



Configuring N Port Virtualization

This chapter provides information about N port virtualization and how to configure N port virtualization.

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Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at <https://tools.cisco.com/bugsearch/> and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the New and Changed chapter or the Feature History table below.

Information About N Port Virtualization

NPV Overview

N port virtualization (NPV) reduces the number of Fibre Channel domain IDs in SANs. Switches operating in the NPV mode do not join a fabric. They pass traffic between NPV core switch links and end devices, which eliminates the domain IDs for these edge switches.

NPV is supported by the following Cisco MDS 9000 switches only:

- Cisco MDS 9148S 16G Multilayer Fabric Switch
- Cisco MDS 9250i Multiservice Fabric Switch
- Cisco MDS 9396S 16G Multilayer Fabric Switch

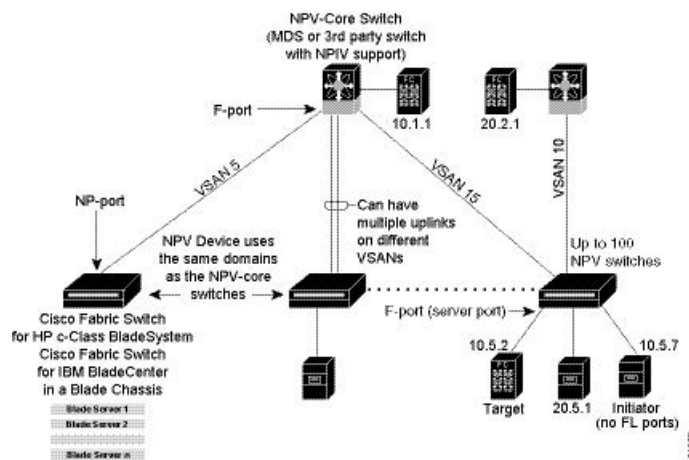


Note NPV is available on these switches only while in NPV mode; if in switch mode, NPV is not available.

N Port Identifier Virtualization

N port identifier virtualization (NPIV) provides a means to assign multiple FC IDs to a single N port. This feature allows multiple applications on the N port to use different identifiers and allows access control, zoning, and port security to be implemented at the application level [Figure 1: NPIV Example, on page 3](#) shows an example application using NPIV.

Figure 1: NPIV Example



You must globally enable NPIV for all VSANs on the MDS switch to allow the NPIV-enabled applications to use multiple N port identifiers.



Note All of the N port identifiers are allocated in the same VSAN.

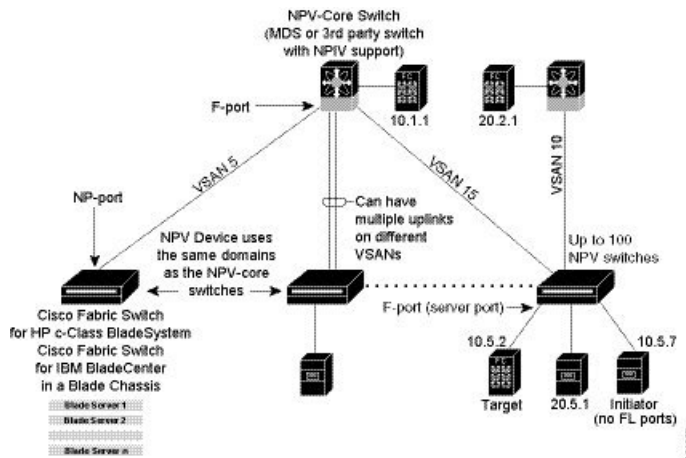
N Port Virtualization

Typically, Fibre Channel networks are deployed using a core-edge model with a large number of fabric switches connected to edge devices. Such a model is cost-effective because the per port cost for director class switches is much higher than that of fabric switches. However, as the number of ports in the fabric increases, the number of switches deployed also increases, and you can end up with a significant increase in the number of domain IDs. This challenge becomes even more difficult when additional blade chassis are deployed in Fibre Channel networks.

NPV addresses the increase in the number of domain IDs needed to deploy a large number of the ports by making a fabric or blade switch appear as a host to the core Fibre Channel switch, and as a Fibre Channel switch to the servers in the fabric or blade switch. NPV aggregates multiple locally connected N ports into one or more external NP links, which shares the domain ID of the NPV core switch among multiple NPV switches. NPV also allows multiple devices to attach to same port on the NPV core switch, which reduces the need for more ports on the core

For more information on scalability limits, see the [Cisco MDS NX-OS Configuration Limits](#) guide.

Figure 2: Cisco NPV Fabric Configuration



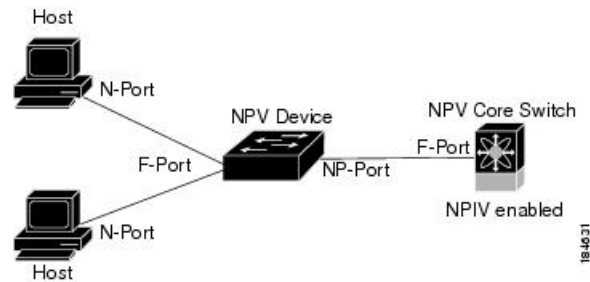
While NPV is similar to N port identifier virtualization (NPIV), it does not offer exactly the same functionality. NPIV provides a means to assign multiple FC IDs to a single N port, and allows multiple applications on the N port to use different identifiers. NPIV also allows access control, zoning, and port security to be implemented at the application level. NPV makes use of NPIV to get multiple FCIDs allocated from the core switch on the NP port.



Note For the Cisco MDS 9124, Cisco MDS 9134, and Cisco MDS 9148 legacy switches and the Cisco MDS 9148S and Cisco MDS 9396S switches supporting NPV mode, the nested NPV switches are not supported in the topology.

Figure 3: Cisco NPV Configuration-Interface View, on page 5 shows a more granular view of an NPV configuration at the interface level.

Figure 3: Cisco NPV Configuration-Interface View



NPV Mode

A switch is in NPV mode after a user has enabled NPV and the switch has successfully rebooted. NPV mode applies to an entire switch. All end devices connected to a switch that is in NPV mode must log in as an N port to use this feature (loop-attached devices are not supported). All links from the edge switches (in NPV mode) to the NPV core switches are established as NP ports (not E ports), which are used for typical interswitch links. NPIV is used by the switches in NPV mode to log in to multiple end devices that share a link to the NPV core switch.



Note In-order data delivery is not required in NPV mode because the exchange between two end devices always takes the same uplink to the core from the NPV device. For traffic beyond the NPV device, core switches will enforce in-order delivery if needed and/or configured.

After entering NPV mode, only the following commands are available:

Command	Description
aaa	Configure aaa functions.
banner	Configure banner message.
boot	Configure boot variables.
callhome	Enter the callhome configuration mode.
cfs	CFS configuration commands.
cli	Configure CLI commands.
clock	Configure time-of-day clock.
crypto	Set crypto settings.
event	Event Manager commands.
fcanalyzer	Configure cisco fabric analyzer.

Command	Description
feature	Command to enable/disable features.
fips	Enable/Disable FIPS mode.
flex-attach	Configure Flex Attach.
hardware	Hardware Internal Information.
hw-module	Enable/Disable OBFL information.
interface	Configure interfaces.
ip	Configure IP features.
ipv6	Configure IPv6 features.
license	Modify license features.
line	Configure a terminal line.
logging	Modify message logging facilities.
module	Configure for module.
no	Negate a command or set its defaults.
npv	Config commands for FC N_port Virtualizer.
ntp	NTP Configuration.
password	Password for the user
port-group-monitor	Configure port group monitor.
port-monitor	Configure port monitor.
power	Configure power supply.
poweroff	Power off a module in the switch.
radius	Configure RADIUS configuration.
radius-server	Configure RADIUS related parameters.
rate-mode	Configure rate mode oversubscription limit.
rmon	Remote Monitoring.
role	Configure roles.
snmp	Configure snmp.
snmp-server	Configure snmp server.
span	Enter SPAN configuration mode.

Command	Description
ssh	SSH to another system.
switchname	Configure system's network name.
system	System management commands.
terminal	Configure terminal settings.
this	Shows info about current object (mode's instance).
username	Configure user information.
vsan	Enter the vsan configuration mode.
wwn	Set secondary base MAC addr and range for additional WWNs.

NP Ports

An NP port (proxy N port) is a port on a device that is in NPV mode and connected to the NPV core switch using an F port. NP ports behave like N ports except that in addition to providing N port behavior, they also function as proxies for multiple, physical N ports.

NP Links

An NP link is basically an NPIV uplink to a specific end device. NP links are established when the uplink to the NPV core switch comes up; the links are terminated when the uplink goes down. Once the uplink is established, the NPV switch performs an internal FLOGI to the NPV core switch, and then (if the FLOGI is successful) registers itself with the NPV core switch's name server. Subsequent FLOGIs from end devices in this NP link are converted to FDISCs. For more details refer to the [Internal FLOGI Parameters, on page 7](#) section.

Server links are uniformly distributed across the NP links. All the end devices behind a server link will be mapped to only one NP link.

Internal FLOGI Parameters

When an NP port comes up, the NPV device first logs itself in to the NPV core switch and sends a FLOGI request that includes the following parameters:

- The fWWN (fabric port WWN) of the NP port used as the pWWN in the internal login.
- The VSAN-based sWWN (switch WWN) of the NPV device used as nWWN (node WWN) in the internal FLOGI.

After completing its FLOGI request, the NPV device registers itself with the fabric name server using the following additional parameters:

- Switch name and interface name (for example, fc1/4) of the NP port is embedded in the symbolic port name in the name server registration of the NPV device itself.
- The IP address of the NPV device is registered as the IP address in the name server registration of the NPV device.



Note The BB_SCN of internal FLOGIs on NP ports is always set to zero. The BB_SCN is supported at the F-port of the NPV device.

Figure 4: Internal FLOGI Flows, on page 8 shows the internal FLOGI flows between an NPV core switch and an NPV device.

Figure 4: Internal FLOGI Flows

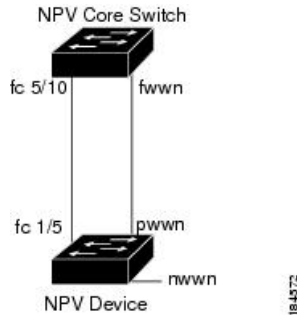


Table 1: Internal FLOGI Parameters , on page 8 identifies the internal FLOGI parameters that appear in .

Table 1: Internal FLOGI Parameters

Parameter	Derived From
pWWN	The fWWN of the NP port.
nWWN	The VSAN-based sWWN of the NPV device.
fWWN	The fWWN of the F port on the NPV core switch.
symbolic port name	The switch name and NP port interface string. Note If there is no switch name available, then the output will display “switch.” For example, switch: fc1/5.
IP address	The IP address of the NPV device.
symbolic node name	The NPV switch name.

Although fWWN-based zoning is supported for NPV devices, it is not recommended because:

- Zoning is not enforced at the NPV device (rather, it is enforced on the NPV core switch).
- Multiple devices behind an NPV device log in via the same F port on the core (they use same fWWN and cannot be separated into different zones).
- The same device might log in using different fWWNs on the core switch (depending on the NPV link it uses) and may need to be zoned using different fWWNs.

Default Port Numbers

Port numbers on NPV-enabled switches will vary depending on the switch model. For details about port numbers for NPV-eligible switches, see the [Cisco NX-OS Series Licensing Guide](#).

NPV CFS Distribution over IP

NPV devices use only IP as the transport medium. CFS uses multicast forwarding for CFS distribution. NPV devices do not have ISL connectivity and FC domain. To use CFS over IP, multicast forwarding has to be enabled on the Ethernet IP switches all along the network that physically connects the NPV switch. You can also manually configure the static IP peers for CFS distribution over IP on NPV-enabled switches. For more information, see the [Cisco MDS 9000 Series NX-OS System Management Configuration Guide](#).

NPV Traffic Management

Auto

Before Cisco MDS SAN-OS Release 3.3(1a), NPV supported automatic selection of external links. When a server interface is brought up, an external interface with the minimum load is selected from the available links. There is no manual selection on the server interfaces using the external links. Also, when a new external interface was brought up, the existing load was not distributed automatically to the newly available external interface. This newly brought up interface is used only by the server interfaces that come up after this interface.

Traffic Map

As in Cisco MDS SAN-OS Release 3.3(1a) and NX-OS Release 4.1(1a), NPV supports traffic management by allowing you to select and configure the external interfaces that the server uses to connect to the core switches.



Note When the NPV traffic management is configured, the server uses only the configured external interfaces. Any other available external interface will not be used.

The NPV traffic management feature provides the following benefits:

- Facilitates traffic engineering by providing dedicated external interfaces for the servers connected to NPV.
- Uses the shortest path by selecting external interfaces per server interface.
- Uses the persistent FC ID feature by providing the same traffic path after a link break, or reboot of the NPV or core switch.
- Balances the load by allowing the user to evenly distribute the load across external interfaces.

Disruptive

Disruptive load balance works independent of automatic selection of interfaces and a configured traffic map of external interfaces. This feature forces reinitialization of the server interfaces to achieve load balance when this feature is enabled and whenever a new external interface comes up. To avoid flapping the server interfaces too often, enable this feature once and then disable it whenever the needed load balance is achieved.

If disruptive load balance is not enabled, you need to manually flap the server interface to move some of the load to a new external interface.

Multiple VSAN Support

By grouping devices into different NPV sessions based on VSANs, it is possible to support multiple VSANs on the NPV-enabled switch. The correct uplink must be selected based on the VSAN that the uplink is carrying.

Guidelines and Limitations

NPV Guidelines and Requirements

Following are recommended guidelines and requirements when deploying NPV:

- NPV core switches must support NPIV.
- You can have up to 105 NPV devices.
- Nondisruptive upgrades are supported. See the [Cisco MDS 9000 Series NX-OS Fundamentals Configuration Guide](#).
- Port tracking is supported. See the [Cisco MDS 9000 Series NX-OS Security Configuration Guide](#).
- You can configure zoning for end devices that are connected to edge switches using all available member types on a core switch. However, the preferred way of zoning servers connected to any switch in NPV mode is via pWWN, device-alias, and fc alias. Multiple servers should be configured in the same zone only when using smart zoning. The smart zoning feature is available on all MDS switches. For more information, see the Smart Zoning section in the Configuring and Managing Zones chapter of the [Cisco MDS 9000 Series Fabric Configuration Guide](#).
- Port security is supported on the NPV core switch for devices logged in via NPV.
- NPV uses a load-balancing algorithm to automatically assign end devices in a VSAN to one of the NPV core switch links (in the same VSAN) upon initial login. If there are multiple NPV core switch links in the same VSAN, then you cannot assign a specific one to an end device.
- Both servers and targets can be connected to an NPV device.
- Remote SPAN is not supported.
- Local switching is not supported; all traffic is switched using the NPV core switch.
- NPV devices can connect to multiple NPV core switches. In other words, different NP ports can be connected to different NPV core switches.
- NPV supports NPIV-capable servers. This capability is called nested NPIV.
- Connecting two Cisco NPV switches together is not supported.
- Only F, NP, and SD ports are supported in NPV mode.
- In the case of servers that are booted over the SAN with NPV, if an NPV link failover occurs, servers will lose access to their boot LUN temporarily.
- NPV switches do not recognize the BB_SCN configuration on the xNP ports because of interoperability issues with the third-party core switches.

NPV Traffic Management Guidelines

When deploying NPV traffic management, follow these guidelines:

- Use NPV traffic management only when the automatic traffic engineering by the NPV device is not sufficient for the network requirements.
- Do not configure traffic maps for all the servers. For non-configured servers, NPV will use automatic traffic engineering.
- Configure the Persistent FC ID on the core switch. Traffic engineering directs the associated server interface to external interfaces that lead to the same core switch. The server will be assigned the same FC ID for every log in. This guideline is not applicable if a 91x4 switch is used as the core switch.
- Server interfaces configured to a set of external interfaces cannot use any other available external interfaces, even if the configured interfaces are not available.
- Do not configure disruptive load balancing because this involves moving a device from one external interface to another interface. Moving the device between external interfaces requires NPV relogin to the core switch through F port leading to traffic disruption.
- Link a set of servers to a core switch by configuring the server to a set of external interfaces that are linked to the core switch.

DPVM Configuration Guidelines

When NPV is enabled, the following requirements must be met before you configure DPVM on the NPV core switch:

- You must explicitly configure the WWN of the internal FLOGI in DPVM. If DPVM is configured on the NPV core switch for an end device that is connected to the NPV device, then that end device must be configured to be in the same VSAN. Logins from a device connected to an NPV device will fail if the device is configured to be in a different VSAN. To avoid VSAN mismatches, ensure that the internal FLOGI VSAN matches the port VSAN of the NP port.
- The first login from an NP port determines the VSAN of that port. If DPVM is configured for this first login, which is the internal login of the NPV device, then the NPV core switch's VSAN F port is located in that VSAN. Otherwise, the port VSAN remains unchanged.

For details about DPVM configuration, see the [Cisco MDS 9000 Series NX-OS Fabric Configuration Guide](#).

NPV and Port Security Configuration Guidelines

Port security is enabled on the NPV core switch on a per interface basis. To enable port security on the NPV core switch for devices logging in via NPV, you must adhere to the following requirements:

- The internal FLOGI must be in the port security database so that, the port on the NPV core switch will allow communications and links.
- All of the end device pWWNs must also be in the port security database.

Once these requirements are met, you can enable port security as you would in any other context. For details about enabling port security, see the [Cisco MDS 9000 Series NX-OS Security Configuration Guide](#).

Connecting an NPIV-Enabled Cisco MDS Fabric Switch

This topic provides information about connecting an NPIV-enabled Cisco MDS 9396S Multilayer Fabric Switch to an NPV switch running Cisco MDS NX-OS Release 6.2(13) and earlier.

When trunking is enabled on the NPV ports of any MDS switch (released before the Cisco MDS 9396S Multilayer Fabric Switch) that runs on an Cisco MDS NX-OS Release 6.2(13) and earlier, and you connect an NPIV enabled Cisco MDS 9396S Multilayer Fabric Switch, use ports fc1/1 through fc1/63.



Note Trunking failure can occur in both non-portChannel (individual physical NP uplinks) and portChannel NP uplinks. To avoid trunking failure, ensure that you upgrade the NPV switch to Cisco MDS NX-OS Release 6.2(13) or later.

Configuring N Port Virtualization

Enabling N Port Identifier Virtualization

You must globally enable NPIV for all VSANs on the MDS switch to allow the NPIV-enabled applications to use multiple N port identifiers.



Note All of the N port identifiers are allocated in the same VSAN.

To enable or disable NPIV on the switch, perform these steps:

Step 1 switch# **configure terminal**

Enters configuration mode.

Step 2 switch(config)# **feature npiv**

Enables NPIV for all VSANs on the switch.

switch(config)# **no feature npiv**

(Optional) Disables (default) NPIV on the switch.

Configuring NPV

When you enable NPV, the system configuration is erased and the system reboots with the NPV mode enabled.



Note We recommend that you save the current configuration either on bootflash or a TFTP server before NPV (if the configuration is required for later use). Use the following commands to save either your non-NPV or NPV configuration:

switch# **copy running bootflash:filename**

The configuration can be reapplied later using the following command:

switch# **copy bootflash:filename running-config**



Note NPV cannot be enabled or disabled from the ASCII configuration file. You can enable or disable only from the command line.

To configure NPV using the CLI, perform the following steps:

-
- Step 1** `switch# configure terminal`
On the NPV core switch, enters configuration mode.
- Step 2** `switch(config)# feature npiv`
Enables NPIV mode on the NPV core switch.
`switch(config)# no feature npiv`
(Optional) Disables NPIV mode on the NPV core switch.
- Step 3** `switch(config)# interface fc 2/1`
Configures the NPIV core switch port as an F port.
Changes Admin status to bring up the interfaces.
- Step 4** `switch(config)# vsan database`
Configures the port VSANs for the F port on the NPIV core switch.
- Step 5** `switch(config)# npv enable`
Enables NPV mode on a NPV device (module, Cisco MDS 9124, Cisco MDS 9134, Cisco MDS 9148 Fabric Switch, Cisco MDS 9148S Multilayer Fabric Switch Cisco MDS 9250i Multilayer Fabric Switch, and Cisco MDS 9396S Multilayer Fabric Switch). The module or switch is rebooted, and when it comes back up, is in NPV mode.
Note A write-erase is performed during the reboot.
- Step 6** `switch(config)# interface fc 1/1`
On the NPV device, selects the interfaces that will be connected to the aggregator switch and configure them as NP ports.
Changes Admin status to bring up the interfaces.
- Step 7** `switch(config)# vsan database`
Configures the port VSANs for the NP port on the NPV device.
- Step 8** `switch(config-if)# exit`
Exits interface mode for the port.
- Step 9** `switch(config)# interface fc 1/2 - 6`
Selects the remaining interfaces (2 through 6) on the NPV-enabled device and configures them as F ports.
Changes Admin status to bring up the interfaces.
- Step 10** `switch(config)# vsan database`
Configures the port VSANs for the F ports on the NPV device.
- Step 11** `switch(config-npv)# no npv enable`
Terminates session and disables NPV mode, which results in a reload of the NPV device.
-

Configuring NPV Traffic Management

The NPV traffic management feature is enabled after configuring NPV. Configuring NPV traffic management involves configuring a list of external interfaces to the servers, and enabling or disabling disruptive load balancing.

Configuring List of External Interfaces per Server Interface

A list of external interfaces are linked to the server interfaces when the server interface is down, or if the specified external interface list includes the external interface already in use.

To configure the list of external interfaces per server interface, perform the following tasks:

-
- Step 1** `switch# configure terminal`
Enters configuration mode on the NPV.
- Step 2** `switch(config)# npv traffic-map server-interface svr-if-range external-interface fc ext-fc-if-range`
Allows you to configure a list of external FC interfaces per server interface by specifying the external interfaces in the *svr-if-range*. The server to be linked is specified in the *ext-fc-if-range*.
- Step 3** `switch(config)# npv traffic-map server-interface svr-if-range external-interface port-channel ext-pc-if-range`
Allows you to configure a list of external PortChannel interfaces per server interface by specifying the external interfaces in the *svr-if-range*. The server to be linked is specified in the *ext-pc-if-range*.
- Note** While mapping non-PortChannel interfaces and PortChannel interfaces to the server interfaces, include them separately in two steps.
- Step 4** `switch(config)# no npv traffic-map server-interface svr-if-range external-interface ext-if-range`
Disables the NPV traffic management feature on the NPV.
-

Enabling the Global Policy for Disruptive Load Balancing

Disruptive load balancing allows you to review the load on all the external interfaces and balance the load disruptively. Disruptive load balancing is done by moving the servers using heavily loaded external interfaces, to the external interfaces running with fewer loads.

To enable or disable the global policy for disruptive load balancing, perform the following tasks:

-
- Step 1** `switch# configure terminal`
Enters configuration mode on the NPV.
- Step 2** `switch(config)# npv auto-load-balance disruptive`
Enables disruptive load balancing on the NPV core switch.
- Step 3** `switch (config)# no npv auto-load-balance disruptive`

Disables disruptive load balancing on the NPV core switch.

Verifying NPV Configuration

To display NPV configuration information, perform one of the following tasks:

Command	Purpose
show fcns database	Displays all the NPV devices in all the VSANs that the aggregator switch belongs to.
show fcns database detail	Displays additional details such as IP addresses, switch names, interface names about the NPV devices.
show npv flogi-table	Displays a list of the NPV devices that are logged in, along with VSANs, source information, pWWNs, and FCIDs.
show npv status	Displays the status of the different servers and external interfaces.
show npv traffic-map	Displays the NPV traffic map.
show npv internal info traffic-map	Displays the NPV internal traffic details.

For detailed information about the fields in the output from these commands, refer to the [Cisco MDS 9000 Series NX-OS Command Reference](#).

Verifying NPV

To view all the NPV devices in all the VSANs that the aggregator switch belongs to, enter the **show fcns database** command.

```
switch# show fcns database

VSAN 1:
-----
FCID TYPE PWWN (VENDOR) FC4-TYPE:FEATURE
-----
0x010000 N 20:01:00:0d:ec:2f:c1:40 (Cisco) npv
0x010001 N 20:02:00:0d:ec:2f:c1:40 (Cisco) npv
0x010200 N 21:00:00:e0:8b:83:01:a1 (Qlogic) scsi-fcp:init
0x010300 N 21:01:00:e0:8b:32:1a:8b (Qlogic) scsi-fcp:init
Total number of entries = 4
```

For additional details (such as IP addresses, switch names, interface names) about the NPV devices you see in the **show fcns database** output, enter the **show fcns database detail** command.

```
switch# show fcns database detail

-----
VSAN:1 FCID:0x010000
-----
port-wwn (vendor) :20:01:00:0d:ec:2f:c1:40 (Cisco)
node-wwn :20:00:00:0d:ec:2f:c1:40
class :2,3
node-ip-addr :172.20.150.38
ipa :ff ff ff ff ff ff ff ff
```

```

fc4-types:fc4_features :npv
symbolic-port-name :para-3:fc1/1
symbolic-node-name :para-3
port-type :N
port-ip-addr :0.0.0.0
fabric-port-wwn :20:01:00:0d:ec:04:99:40
hard-addr :0x000000
permanent-port-wwn (vendor) :20:01:00:0d:ec:2f:c1:40 (Cisco)
connected interface :port-channel6
switch name (IP address) :switch (192.0.2.1)
-----
VSAN:1 FCID:0x010001
-----
port-wwn (vendor) :20:02:00:0d:ec:2f:c1:40 (Cisco)
node-wwn :20:00:00:0d:ec:2f:c1:40
class :2,3
node-ip-addr :172.20.150.38
ipa :ff ff ff ff ff ff ff ff
fc4-types:fc4_features :npv
symbolic-port-name :para-3:fc1/2
symbolic-node-name :para-3
port-type :N
port-ip-addr :0.0.0.0
fabric-port-wwn :20:02:00:0d:ec:04:99:40
hard-addr :0x000000
permanent-port-wwn (vendor) :20:02:00:0d:ec:2f:c1:40 (Cisco)
connected interface :port-channel6
switch name (IP address) :switch (192.0.2.1)

```

If you need to contact support, enter the **show tech-support NPV** command and save the output so that support can use it to troubleshoot, if necessary.

To display a list of the NPV devices that are logged in, along with VSANs, source information, pWWNs, and FCIDs, enter the **show npv flogi-table** command.

```
switch# show npv flogi-table
```

-----		VSAN	FCID
SERVER			
INTERFACE			

fc1/19		1	0xee0
fc1/19		1	0xee0
fc1/19		1	0xee0
fc1/19		1	0xee0

Total number of flogi = 4.

To display the status of the different servers and external interfaces, enter the **show npv status** command.

```
switch# show npv status

npiv is enabled

External Interfaces:
=====
  Interface: fc1/1, VSAN: 2, FCID: 0x1c0000, State: Up
  Interface: fc1/2, VSAN: 3, FCID: 0x040000, State: Up

  Number of External Interfaces: 2

Server Interfaces:
=====
  Interface: fc1/7, VSAN: 2, NPIV: No, State: Up
  Interface: fc1/8, VSAN: 3, NPIV: No, State: Up

  Number of Server Interfaces: 2
```

Verifying NPV Traffic Management

To display the NPV traffic map, enter the **show npv traffic-map** command.

```
switch# show npv traffic-map

NPV Traffic Map Information:
-----
Server-If      External-If(s)
-----
fc1/1          fc1/5
-----
```

To display the NPV internal traffic details, enter the **show npv internal info traffic-map** command.

```
switch# show npv internal info traffic-map

NPV Traffic Map Information:
-----
Server-If      Last Change Time          External-If(s)
-----
fc1/1          2015-01-15 03:24:16.247856  fc1/5
-----
```