KB, Maximum: 63 KB, Scale: 0
            Congestion window: Current: 1 KB

      FCP Session details
        Target FCID: 0x6c01e8 (S_ID of this session: 0x6c0202)
          pWWN: 21:00:00:20:37:62:c0:0c, nWWN: 20:00:00:20:37:62:c0:0c
          Session state: CLEANUP
          1 iSCSI sessions share this FC session
            Target: VT1
          Negotiated parameters
            RcvDataFieldSize 1392 our_RcvDataFieldSize 1392
            MaxBurstSize 0, EMPD: FALSE
            Random Relative Offset: FALSE, Sequence-in-order: Yes
          Statistics:
            PDU: Command: 0, Response: 0
```

```
switch#
VSAN 1:
--------------------------------------------------------------------------
FCID        TYPE  PWWN                    (VENDOR)        FC4-TYPE:FEATURE
--------------------------------------------------------------------------
0x020101    N     22:04:00:05:30:00:35:e1 (Cisco)         scsi-fcp:init isc..w
0x020102    N     22:02:00:05:30:00:35:e1 (Cisco)         scsi-fcp:init isc..w
0x0205d4    NL    21:00:00:04:cf:da:fe:c6 (Seagate)       scsi-fcp:target
0x0205d5    NL    21:00:00:04:cf:e6:e4:4b (Seagate)       scsi-fcp:target
...
Total number of entries = 10

VSAN 2:
--------------------------------------------------------------------------
FCID        TYPE  PWWN                    (VENDOR)        FC4-TYPE:FEATURE
--------------------------------------------------------------------------
0xef0001    N     22:02:00:05:30:00:35:e1 (Cisco)         scsi-fcp:init isc..w
Total number of entries = 1

VSAN 3:
--------------------------------------------------------------------------
FCID        TYPE  PWWN                    (VENDOR)        FC4-TYPE:FEATURE
--------------------------------------------------------------------------
0xed0001    N     22:02:00:05:30:00:35:e1 (Cisco)         scsi-fcp:init isc..w
Total number of entries = 1
```

```
switch#
------------------------
VSAN:1     FCID:0x020101
------------------------
port-wwn (vendor)     :22:04:00:05:30:00:35:e1 (Cisco)
node-wwn              :22:03:00:05:30:00:35:e1
class                 :2,3
node-ip-addr          :10.2.2.12                  <--- iSCSI initiator's IP address
ipa                   :ff ff ff ff ff ff ff ff
fc4-types:fc4_features:scsi-fcp:init iscsi-gw
symbolic-port-name    :
symbolic-node-name    :iqn.1991-05.com.microsoft:oasis2-dell <--- iSCSI initiator's IQN
port-type             :N
port-ip-addr          :0.0.0.0
fabric-port-wwn       :22:01:00:05:30:00:35:de
hard-addr             :0x000000
------------------------
VSAN:1     FCID:0x020102
------------------------
port-wwn (vendor)     :22:02:00:05:30:00:35:e1 (Cisco)
node-wwn              :22:01:00:05:30:00:35:e1
class                 :2,3
node-ip-addr          :10.2.2.11
ipa                   :ff ff ff ff ff ff ff ff
fc4-types:fc4_features:scsi-fcp:init iscsi-gw
symbolic-port-name    :
symbolic-node-name    :iqn.1987-05.com.cisco.01.14ac33ba567f986f174723b5f9f2377
port-type             :N
port-ip-addr          :0.0.0.0
fabric-port-wwn       :22:01:00:05:30:00:35:de
hard-addr             :0x000000
...
Total number of entries = 10
```

```
==============================================================================
------------------------
VSAN:2     FCID:0xef0001
------------------------
port-wwn (vendor)     :22:02:00:05:30:00:35:e1 (Cisco)
node-wwn              :22:01:00:05:30:00:35:e1
class                 :2,3
node-ip-addr          :10.2.2.11
ipa                   :ff ff ff ff ff ff ff ff
fc4-types:fc4_features:scsi-fcp:init iscsi-gw
symbolic-port-name    :
symbolic-node-name    :iqn.1987-05.com.cisco.01.14ac33ba567f986f174723b5f9f2377
port-type             :N
port-ip-addr          :0.0.0.0
fabric-port-wwn       :22:01:00:05:30:00:35:de
hard-addr             :0x000000
Total number of entries = 1
...
```

```
switch# show iscsi initiator configured
iSCSI Node name is iqn.1987-05.com.cisco:02.3021b0f2fda0.avanti12-w2k
    Member of vsans: 1, 2, 10
    Node WWN is 22:01:00:05:30:00:10:e1
    No. of PWWN: 5
      Port WWN is 22:04:00:05:30:00:10:e1
      Port WWN is 22:05:00:05:30:00:10:e1
      Port WWN is 22:06:00:05:30:00:10:e1
      Port WWN is 22:07:00:05:30:00:10:e1
      Port WWN is 22:08:00:05:30:00:10:e1

iSCSI Node name is 10.10.100.199
    Member of vsans: 1, 5
    Node WWN is 22:03:00:05:30:00:10:e1
    No. of PWWN: 4
      Port WWN is 22:00:00:05:30:00:10:e1
      Port WWN is 22:09:00:05:30:00:10:e1
      Port WWN is 22:0a:00:05:30:00:10:e1
      Port WWN is 22:0b:00:05:30:00:10:e1

    User Name for Mutual CHAP: testuser
```

Displaying iSCSI Virtual Targets

```
  * Port WWN 21:00:00:20:37:62:c0:0c
    Configured node
    all initiator permit is enabled

target: VT2
    Port WWN 21:00:00:04:cf:4c:52:c1
    Configured node
    all initiator permit is disabled
target: iqn.1987-05.com.cisco:05.switch.04-01.2100002037a6be32
    Port WWN 21:00:00:20:37:a6:be:32 , VSAN 1
    Auto-created node
```

Displaying iSCSI User Information

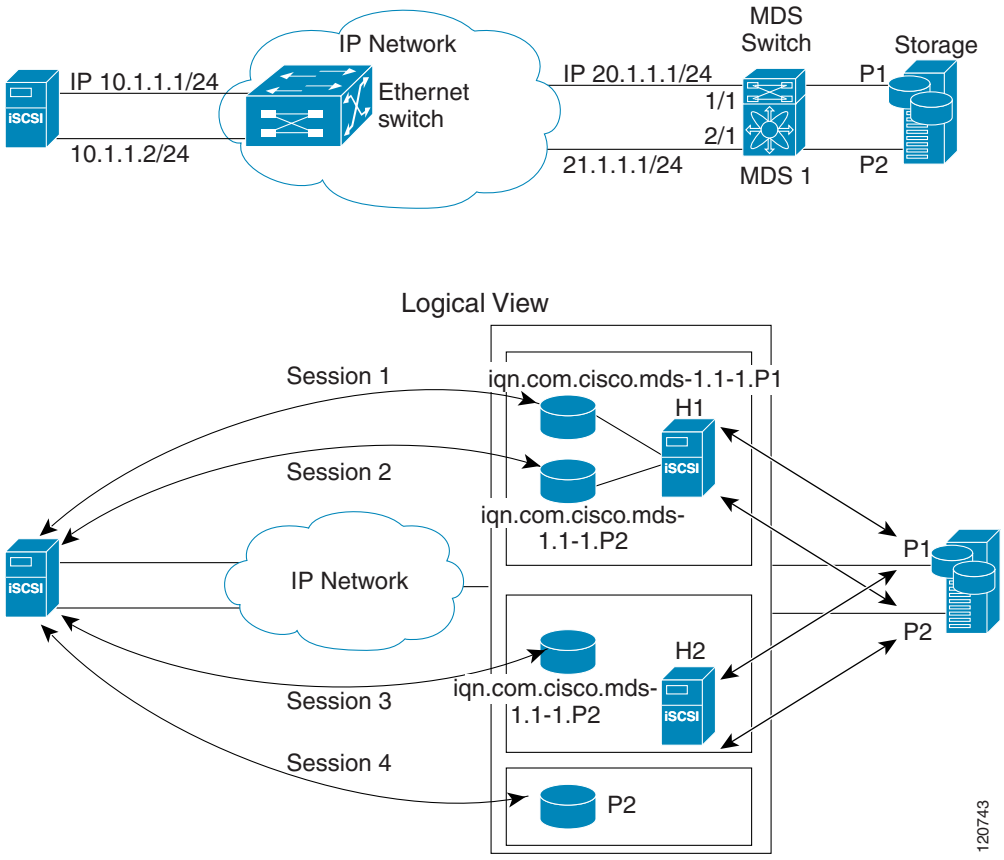
iSCSI High Availability

-
-
-
-

Transparent Target Failover

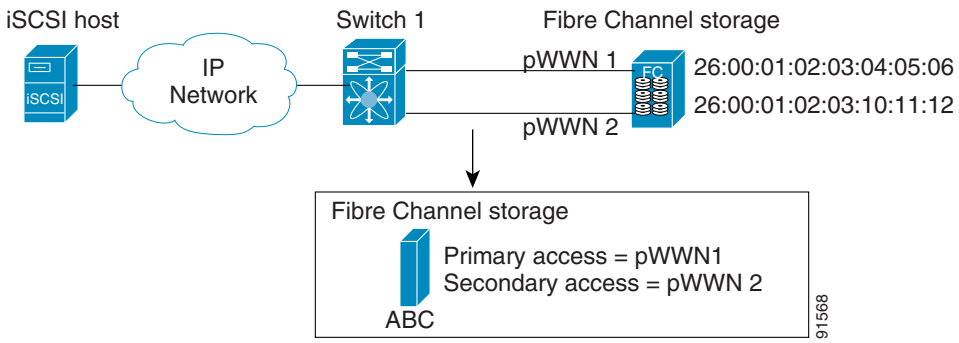
-
-

iSCSI High Availability with Host Running Multi-Path Software



iSCSI HA with Host Not Having Any Multi-Path Software

-
-

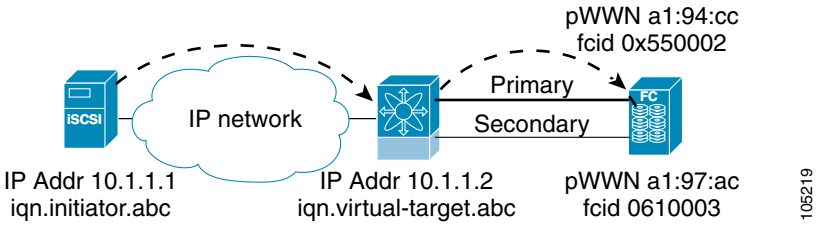


Tip

	Command	Purpose
Step 1		
Step 2		

	Command	Purpose
Step 3		
		Note
Step 4		
Step 5		

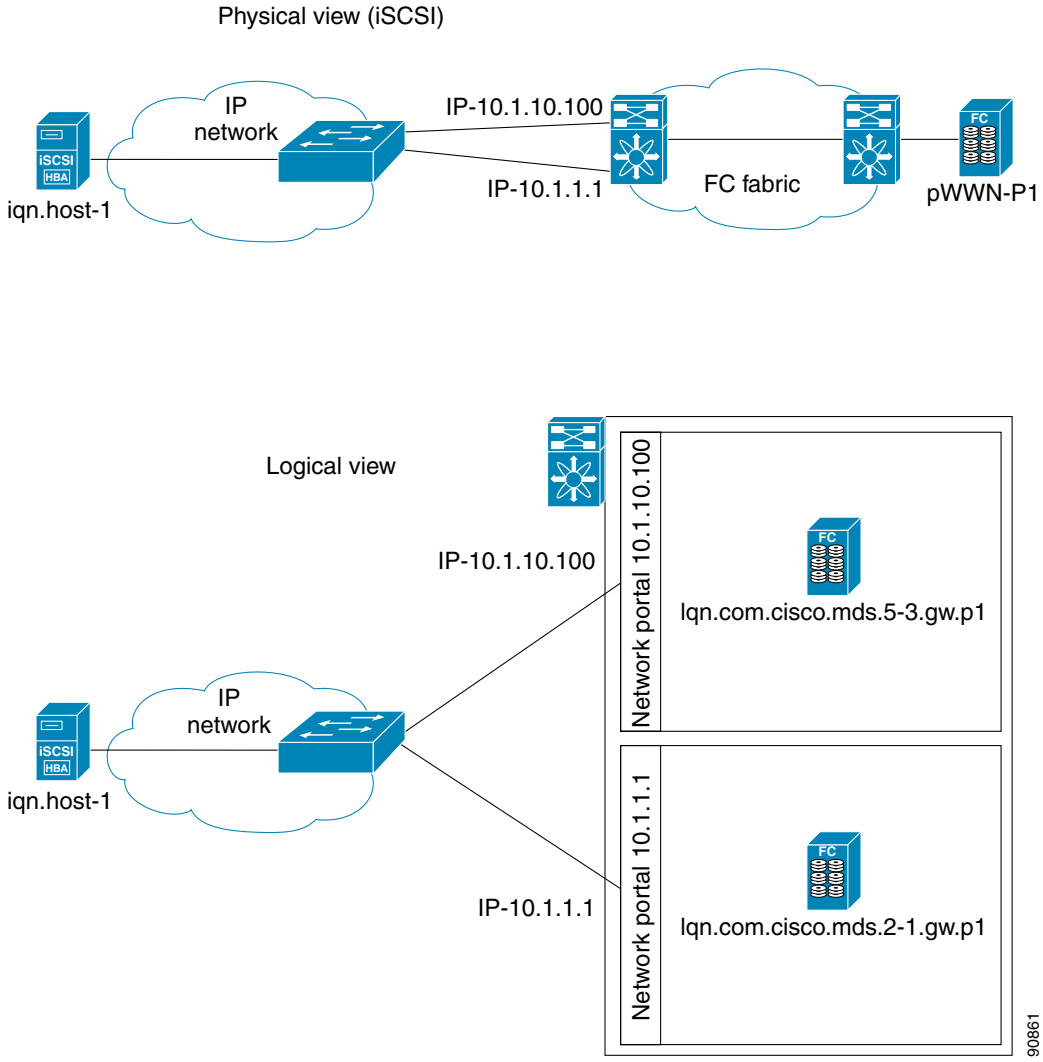
Storage Port Failover LUN Trespass



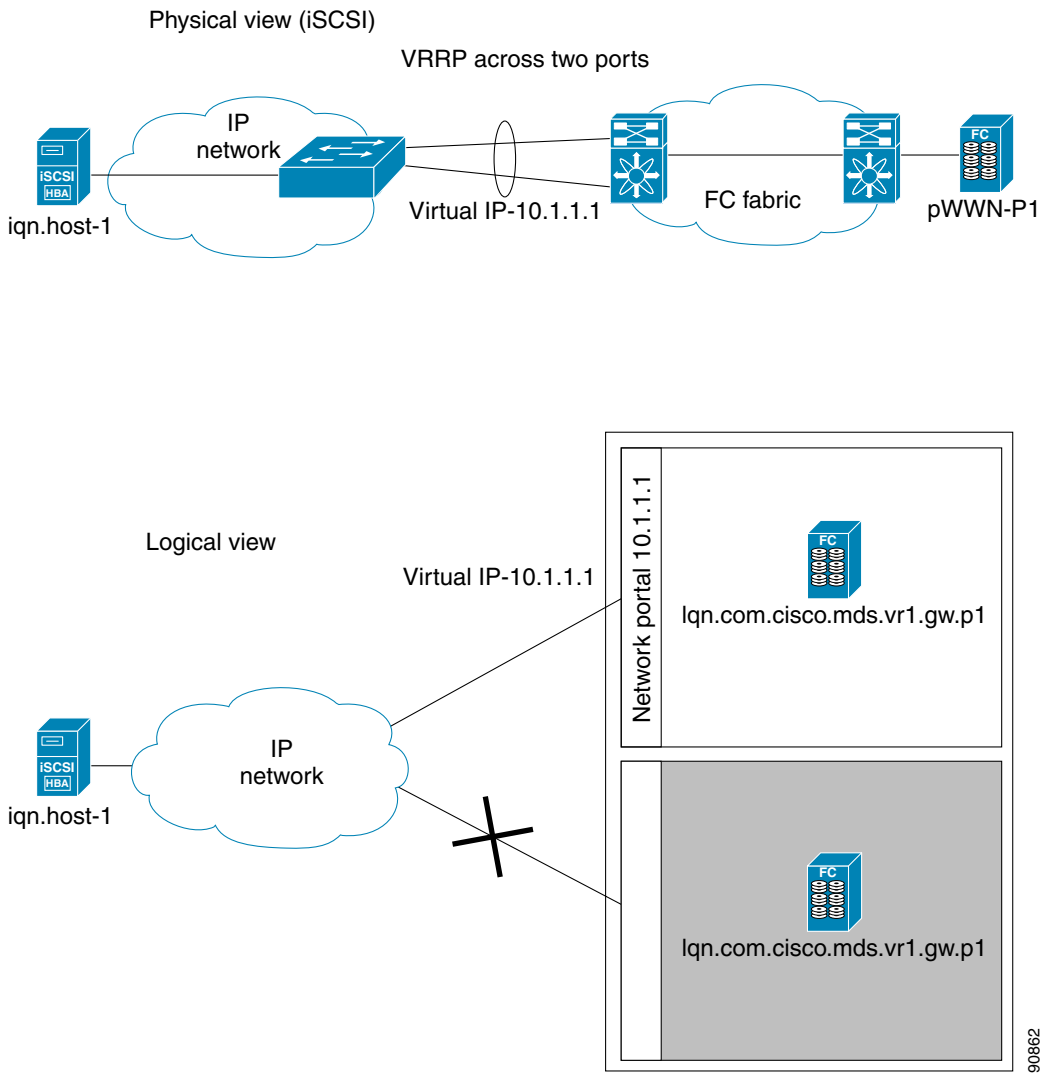
	Command	Purpose
Step 1		
Step 2		
Step 3		
Step 4		

Multiple IPS Ports Connected to the Same IP Network

Multiple Gigabit Ethernet Interfaces in the Same IP Network

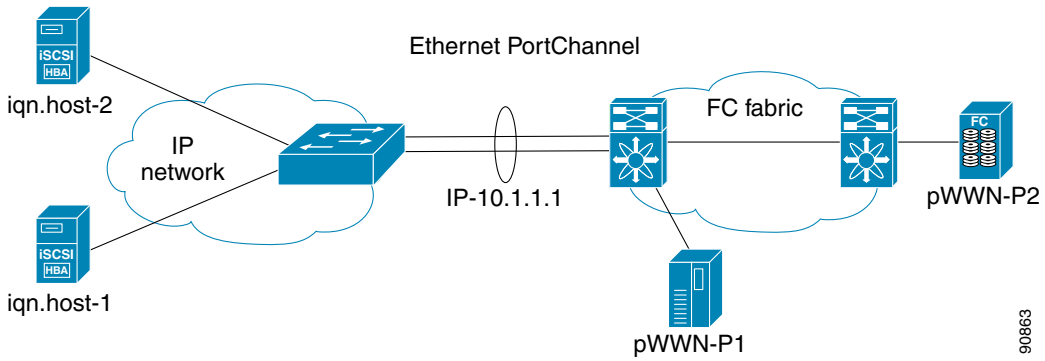


VRRP-Based High Availability



Ethernet PortChannel-Based High Availability

Note



Note

iSCSI Authentication Setup Guidelines and Scenarios

-
-
-

Note

No Authentication

CHAP with Local Password Database

Step 1

Step 2

Step 3

Note

Step 4

CHAP with External RADIUS Server

Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

```
                                        <---------------- Verify CHAP
```

Step 7

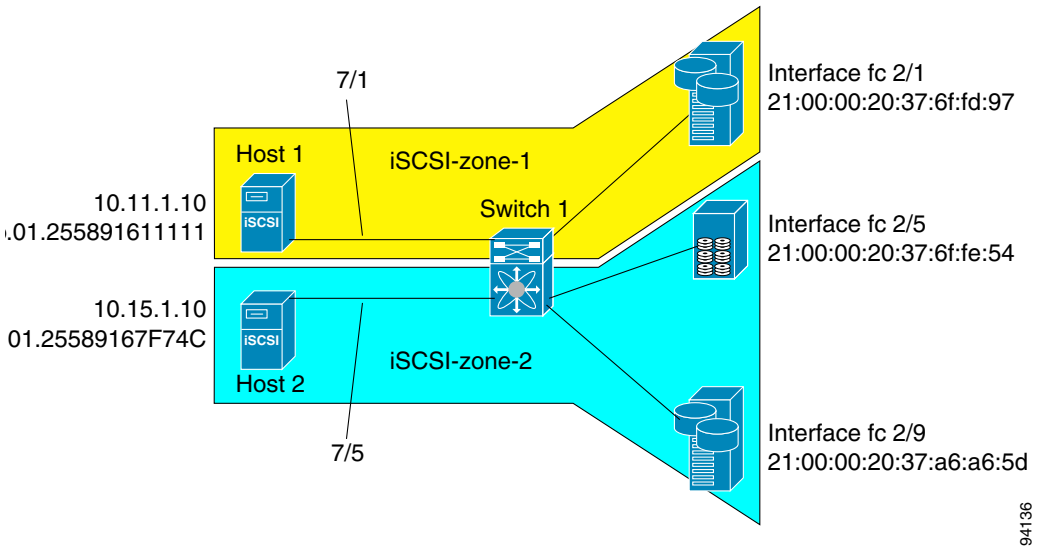
Step 1

Step 2

Step 3

iSCSI Transparent Mode Initiator

-



Step 1

Step 2

Step 3

Note

Step 4

Step 5

Step 6

Note

Step 7

Step 8 *iscsi-zone-1*

Step 9 *iscsi-zone-2*

Step 10

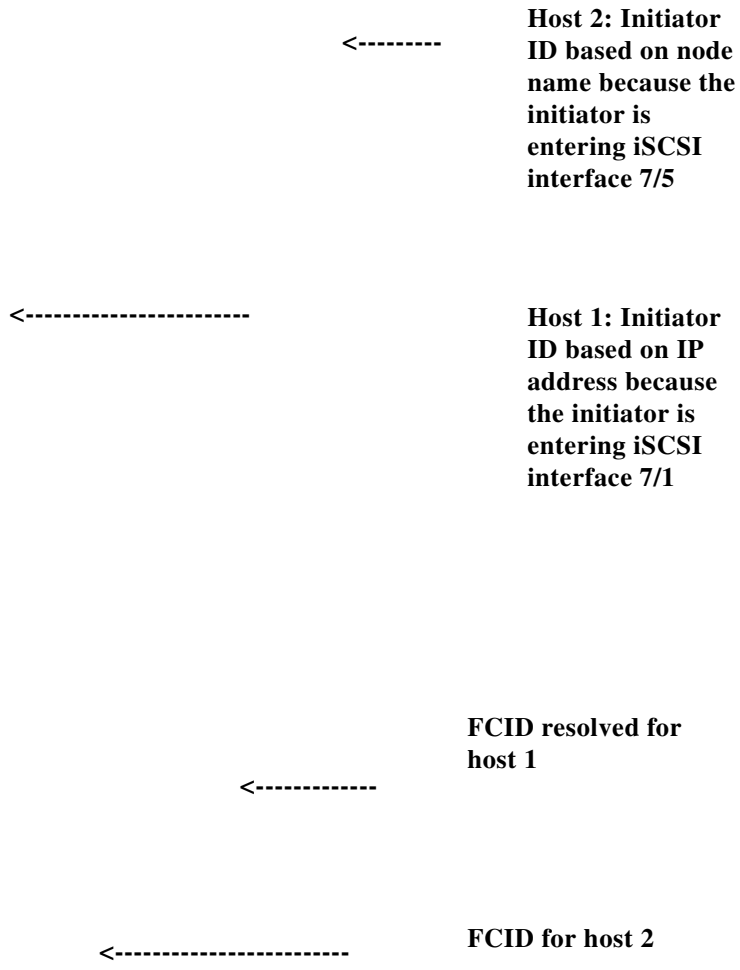
Step 11

Step 12

Note

```
* fcid 0x6d0001 [pwwn 21:00:00:20:37:6f:fd:97] <----------Target
                                              <---------- iSCSI host (host 1, not online)

                                                          <----------Target
                                                          <----------Target
                                                                     <-iSCSI host (host 2, not online)
```

detail


<---------
Host 2: Initiator ID based on node name because the initiator is entering iSCSI interface 7/5
<-----------------------
Host 1: Initiator ID based on IP address because the initiator is entering iSCSI interface 7/1
FCID resolved for host 1
<-------------
FCID for host 2
<--------------------------

<---------- **IP address of the iSCSI host**

<------ **iSCSI gateway node**

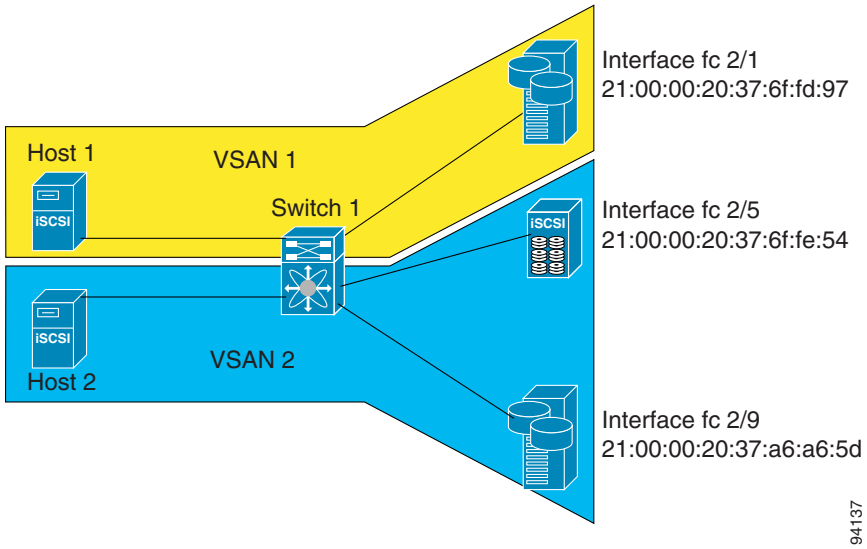
<---------- **iSCSI initiator ID is based on the registered node name**

<------ **iSCSI gateway node**

<---------- **iSCSI initiator ID is based on the IP address registered in symbolic-node-name field**

Target Storage Device Requiring LUN Mapping

-
-
-
-



Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

Step 7

<-----Host 2

<----------Host 1

Note

Step 8

Note

Step 9

Step 10

Note

-
-

show iscsi initiator

Step 11

Note

Step 12

```
Zoneset activation initiated. check zone status
switch#
zoneset name iscsi-zoneset-v2 vsan 2
  zone name iscsi-zone-2 vsan 2
  * fcid 0x750001 [pwwn 21:00:00:20:37:6f:fe:54]
  * fcid 0x750101 [pwwn 21:00:00:20:37:a6:a6:5d]
    pwwn 20:06:00:0b:fd:44:68:c2
```

```
switch#
Initiator iqn.1987-05.com.cisco:01.e41695d16b1a
    Initiator ip addr (s): 10.11.1.10
  Session #1
    Discovery session, ISID 00023d000001, Status active

  Session #2
    Target
iqn.1987-05.com.cisco:05.172.22.92.166.07-01.21000020376ffd97
    VSAN 1, ISID 00023d000001, Status active, no reservation
```

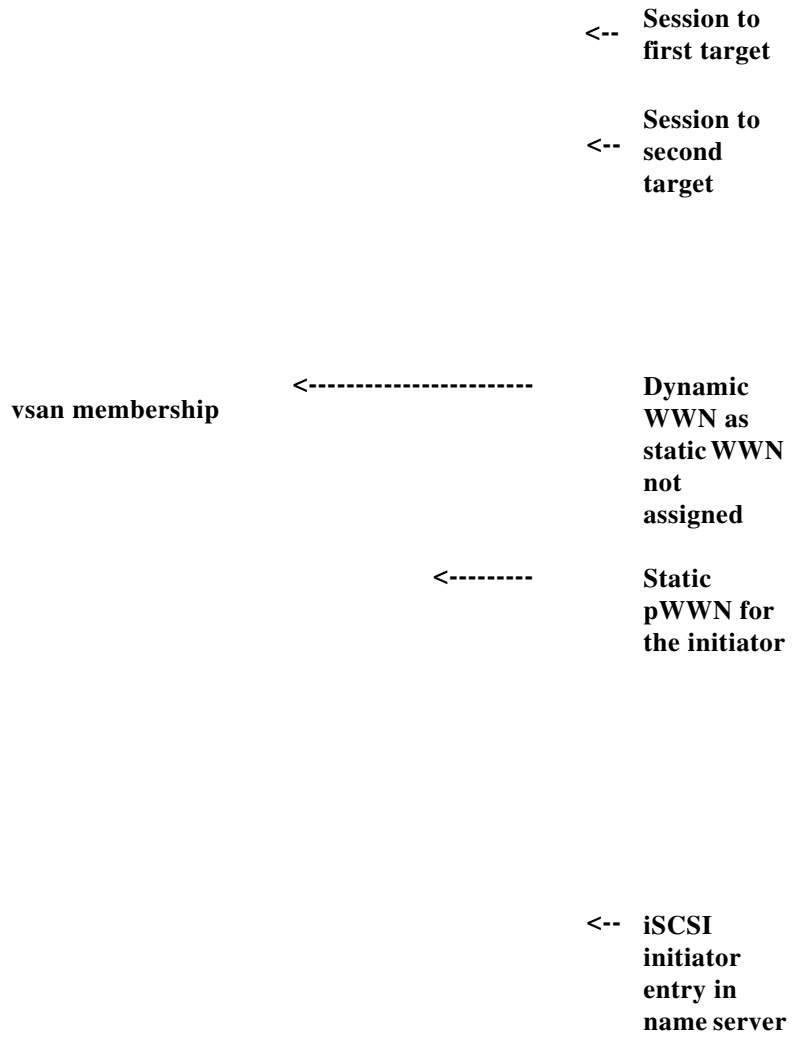
```
switch#
iSCSI Node name is iqn.1987-05.com.cisco:01.e41695d16b1a
    Initiator ip addr (s): 10.11.1.10
    iSCSI alias name: oasis10.cisco.com

    Node WWN is 20:03:00:0b:fd:44:68:c2 (configured)
    Member of vsans: 1
    Number of Virtual n_ports: 1
```

The configured nWWN

<---- The configured pWWN

<--- iSCSI initiator in name server

<----- iSCSI initiator in name server


<-- Session to first target
<-- Session to second target
vsan membership
<---------- Dynamic WWN as static WWN not assigned
<--------- Static pWWN for the initiator
<-- iSCSI initiator entry in name server

About iSCSI Storage Name Services

-
-
  -
  -
  -

About iSNS Client Functionality

; a unique entity is associated with each IPS interface

The iSNS client uses a registration interval value of 15 minutes. If the client fails to refresh the registration during this interval, the server will deregister the entries.

Creating an iSNS Client Profile

Step 1		
Step 2		
Step 3		

	Command	Purpose
Step 1		
Step 2		

	Command	Purpose
Step 1		
Step 2		
Step 3		

	Command	Purpose
Step 1		
Step 2		
Step 3		

isns reregister

Verifying iSNS Client Configuration

show isns profile

show isns profile counters

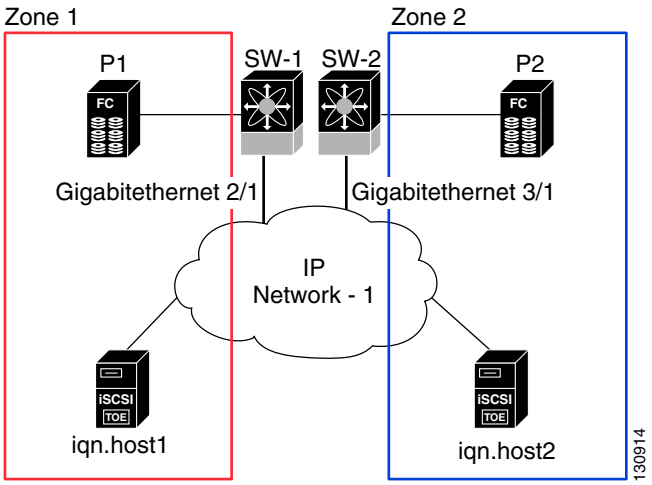
show isns

Displays iSNS Queries

Example 35-22 Displays Tagged iSNS Interfaces

```
^^^^^^^^^^^^^^^^
5 minutes input rate 112 bits/sec, 14 bytes/sec, 0 frames/sec
5 minutes output rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
1935 packets input, 132567 bytes
  4 multicast frames, 0 compressed
  0 input errors, 0 frame, 0 overrun 0 fifo
1 packets output, 42 bytes, 0 underruns
  0 output errors, 0 collisions, 0 fifo
  0 carrier errors
```

discover



1.
2.
3.
4.
5.
6.
7.
8.

Configuring iSNS Servers

Enabling the iSNS Server

Before iSNS server feature can be enabled, iSCSI must be enabled (see the "Enabling iSCSI" section on page 35-4). When you disable iSCSI, iSNS is automatically disabled. When the iSNS server is enabled on a switch, every IPS port whose corresponding iSCSI interface is up is capable of servicing iSNS registration and query requests from external iSNS clients.

	Command	Purpose
Step 1		
Step 2		

Note

iSCSI Configuration Distribution

	Command	Purpose
Step 1		
Step 2		

Configuring the ESI Retry Count

iSNS Client Registration and Deregistration

Target Discovery

DevGetNext

DevAttrQuery

Displays Explicitly Registered Objects

```
    SCN Bitmap: OBJ_UPDATED|OBJ ADDED|OBJ REMOVED|TARGET&SELF
    Node Alias: <MS SW iSCSI Initiator>

    VSANS: 1(*), 5(*)
Portal IP Address: 192.168.100.2          TCP Port: 4179
    Entity Index: 2    Portal Index: 1
    ESI Interval: 0     ESI Port: 4180     SCN Port: 4180




switch#
Entity Id: isns.entity.mds9000
    Index: 1             Last accessed: Fri Jul 30 04:08:16 2004

iSCSI Node Name: iqn.com.cisco.disk1
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000001
    WWN(s):
        22:00:00:20:37:39:dc:45

    VSANS:
iSCSI Node Name: iqn.isns-first-virtual-target
    Entity Index: 1
```

```
    Node Type: Target(1)      Node Index: 0x80000002

    VSANS:
iSCSI Node Name: iqn.com.cisco.disk2
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000003
    WWN(s):
        22:00:00:20:37:39:dc:45

    VSANS:
Portal IP Address: 192.168.100.5          TCP Port: 3205
    Entity Index: 1    Portal Index: 3

Portal IP Address: 192.168.100.6          TCP Port: 3205
    Entity Index: 1    Portal Index: 5

Entity Id: dp-204
    Index: 2             Last accessed: Fri Jul 30 04:08:46 2004

iSCSI Node Name: iqn.1991-05.com.microsoft:dp-2041
    Entity Index: 2
    Node Type: Initiator(2)      Node Index: 0x1
    SCN Bitmap: OBJ_UPDATED|OBJ ADDED|OBJ REMOVED|TARGET&SELF
    Node Alias: <MS SW iSCSI Initiator>

    VSANS: 1(*), 5(*)
Portal IP Address: 192.168.100.2          TCP Port: 4179
    Entity Index: 2    Portal Index: 1
    ESI Interval: 0     ESI Port: 4180     SCN Port: 4180
```

```
switch#
Entity Id: isns.entity.mds9000
    Index: 1             Last accessed: Fri Jul 30 04:08:16 2004

iSCSI Node Name: iqn.com.cisco.disk1
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000001
    WWN(s):
        22:00:00:20:37:39:dc:45

    VSANS:
iSCSI Node Name: iqn.isns-first-virtual-target
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000002

    VSANS:
iSCSI Node Name: iqn.com.cisco.disk2
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000003
    WWN(s):
        22:00:00:20:37:39:dc:45

    VSANS:
Portal IP Address: 192.168.100.5          TCP Port: 3205
    Entity Index: 1    Portal Index: 3
```

```
Portal IP Address: 192.168.100.6          TCP Port: 3205
    Entity Index: 1    Portal Index: 5
```

```
switch#
Entity Id: isns.entity.mds9000
    Index: 1             Last accessed: Fri Jul 30 04:08:16 2004

iSCSI Node Name: iqn.com.cisco.disk1
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000001
    WWN(s):
        22:00:00:20:37:39:dc:45

    VSANS:
iSCSI Node Name: iqn.isns-first-virtual-target
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000002

    VSANS:
iSCSI Node Name: iqn.com.cisco.disk2
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000003
    WWN(s):
        22:00:00:20:37:39:dc:45

    VSANS:
Portal IP Address: 192.168.100.5          TCP Port: 3205
    Entity Index: 1    Portal Index: 3

Portal IP Address: 192.168.100.6          TCP Port: 3205
    Entity Index: 1    Portal Index: 5
```

and node type attribute in a compact format; one per line.

```
switch#
--------------------------------------------------------------------------------
iSCSI Node Name                                                      Type
--------------------------------------------------------------------------------
iqn.1987-05.com.cisco:05.switch1.02-03.22000020375a6c8               Target
...
iqn.com.cisco.disk1                                                  Target
iqn.com.cisco.ipdisk                                                 Target
iqn.isns-first-virtual-target                                        Target
iqn.1991-05.cw22                                                     Target
iqn.1991-05.cw53                                                     Target
```

```
switch#
iSCSI Node Name: iqn.com.cisco.disk1
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000001
    WWN(s):
        22:00:00:20:37:39:dc:45
    VSANS:  1
```

```
switch#
iSCSI Node Name: iqn.1987-05.com.cisco:05.switch1.02-03.22000020375a6c8f
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x3000003
    Configured Switch WWN: 20:00:00:0d:ec:01:04:40
        WWN(s):
            22:00:00:20:37:5a:6c:8f
        VSANS:  1
...
iSCSI Node Name: iqn.com.cisco.disk1
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000001
    Configured Switch WWN: 20:00:00:0d:ec:01:04:40
        WWN(s):
            22:00:00:20:37:39:dc:45
        VSANS:  1

iSCSI Node Name: iqn.com.cisco.ipdisk
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000002
    Configured Switch WWN: 20:00:00:0d:ec:01:04:40
        WWN(s):
            22:00:00:20:37:5a:70:1a
        VSANS:  1

iSCSI Node Name: iqn.isns-first-virtual-target
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000003
    Configured Switch WWN: 20:00:00:0d:ec:01:04:40

iSCSI Node Name: iqn.parna.121212
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000004
    Configured Switch WWN: 20:00:00:0d:ec:01:04:40

iSCSI Node Name: iqn.parna.121213
    Entity Index: 1
    Node Type: Target(1)      Node Index: 0x80000005
    Configured Switch WWN: 20:00:00:0d:ec:01:04:40
```

Use the command to display the attributes of a portal along with its accessible nodes (see Example 35-31 through Example 35-35). You can specify portals by using the switch WWN-interface combination or the IP address-port number combination.

```
switch#
-------------------------------------------------------------------------------
IPAddress      TCP Port     Index               SCN Port            ESI  port
-------------------------------------------------------------------------------
192.168.100.5    3205         3                   -                   -
192.168.100.6    3205         5                   -                   -
```

```
switch#
Portal IP Address: 192.168.100.5          TCP Port: 3205
    Entity Index: 1    Portal Index: 3

Portal IP Address: 192.168.100.6          TCP Port: 3205
    Entity Index: 1    Portal Index: 5
```

```
switch#
-------------------------------------------------------------------------------
IPAddress      TCP Port     Index               SCN Port            ESI  port
-------------------------------------------------------------------------------
192.168.100.5    3205         3                   -                   -
192.168.100.6    3205         5                   -                   -
```

```
switch#
-------------------------------------------------------------------------------
IPAddress      TCP Port     Index               SCN Port            ESI  port
-------------------------------------------------------------------------------
192.168.100.5    3205         3                   -                   -
192.168.100.6    3205         5                   -                   -
```

```
switch#
Portal IP Address: 192.168.100.5          TCP Port: 3205
    Entity Index: 1    Portal Index: 3
    Switch WWN: 20:00:00:0d:ec:01:04:40
    Interface: GigabitEthernet2/3

Portal IP Address: 192.168.100.6          TCP Port: 3205
    Entity Index: 1    Portal Index: 5
    Switch WWN: 20:00:00:0d:ec:01:04:40
    Interface: GigabitEthernet2/5
```

Use the command to display the attributes of an entity along with the list of portals and nodes in that entity (see Example 35-36 through Example 35-40). If you do not specify any option, this command displays the entity ID and number of nodes or portals associated with the entity in a compact format; one per line.

```
switch1#
--------------------------------------------------------------------------------
Entity ID                                                  Last Accessed
--------------------------------------------------------------------------------
dp-204                                              Tue Sep  7 23:15:42 2004
```

```
switch#

--------------------------------------------------------------------------------
Entity ID                                                  Last Accessed
--------------------------------------------------------------------------------
isns.entity.mds9000                                 Tue Sep  7 21:33:23 2004

dp-204                                              Tue Sep  7 23:15:42 2004
```

```
switch1#
Entity Id: dp-204
    Index: 2             Last accessed: Tue Sep  7 23:15:42 2004
```

```
switch1#
Entity Id: isns.entity.mds9000
    Index: 1             Last accessed: Tue Sep  7 21:33:23 2004

Entity Id: dp-204
    Index: 2             Last accessed: Tue Sep  7 23:16:34 2004
```

```
switch#
Entity Id: isns.entity.mds9000
    Index: 1             Last accessed: Thu Aug  5 00:58:50 2004

Entity Id: dp-204
    Index: 2             Last accessed: Thu Aug  5 01:00:23 2004
```

Use the command to display information about import targets (see Example 35-41 and Example 35-42).

```
switch#
iSCSI Global configuration:
  Switch: 20:00:00:05:ec:01:04:00 iSCSI Auto Import: Enabled
```

```
switch#
iSCSI Global configuration:
  Switch: 20:00:44:0d:ec:01:02:40 iSCSI Auto Import: Enabled
```

Use the command to display CFS peers switch information about the iSNS application (see Example 35-43).

```
switch#

Scope      : Physical
--------------------------------------------------
 Switch WWN               IP Address
--------------------------------------------------
 20:00:00:00:ec:01:00:40  10.10.100.11   [Local]

Total number of entries = 1
```

Default Settings

Parameters	Default
keepalive-timeout	
max-retransmissions	
pmtu-enable reset-timeout	
max-bandwidth	
min-available-bandwidth	
round-trip-time	

Parameters	Default
	CHAP or none authentication mechanism.
revert-primary-port	