CHAPTER 5

VSANs

This chapter provides recipes for configuring VSANs (virtual SANs). A VSAN is a logical grouping of ports in a single switch or across multiple switches that function like a single fabric.

This chapter includes the following sections:

VSAN Overview

A VSAN is a logical fabric. Each VSAN has all the required fabric services, independent of the other VSANs, configured on the same switch or set of switches. A VSAN provides:

- SAN island consolidation on a high-port-density physical switch
- Traffic isolation
- Increased security

VSANs can be numbered from 1 to 4094. VSAN 1 and VSAN 4094 are predefined and have very specific roles. VSAN 1 is the default VSAN which holds all the ports by default and the VSAN 4094 is the isolated VSAN into which orphaned ports are assigned.

Creating a VSAN on a Single Switch and Adding an Interface

This recipe shows the steps to create and name a VSAN on a single switch. Enter the following commands to create VSAN 200 with the name TapeVSAN and add Fibre Channel interface fc 1/1.

```
switch1# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# vsan database
switch(config-vsan-db)# vsan 200 name TapeVSAN
switch(config-vsan-db)# vsan 200 interface fc 1/1
switch(config-vsan-db)# ^Z
switch#
```

Setting VSAN Interop Mode

Interop mode can be set for VSANs that need to interact with other third-party switches. Interop mode 1 is required when all vendor switches are set in their respective interop modes. In interop mode, only domain IDs 97 to 127 are allowed. Interop mode 2 is required when a VSAN has to work with a Brocade 2800/3800 switch in its native mode. Interop mode 3 is required when the VSAN has to work with Brocade 3900 or a 12000 switch. For more information, refer to the *MDS Switch to Switch Interoperability Configuration Guide*.

Note Before performing any interoperability work, consult the *MDS Switch to Switch Interoperability Configuration Guide,* which explains and provides detailed instructions on using the interop modes. The guide may be found at the following location: http://www.cisco.com/en/US/products/hw/ps4159/ps4358/products_device_support_tables_list.html.

To set the interop modes 1, 2, 3 for a VSAN, follow these steps:

Step 1 For **Interop mode 1,** ensure that the domain ID of the VSAN is between 97 – 127 for this mode to work. To change the interop mode of VSAN 200 to interop mode 1, enter these commands:

```
switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# vsan database
switch(config-vsan-db)# vsan 200 interop 1
switch(config-vsan-db)# ^Z
switch#
```

Step 2 For **Interop mode 2** with brocade 2800/ 3800 switches, change the interop mode of VSAN 200 to interop mode 2.

```
switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# vsan database
switch(config-vsan-db)# vsan 200 interop 2
switch(config-vsan-db)# ^Z
switch#
```

Step 3 **For Interop mode 3** with brocade switches 3900/12000, change the interop mode of VSAN 200 to interop mode 3.

```
switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# vsan database
switch(config-vsan-db)# vsan 200 interop 3
switch(config-vsan-db)# ^Z
switch#
```

Changing a Load Balancing Scheme

The load-balancing scheme can be configured per VSAN. On a Cisco MDS 9000 switch, you can configure S_ID (source id) or D_ID (destination id) based load balancing, as well as exchange level (S_ID, D_ID, OX_ID) load balancing.

Sequence Level load-balancing (Source_ID, Destination_ID)

To change the load-balancing scheme for a VSAN 200 to S_ID, D_ID mode, enter the following commands:

```
switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# vsan database
switch(config-vsan-db)# vsan 200 loadbalancing src-dst-id
switch(config-vsan-db)# ^Z
switch#
```

Exchange Level Load Balancing (S_ID, D_ID, OX_ID)

To change the load-balancing scheme for a VSAN 200 to S_ID, D_ID, and OX_ID mode, enter the following commands:

```
switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# vsan database
switch(config-vsan-db)# vsan 200 loadbalancing src-dst-ox-id
switch(config-vsan-db)# ^Z
switch#
```

Exchange level load balancing is the default load-balancing scheme.

Configuring a Static Domain ID and Persistent FC ID

Within a VSAN, the domain manager process on the principal switch in a fabric is responsible for assigning a domain_ID to switch that is joining the fabric. When a switch boots up or joins a new fabric, it can request a specific domain_ID or take any available domain_ID. A domain_ID can be configured in one of three ways:

- **Dynamic** (default): The new switch will not request any domain_ID from the principal switch and accept any domain_ID that is assigned.
- **Preferred**: The new switch will request a specific domain_ID, however, if it receives a different domain_ID it will accept it.
- **Static**: The new switch will request a specific domain_ID, however, if it receives a different domain_ID, it will isolate itself from the fabric. This is the case when the same domain_ID must be maintained under all circumstances.

After obtaining the domain_ID from the principal switch in the VSAN, the local switch will assign Fibre Channel Identifiers (FC IDs) to each device as they log in to the Fabric. This process is known as FLOGI (Fabric Login). Some devices require that the same FC ID be assigned to a device as the FC ID used in the host's device path. HPUX and AIX are two operating systems that use the FC ID in the device path to the storage. To have the switch always assign the same FC ID to a device, a persistent FC ID must be configured for the VSAN. By default, the switch assigns the same FC ID to a device; however, if the switch is rebooted, the database of pWWN/FC ID mapping is not maintained. Enabling persistent FC IDs makes this database persistent.

When persistent FC ID is enabled, the MDS 9000 switch makes all of the devices in that VSAN persistent. Therefore, the admin is not required to manually type in devices entering that VSAN.

This recipe shows the steps to configure a static domain_ID for a VSAN and also how to enable a persistent FC ID for the same VSAN.

This procedure sets the domain_ID of VSAN 200 to 22 and then enables a persistent FC ID.

```
switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# fcdomain domain 22 static vsan 200
switch(config)# fcdomain fcid persistent vsan 200
switch(config)# ^Z
switch#
```

Note If the domain ID of VSAN 200 is different than what is currently running (22 in this case), then the VSAN will have to be restarted for the configuration changes to the domain_ID and FC ID persistence to take effect. Read the following Warning.

Warning **Changing domain_IDs and therefore FC IDs for a device is disruptive, because an end device will have to log in to the fabric (FLOGI) again to obtain a new FC ID. However, making a domain_ID static without changing its value is not disruptive.**

Restarting a VSAN

Sometimes the VSAN on a switch will need to be restarted. For example, after changing the domain_ID of a VSAN, the VSAN should be restarted for the new domain_ID to take effect.

The recipe shows how a VSAN (200) can be restarted.

```
switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# vsan database
switch(config-vsan-db)# vsan 200 suspend
switch(config-vsan-db)# no vsan 200 suspend
switch(config-vsan-db)# end
```

Assigning a Predetermined FC ID to a PWWN

When performing a migration or HBA replacement, the same FC ID as was used previously may need to be assigned to the new pWWN. This recipe shows steps to assign a predetermined FC ID to a specific pWWN.

FC ID 0x160000 will be assigned permanently to pWWN 50:06:0b:82:bf:d1:db:cd. Therefore, when the pWWN logs into the switch (FLOGI), it will get this assigned FC ID.

Note The FC ID to be assigned (0x160000) should contain the same domain_ID (0x16) as the currently running domain in the VSAN.

```
switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# fcdomain fcid database
switch(config-fcid-db)# vsan 22 wwn 50:06:0b:82:bf:d1:db:cd fcid 0x160000 dynamic
switch(config-fcid-db)# ^Z
switch#
```