Configuring Fibre Channel Domain Parameters

This chapter describes how to configure Fibre Channel domain parameters.

This chapter includes the following sections:

- Information About Domain Parameters, page 1

Information About Domain Parameters

The Fibre Channel domain (fcdomain) feature performs principal switch selection, domain ID distribution, FC ID allocation, and fabric reconfiguration functions as described in the FC-SW-2 standards. The domains are configured on a per-VSAN basis. If you do not configure a domain ID, the local switch uses a random ID.

Caution Changes to fcdomain parameters should not be performed on a daily basis. These changes should be made by an administrator or individual who is completely familiar with switch operations.

When you change the configuration, be sure to save the running configuration. The next time you reboot the switch, the saved configuration is used. If you do not save the configuration, the previously saved startup configuration is used.

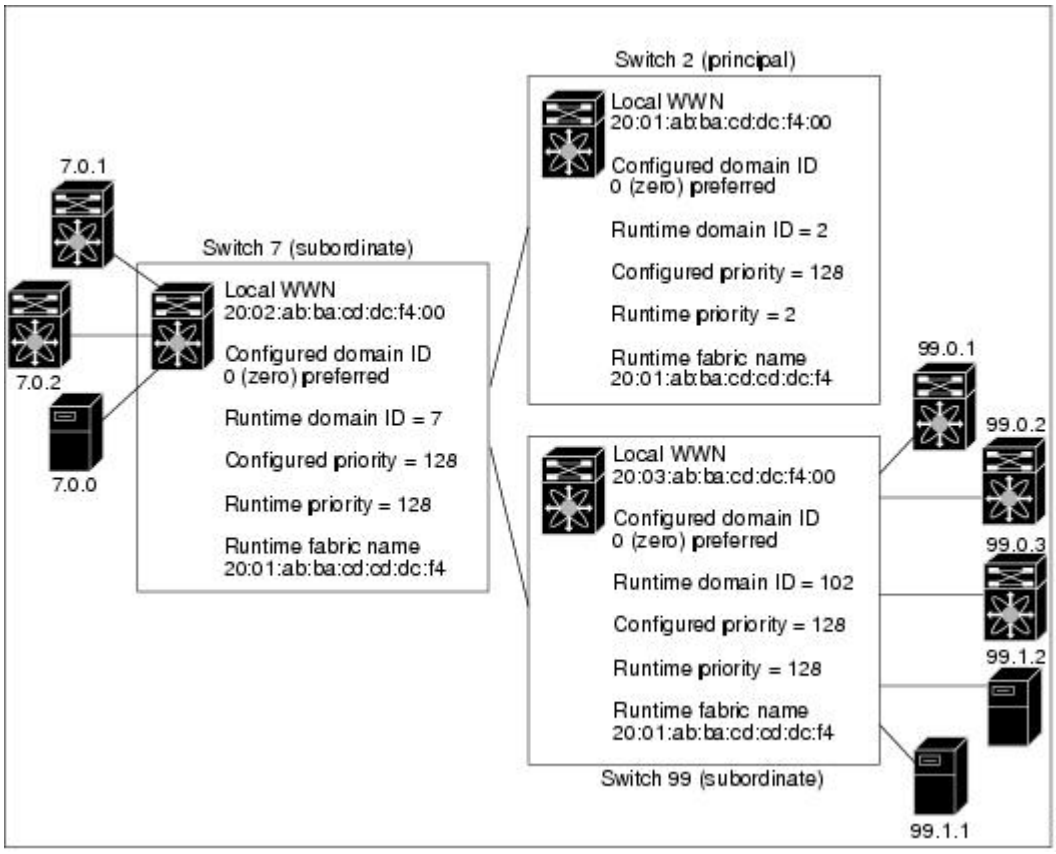
Fibre Channel Domains

The fcdomain has four phases:

- Principal switch selection—This phase guarantees the selection of a unique principal switch across the fabric.
- Domain ID distribution—This phase guarantees that each switch in the fabric obtains a unique domain ID.
- FC ID allocation—This phase guarantees a unique FC ID assignment to each device attached to the corresponding switch in the fabric.
- Fabric reconfiguration—This phase guarantees a resynchronization of all switches in the fabric to ensure they simultaneously restart a new principal switch selection phase.

The following figure shows an example fcdomain configuration.

Figure 1: Sample fcdomain Configuration



Domain Restarts

Fibre Channel domains can be started disruptively or nondisruptively. If you perform a disruptive restart, reconfigure fabric (RCF) frames are sent to other switches in the fabric and data traffic is disrupted on all the switches in the VSAN (including remotely segmented ISLs). If you perform a nondisruptive restart, build fabric (BF) frames are sent to other switches in the fabric and data traffic is disrupted only on the switch.

If you are attempting to resolve a domain ID conflict, you must manually assign domain IDs. A disruptive restart is required to apply most configuration changes, including manually assigned domain IDs. Nondisruptive domain restarts are acceptable only when changing a preferred domain ID into a static one (and the actual domain ID remains the same).

Note A static domain is specifically configured by the user and may be different from the runtime domain. If the domain IDs are different, the runtime domain ID changes to take on the static domain ID after the next restart, either disruptive or nondisruptive.

If a VSAN is in interop mode, you cannot disruptively restart the fcdomain for that VSAN.

You can apply most of the configurations to their corresponding runtime values. Each of the following sections provide further details on how the fcdomain parameters are applied to the runtime values.

The **fcdomain restart** command applies your changes to the runtime settings. Use the disruptive option to apply most of the configurations to their corresponding runtime values, including preferred domain IDs.

Restarting a Domain

You can restart the fabric disruptively or nondisruptively.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain restart vsan** *vsan-id*
3. switch(config)# **fcdomain restart disruptive vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain restart vsan** *vsan-id* **Example:** `switch (config)# fcdomain restart vsan 100`	Forces the VSAN to reconfigure without traffic disruption. The VSAN ID ranges from 1 to 4093.
Step 3	switch(config)# **fcdomain restart disruptive vsan** *vsan-id* **Example:** `switch (config)# fcdomain restart disruptive vsan 101`	Forces the VSAN to reconfigure with data traffic disruption.

Domain Manager Fast Restart

When a principal link fails, the domain manager must select a new principal link. By default, the domain manager starts a build fabric (BF) phase, followed by a principal switch selection phase. Both of these phases involve all the switches in the VSAN, and together take at least 15 seconds to complete. To reduce the time required for the domain manager to select a new principal link, you can enable the domain manager fast restart feature.

When fast restart is enabled and a backup link is available, the domain manager needs only a few milliseconds to select a new principal link to replace the one that failed. Also, the reconfiguration required to select the new principal link only affects the two switches that are directly attached to the failed link, not the entire VSAN. When a backup link is not available, the domain manager reverts to the default behavior and starts a

BF phase, followed by a principal switch selection phase. The fast restart feature can be used in any interoperability mode.

Enabling Domain Manager Fast Restart

You can enable the domain manager fast restart feature.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain optimize fast-restart vsan** *vsan-id*
3. **no fcdomain optimize fast-restart vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain optimize fast-restart vsan** *vsan-id* **Example:** `switch(config)# fcdomain optimize fast-restart vsan 1`	Enables domain manager fast restart in the specified VSAN. The VSAN ID range is from 1 to 4093.
Step 3	**no fcdomain optimize fast-restart vsan** *vsan-id* **Example:** `switch(config)# no fcdomain optimize fast-restart vsan 1`	Disables (default) domain manager fast restart in the specified VSAN. The VSAN ID range is from 1 to 4093.

Switch Priority

By default, the configured priority is 128. The valid range to set the priority is between 1 and 254. Priority 1 has the highest priority. Value 255 is accepted from other switches, but cannot be locally configured.

Any new switch cannot become the principal switch when it joins a stable fabric. During the principal switch selection phase, the switch with the highest priority becomes the principal switch. If two switches have the same configured priority, the switch with the lower world-wide name (WWN) becomes the principal switch.

The priority configuration is applied to runtime when the fcdomain is restarted. This configuration is applicable to both disruptive and nondisruptive restarts.

Configuring Switch Priority

You can configure the priority for the principal switch.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain priority** *number* **vsan** *vsan-id*
3. **no fcdomain priority** *number* **vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain priority** *number* **vsan** *vsan-id* **Example:** `switch(config)# fcdomain priority 12 vsan 1`	Configures the specified priority for the local switch in the specified VSAN. The fcdomain priority ranges from 1 to 254. The VSAN ID ranges from 1 to 4093.
Step 3	**no fcdomain priority** *number* **vsan** *vsan-id* **Example:** `switch(config)# no fcdomain priority 12 vsan 1`	Reverts the priority to the factory default (128) in the specified VSAN. The fcdomain priority ranges from 1 to 254. The VSAN ID ranges from 1 to 4093.

About fcdomain Initiation

By default, the fcdomain feature is enabled on each switch. If you disable the fcdomain feature in a switch, that switch can no longer participate with other switches in the fabric. The fcdomain configuration is applied to runtime through a disruptive restart.

Disabling or Reenabling fcdomains

To disable or reenable fcdomains in a single VSAN or a range of VSANs, perform this task:

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **no fcdomain vsan** *vsan-id* **-** *vsan-id*
3. switch(config)# **fcdomain vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **no fcdomain vsan** *vsan-id - vsan-id*	Disables the fcdomain configuration in the specified VSAN range.
Step 3	switch(config)# **fcdomain vsan** *vsan-id*	Enables the fcdomain configuration in the specified VSAN.

Configuring Fabric Names

You can set the fabric name value for a disabled fcdomain.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain fabric-name 20:1:ac:16:5e:0:21:01 vsan** *vsan-id*
3. **no fcdomain fabric-name 20:1:ac:16:5e:0:21:01 vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain fabric-name 20:1:ac:16:5e:0:21:01 vsan** *vsan-id* **Example:** `switch(config)# fcdomain fabric-name 20:1:ac:16:5e:0:21:01 vsan 1`	Assigns the configured fabric name value in the specified VSAN. The VSAN ID ranges from 1 to 4093.
Step 3	**no fcdomain fabric-name 20:1:ac:16:5e:0:21:01 vsan** *vsan-id* **Example:** `switch(config)# no fcdomain fabric-name 20:1:ac:16:5e:0:21:01 vsan 1`	Changes the fabric name value to the factory default (20:01:00:05:30:00:28:df) in VSAN 3010. The VSAN ID ranges from 1 to 4093.

Incoming RCFs

You can configure the rcf-reject option on a per-interface, per-VSAN basis. By default, the rcf-reject option is disabled (that is, RCF request frames are not automatically rejected).

The rcf-reject option takes effect immediately.

No fcdomain restart is required.

Note You do not need to configure the RCF reject option on virtual Fibre Channel interfaces.

Rejecting Incoming RCFs

You can reject incoming RCF request frames.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain rcf-reject vsan** *vsan-id*
3. **no fcdomain rcf-reject vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain rcf-reject vsan** *vsan-id* **Example:** `switch(config-if)# fcdomain rcf-reject vsan 10`	Enables the RCF filter on the specified interface in the specified VSAN. The VSAN ID ranges from 1 to 4093.
Step 3	**no fcdomain rcf-reject vsan** *vsan-id* **Example:** `switch(config-if)# no fcdomain rcf-reject vsan 10`	Disables (default) the RCF filter on the specified interface in the specified VSAN. The VSAN ID ranges from 1 to 4093.

Autoreconfiguring Merged Fabrics

By default, the autoreconfigure option is disabled. When you join two switches belonging to two different stable fabrics that have overlapping domains, the following situations can occur:

- If the autoreconfigure option is enabled on both switches, a disruptive reconfiguration phase is started.
- If the autoreconfigure option is disabled on either or both switches, the links between the two switches become isolated.

The autoreconfigure option takes immediate effect at runtime. You do not need to restart the fcdomain. If a domain is currently isolated due to domain overlap, and you later enable the autoreconfigure option on both switches, the fabric continues to be isolated. If you enabled the autoreconfigure option on both switches before connecting the fabric, a disruptive reconfiguration (RCF) will occur. A disruptive reconfiguration can affect data traffic. You can nondisruptively reconfigure the fcdomain by changing the configured domains on the overlapping links and eliminating the domain overlap.

Enabling Autoreconfiguration

You can enable automatic reconfiguration in a specific VSAN (or range of VSANs).

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain auto-reconfigure vsan** *vsan-id*
3. **no fcdomain auto-reconfigure vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain auto-reconfigure vsan** *vsan-id* **Example:** `switch(config)# fcdomain auto-reconfigure vsan 1`	Enables the automatic reconfiguration option in the specified VSAN. The VSAN ID ranges from 1 to 4093.
Step 3	**no fcdomain auto-reconfigure vsan** *vsan-id* **Example:** `switch(config)# no fcdomain auto-reconfigure vsan 1`	Disables the automatic reconfiguration option and reverts it to the factory default in the specified VSAN. The VSAN ID ranges from 1 to 4093.

Domain IDs

Domain IDs uniquely identify a switch in a VSAN. A switch may have different domain IDs in different VSANs. The domain ID is part of the overall FC ID.

Domain IDs - Guidelines

The configured domain ID can be preferred or static. By default, the configured domain ID is 0 (zero) and the configured type is preferred.

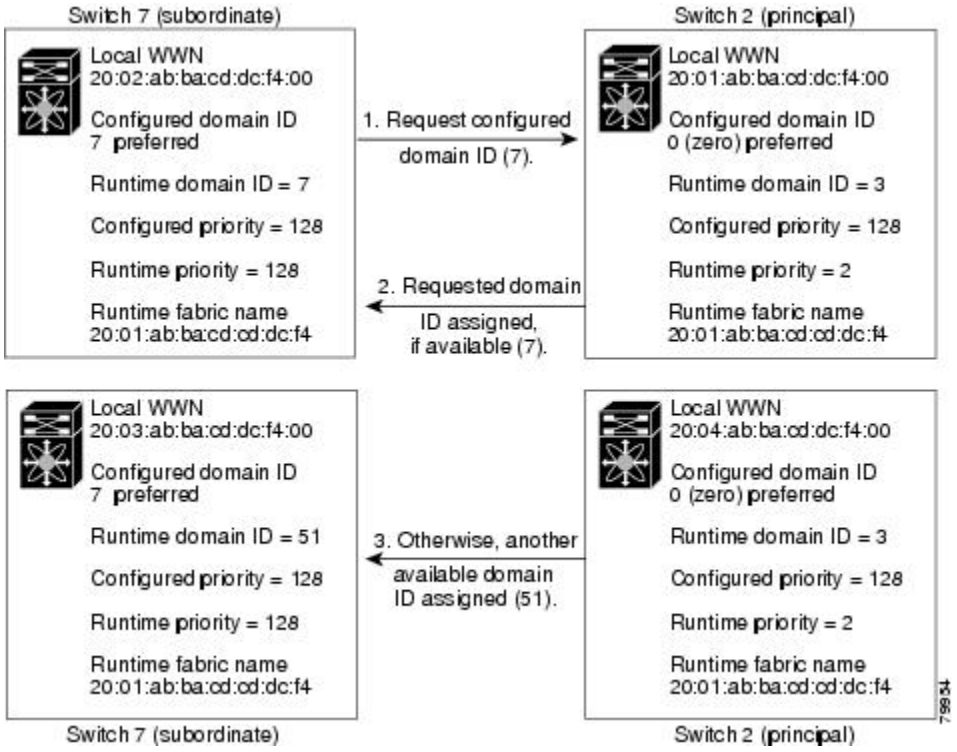
Note The 0 (zero) value can be configured only if you use the preferred option.

If you do not configure a domain ID, the local switch sends a random ID in its request. We recommend that you use static domain IDs.

When a subordinate switch requests a domain, the following process takes place (see the figure below):

- The local switch sends a configured domain ID request to the principal switch.
- The principal switch assigns the requested domain ID if available. Otherwise, it assigns another available domain ID.

Figure 2: Configuration Process Using the Preferred Option



The operation of a subordinate switch changes based on three factors:

- The allowed domain ID lists
- The configured domain ID
- The domain ID that the principal switch has assigned to the requesting switch

In specific situations, the changes are as follows:

- When the received domain ID is not within the allowed list, the requested domain ID becomes the runtime domain ID and all interfaces on that VSAN are isolated.
- When the assigned and requested domain IDs are the same, the preferred and static options are not relevant, and the assigned domain ID becomes the runtime domain ID.
- When the assigned and requested domain IDs are different, the following cases apply:
  - If the configured type is static, the assigned domain ID is discarded, all local interfaces are isolated, and the local switch assigns itself the configured domain ID, which becomes the runtime domain ID.
  - If the configured type is preferred, the local switch accepts the domain ID assigned by the principal switch and the assigned domain ID becomes the runtime domain ID.

If you change the configured domain ID, the change is only accepted if the new domain ID is included in all the allowed domain ID lists currently configured in the VSAN. Alternatively, you can also configure zero-preferred domain ID.

Caution You must enter the fcdomain restart command if you want to apply the configured domain changes to the runtime domain.

Note If you have configured an allow domain ID list, the domain IDs that you add must be in that range for the VSAN.

Related Topics

Allowed Domain ID Lists, on page 11

Configuring Static or Preferred Domain IDs

You can specify a static or preferred domain ID.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain domain** *domain-id* **static vsan** *vsan-id*
3. **no fcdomain domain** *domain-id* **static vsan** *vsan-id*
4. **fcdomain domain** *domain-id* **preferred vsan** *vsan-id*
5. **no fcdomain domain** *domain-id* **preferred vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain domain** *domain-id* **static vsan** *vsan-id* **Example:** `switch(config)# fcdomain domain 1 static vsan 3`	Configures the switch in the specified VSAN to accept only a specific value and moves the local interfaces in the specified VSAN to an isolated state if the requested domain ID is not granted. The domain ID range is 1 to 239. The VSAN ID range is 1 to 4093.
Step 3	**no fcdomain domain** *domain-id* **static vsan** *vsan-id* **Example:** `switch(config)# no fcdomain domain 1 static vsan 3`	Resets the configured domain ID to factory defaults in the specified VSAN. The configured domain ID becomes 0 preferred.
Step 4	**fcdomain domain** *domain-id* **preferred vsan** *vsan-id* **Example:** `switch(config)# fcdomain domain 1 preferred vsan 5`	Configures the switch in the specified VSAN to request a preferred domain ID 3 and accepts any value assigned by the principal switch. The domain ID range is 1 to 239. The VSAN ID range is 1 to 4093.
Step 5	**no fcdomain domain** *domain-id* **preferred vsan** *vsan-id* **Example:** `switch(config)# no fcdomain domain 1 preferred vsan 5`	Resets the configured domain ID to 0 (default) in the specified VSAN. The configured domain ID becomes 0 preferred.

Allowed Domain ID Lists

By default, the valid range for an assigned domain ID list is from 1 to 239. You can specify a list of ranges to be in the allowed domain ID list and separate each range with a comma. The principal switch assigns domain IDs that are available in the locally configured allowed domain list.

Use allowed domain ID lists to design your VSANs with nonoverlapping domain IDs. This helps you in the future if you need to implement IVR without the NAT feature.

If you configure an allowed list on one switch in the fabric, we recommend that you configure the same list in all other switches in the fabric to ensure consistency or use CFS to distribute the configuration.

Configuring Allowed Domain ID Lists

You can configure the allowed domain ID list.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain allowed** *domain-id range* **vsan** *vsan-id*
3. **no fcdomain allowed** *domain-id range* **vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain allowed** *domain-id range* **vsan** *vsan-id* **Example:** `switch(config)# fcdomain allowed 3 vsan 10`	Configures the list to allow switches with the domain ID range in the specified VSAN. The domain ID range is from 1 to 239. The VSAN ID range is from 1 to 4093.
Step 3	**no fcdomain allowed** *domain-id range* **vsan** *vsan-id* **Example:** `switch(config)# no fcdomain allowed 3 vsan 10`	Reverts to the factory default of allowing domain IDs from 1 through 239 in the specified VSAN.

CFS Distribution of Allowed Domain ID Lists

You can enable the distribution of the allowed domain ID list configuration information to all Cisco SAN switches in the fabric using the Cisco Fabric Services (CFS) infrastructure. This feature allows you to synchronize the configuration across the fabric from the console of a single switch. Because the same configuration is distributed to the entire VSAN, you can avoid a possible misconfiguration and the possibility that two switches in the same VSAN have configured incompatible allowed domains.

Use CFS to distribute the allowed domain ID list to ensure consistency in the allowed domain ID lists on all switches in the VSAN.

Note We recommend configuring the allowed domain ID list and committing it on the principal switch.

For additional information, refer to Using Cisco Fabric Services in the System Management Configuration Guide for your device.

Enabling Distribution

You can enable (or disable) allowed domain ID list configuration distribution.

CFS distribution of allowed domain ID lists is disabled by default. You must enable distribution on all switches to which you want to distribute the allowed domain ID lists.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain distribute**
3. **no fcdomain distribute**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain distribute** **Example:** `switch(config)# fcdomain distribute`	Enables domain configuration distribution.
Step 3	**no fcdomain distribute** **Example:** `switch(config)# no fcdomain distribute`	Disables (default) domain configuration distribution.

Locking the Fabric

The first action that modifies the existing configuration creates the pending configuration and locks the feature in the fabric. After you lock the fabric, the following conditions apply:

- No other user can make any configuration changes to this feature.
- A pending configuration is created by copying the active configuration. Subsequent modifications are made to the pending configuration and remain there until you commit the changes to the active configuration (and other switches in the fabric) or discard them.

Committing Changes

You can commit pending domain configuration changes and release the lock.

To apply the pending domain configuration changes to other SAN switches in the VSAN, you must commit the changes. The pending configuration changes are distributed and, on a successful commit, the configuration changes are applied to the active configuration in the SAN switches throughout the VSAN and the fabric lock is released.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain commit vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain commit vsan** *vsan-id* **Example:** `switch(config)# fcdomain commit vsan 45`	Commits the pending domain configuration changes.

Discarding Changes

You can discard pending domain configuration changes and release the lock.

At any time, you can discard the pending changes to the domain configuration and release the fabric lock. If you discard (abort) the pending changes, the configuration remains unaffected and the lock is released.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain abort vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain abort vsan** *vsan-id* **Example:** `switch(config)# fcdomain abort vsan 30`	Discards the pending domain configuration changes.

Clearing a Fabric Lock

If you have performed a domain configuration task and have not released the lock by either committing or discarding the changes, an administrator can release the lock from any switch in the fabric. If the administrator performs this task, your pending changes are discarded and the fabric lock is released.

The pending changes are only available in the volatile directory and are discarded if the switch is restarted.

To release a fabric lock, enter the **clear fcdomain session vsan** command in EXEC mode using a login ID that has administrative privileges:

```
switch# clear fcdomain session vsan 10
```

Displaying CFS Distribution Status

You can display the status of CFS distribution for allowed domain ID lists by using the **show fcdomain status** command:

```
switch# show fcdomain status
CFS distribution is enabled
```

Displaying Pending Changes

You can display the pending configuration changes by using the **show fcdomain pending** command:

```
switch# show fcdomain pending vsan 10
Pending Configured Allowed Domains
---------------------------------
VSAN 10
Assigned or unallowed domain IDs: 1-9,24,100,231-239.
[User] configured allowed domain IDs: 10-230.
```

You can display the differences between the pending configuration and the current configuration by using the **show fcdomain pending-diff** command:

```
switch# show fcdomain pending-diff vsan 10
Current Configured Allowed Domains
---------------------------------
VSAN 10
Assigned or unallowed domain IDs: 24,100.
[User] configured allowed domain IDs: 1-239.
Pending Configured Allowed Domains
---------------------------------
VSAN 10
Assigned or unallowed domain IDs: 1-9,24,100,231-239.
[User] configured allowed domain IDs: 10-230.
```

Displaying Session Status

You can display the status of the distribution session by using the **show fcdomain session-status vsan** command:

```
switch# show fcdomain session-status vsan 1
Last Action: Distribution Enable
Result: Success
```

Contiguous Domain ID Assignments

By default, the contiguous domain assignment is disabled. When a subordinate switch requests the principal switch for two or more domains and the domains are not contiguous, the following situations can occur:

- If the contiguous domain assignment is enabled in the principal switch, the principal switch locates contiguous domains and assigns them to the subordinate switches. If contiguous domains are not available, the switch software rejects this request.
- If the contiguous domain assignment is disabled in the principal switch, the principal switch assigns the available domains to the subordinate switch.

Enabling Contiguous Domain ID Assignments

You can enable contiguous domains in a specific VSAN (or a range of VSANs).

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain contiguous-allocation vsan** *vsan-id* **-** *vsan-id*
3. **no fcdomain contiguous-allocation vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain contiguous-allocation vsan** *vsan-id* **-** *vsan-id* **Example:** `switch(config)# fcdomain contiguous-allocation vsan 22-30`	Enables the contiguous allocation option in the specified VSAN range. **Note** The **contiguous-allocation** option takes immediate effect at runtime. You do not need to restart the fcdomain.
Step 3	**no fcdomain contiguous-allocation vsan** *vsan-id* **Example:** `switch(config)# no fcdomain contiguous-allocation vsan 7`	Disables the contiguous allocation option and reverts it to the factory default in the specified VSAN.

FC IDs

When an N port logs into a SAN switch, it is assigned an FC ID. By default, the persistent FC ID feature is enabled. If this feature is disabled, the following situations can occur:

- An N port logs into a SAN switch. The WWN of the requesting N port and the assigned FC ID are retained and stored in a volatile cache. The contents of this volatile cache are not saved across reboots.
- The switch is designed to preserve the binding FC ID to the WWN on a best-effort basis. For example, if one N port disconnects from the switch and its FC ID is requested by another device, this request is granted and the WWN with the initial FC ID association is released.
- The volatile cache stores up to 4000 entries of WWN to FC ID binding. If this cache is full, a new (more recent) entry overwrites the oldest entry in the cache. In this case, the corresponding WWN to FC ID association for the oldest entry is lost.
- N ports receive the same FC IDs if disconnected and reconnected to any port within the same switch (as long as it belongs to the same VSAN).

Persistent FC IDs

When persistent FC IDs are enabled, the following occurs:

- The current FC IDs in use in the fcdomain are saved across reboots.
- The fcdomain automatically populates the database with dynamic entries that the switch has learned about after a device (host or disk) is plugged into a port interface.

Note If you connect to the switch from an AIX or HP-UX host, be sure to enable the persistent FC ID feature in the VSAN that connects these hosts.

Note When persistent FC IDs are enabled, FC IDs cannot be changed after a reboot. FC IDs are enabled by default, but can be disabled for each VSAN.

A persistent FC ID assigned to an F port can be moved across interfaces and can continue to maintain the same persistent FC ID.

Enabling the Persistent FC ID Feature

You can enable the persistent FC ID feature.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain fcid persistent vsan** *vsan-id*
3. **no fcdomain fcid persistent vsan** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain fcid persistent vsan** *vsan-id* **Example:** `switch(config)# fcdomain fcid persistent vsan 78`	Activates (default) persistency of FC IDs in the specified VSAN.
Step 3	**no fcdomain fcid persistent vsan** *vsan-id* **Example:** `switch(config)# no fcdomain fcid persistent vsan 33`	Disables the FC ID persistency feature in the specified VSAN.

Persistent FC ID Configuration Guidelines

When the persistent FC ID feature is enabled, you can enter the persistent FC ID submode and add static or dynamic entries in the FC ID database. By default, all added entries are static. Persistent FC IDs are configured on a per-VSAN basis.

When manually configuring a persistent FC ID, follow these requirements:

- Ensure that the persistent FC ID feature is enabled in the required VSAN.
- Ensure that the required VSAN is an active VSAN. Persistent FC IDs can only be configured on active VSANs.
- Verify that the domain part of the FC ID is the same as the runtime domain ID in the required VSAN. If the software detects a domain mismatch, the command is rejected.
- Verify that the port field of the FC ID is 0 (zero) when configuring an area.

Configuring Persistent FC IDs

You can configure persistent FC IDs.

SUMMARY STEPS

1. **configure terminal**
2. **fcdomain fcid database**
3. **vsan** *vsan-id* **wwn 33:e8:00:05:30:00:16:df fcid** *fcid*
4. **vsan** *vsan-id* **wwn 11:22:11:22:33:44:33:44 fcid** *fcid* **dynamic**
5. **vsan** *vsan-id* **wwn 11:22:11:22:33:44:33:44 fcid** *fcid* **area**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**configure terminal**
	
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**fcdomain fcid database** **Example:** `switch(config)# fcdomain fcid database`	Enters FC ID database configuration submode.
Step 3	**vsan** *vsan-id* **wwn 33:e8:00:05:30:00:16:df fcid** *fcid* **Example:** `switch(config-fcid-db)# vsan 26 wwn 33:e8:00:05:30:00:16:df fcid 4`	Configures a device WWN (33:e8:00:05:30:00:16:df) with the FC ID 0x070128 in the specified VSAN. **Note** To avoid assigning a duplicate FC ID, use the **show fcdomain address-allocation vsan** command to display the FC IDs in use.
Step 4	**vsan** *vsan-id* **wwn 11:22:11:22:33:44:33:44 fcid** *fcid* **dynamic** **Example:** `switch(config-fcid-db)# vsan 13 wwn 11:22:11:22:33:44:33:44 fcid 6 dynamic`	Configures a device WWN (11:22:11:22:33:44:33:44) with the FC ID 0x070123 in the specified VSAN in dynamic mode.
Step 5	**vsan** *vsan-id* **wwn 11:22:11:22:33:44:33:44 fcid** *fcid* **area** **Example:** `switch(config-fcid-db)# vsan 88 wwn 11:22:11:22:33:44:33:44 fcid 4 area`	Configures a device WWN (11:22:11:22:33:44:33:44) with the FC IDs 0x070100 through 0x701FF in the specified VSAN. **Note** To secure the entire area for this fcdomain, assign 00 as the last two characters of the FC ID.

Unique Area FC IDs for HBAs

Note Read this section only if the Host Bus Adapter (HBA) port and the storage port are connected to the same switch.

Some HBA ports require a different area ID than for the storage ports when they are both connected to the same switch. For example, if the storage port FC ID is 0x6f7704, the area for this port is 77. In this case, the HBA port's area can be anything other than 77. The HBA port's FC ID must be manually configured to be different from the storage port's FC ID.

Cisco SAN switches facilitate this requirement with the FC ID persistence feature. You can use this feature to preassign an FC ID with a different area to either the storage port or the HBA port.

Configuring Unique Area FC IDs for an HBA

You can configure a different area ID for the HBA port.

The following task uses an example configuration with a switch domain of 111(6f hex). The server connects to the switch over FCoE. The HBA port connects to interface vfc20 and the storage port connects to interface fc2/3 on the same switch.

Step 1 Obtain the port WWN (Port Name field) ID of the HBA using the **show flogi database** command.

```
switch# show flogi database

--------------------------------------------------------------------
INTERFACE VSAN   FCID           PORT NAME                NODE NAME
--------------------------------------------------------------------
 vfc20     3    0x6f7703  50:05:08:b2:00:71:c8:c2   50:05:08:b2:00:71:c8:c0
 fc2/3     3    0x6f7704  50:06:0e:80:03:29:61:0f   50:06:0e:80:03:29:61:0f
```

Note Both FC IDs in this setup have the same area 77 assignment.

Step 2 Shut down the HBA interface in the SAN switch.

```
switch# configure terminal
switch(config)# interface vfc 20

switch(config-if)# shutdown

switch(config-if)# end
```

Step 3 Verify that the FC ID feature is enabled using the **show fcdomain vsan** command.

```
switch# show fcdomain vsan 1
...
Local switch configuration information:
        State: Enabled
        FCID persistence: Disabled
```

If this feature is disabled, continue to the next step to enable the persistent FC ID.

If this feature is already enabled, skip to the following step.

Step 4 Enable the persistent FC ID feature in the SAN switch.

```
switch# configure terminal
switch(config)# fcdomain fcid persistent vsan 1
switch(config)# end
```

Step 5 Assign a new FC ID with a different area allocation. In this example, replace *77* with *ee*.

```
switch# configure terminal
switch(config)# fcdomain fcid database
switch(config-fcid-db)# vsan 3 wwn 50:05:08:b2:00:71:c8:c2
fcid 0x6fee00 area
```

Step 6 Enable the HBA interface in the SAN switch.

```
switch# configure terminal
switch(config)# interface vfc 20
switch(config-if)# no shutdown

switch(config-if)# end
```

Step 7 Verify the pWWN ID of the HBA by using the **show flogi database** command.

```
switch# show flogi database

--------------------------------------------------------------------------
INTERFACE VSAN  FCID      PORT NAME                NODE NAME
--------------------------------------------------------------------------
 vfc20    3   0x6fee00    50:05:08:b2:00:71:c8:c2   50:05:08:b2:00:71:c8:c0
 fc2/3    3   0x6f7704    50:06:0e:80:03:29:61:0f   50:06:0e:80:03:29:61:0f
```

Note Both FC IDs now have different area assignments.

Persistent FC ID Selective Purging

Persistent FC IDs can be purged selectively. Static entries and FC IDs currently in use cannot be deleted. The table below identifies the FC ID entries that are deleted or retained when persistent FC IDs are purged.

Table 1: Purged FC IDs

Persistent FC ID state	Persistent Usage State	Action
Static	In use	Not deleted
Static	Not in use	Not deleted
Dynamic	In use	Not deleted
Dynamic	Not in use	Deleted

Purging Persistent FC IDs

You can purge persistent FC IDs.

SUMMARY STEPS

1. **purge fcdomain fcid vsan** *vsan-id*
2. **purge fcdomain fcid vsan** *vsan-id* **-** *vsan-id*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**purge fcdomain fcid vsan** *vsan-id* **Example:** `switch# purge fcdomain fcid vsan 667`	Purges all dynamic and unused FC IDs in the specified VSAN.

	Command or Action	Purpose
Step 2	**purge fcdomain fcid vsan** *vsan-id* **-** *vsan-id* **Example:** `switch# purge fcdomain fcid vsan 50-100`	Purges dynamic and unused FC IDs in the specified VSAN range.

Verifying the fcdomain Configuration

Note If the fcdomain feature is disabled, the runtime fabric name in the display is the same as the configured fabric name.

This example shows how to display information about fcdomain configurations:

```
switch# show fcdomain vsan 2
```

Use the **show fcdomain domain-list** command to display the list of domain IDs of all switches belonging to a specified VSAN. This list provides the WWN of the switches owning each domain ID. The next example uses the following values:

- A switch with WWN of 20:01:00:05:30:00:47:df is the principal switch and has domain 200.
- A switch with WWN of 20:01:00:0d:ec:08:60:c1 is the local switch (the one where you typed the CLI command to show the domain-list) and has domain 99.
- The IVR manager obtained virtual domain 97 using 20:01:00:05:30:00:47:df as the WWN for a virtual switch.

```
switch# show fcdomain domain-list vsan 76
Number of domains: 3
Domain ID              WWN
---------    -----------------------
0xc8(200)    20:01:00:05:30:00:47:df [Principal]
 0x63(99)    20:01:00:0d:ec:08:60:c1 [Local]
 0x61(97)    50:00:53:0f:ff:f0:10:06 [Virtual (IVR)]
```

Use the **show fcdomain allowed vsan** command to display the list of allowed domain IDs configured on this switch..

```
switch# show fcdomain allowed vsan 1
Assigned or unallowed domain IDs: 1-96,100,111-239.
[Interoperability Mode 1] allowed domain IDs: 97-127.
[User] configured allowed domain IDs: 50-110.
```

Ensure that the requested domain ID passes the switch software checks, if interop 1 mode is required in this switch.

The following example shows how to display all existing, persistent FC IDs for a specified VSAN. You can also specify the unused option to view only persistent FC IDs that are still not in use.

```
switch# show fcdomain fcid persistent vsan 1000
```

The following example shows how to display frame and other fcdomain statistics for a specified VSAN or SAN port channel:

```
switch# show fcdomain statistics vsan 1
VSAN Statistics
        Number of Principal Switch Selections: 5
        Number of times Local Switch was Principal: 0
        Number of 'Build Fabric's: 3
        Number of 'Fabric Reconfigurations': 0
```

The following example shows how to display FC ID allocation statistics including a list of assigned and free FC IDs:

```
switch# show fcdomain address-allocation vsan 1
```

The following example shows how to display the valid address allocation cache. The cache is used by the principal switch to reassign the FC IDs for a device (disk or host) that exited and reentered the fabric. In the cache content, VSAN refers to the VSAN that contains the device, WWN refers to the device that owned the FC IDs, and mask refers to a single or entire area of FC IDs.

```
switch# show fcdomain address-allocation cache
```

Default Settings for Fibre Channel Domains

The following table lists the default settings for all fcdomain parameters.

Table 2: Default fcdomain Parameters

Parameters	Default
fcdomain feature	Enabled
Configured domain ID	0 (zero)
Configured domain	Preferred
auto-reconfigure option	Disabled
contiguous-allocation option	Disabled
Priority	128
Allowed list	1 to 239
Fabric name	20:01:00:05:30:00:28:df
rcf-reject	Disabled
Persistent FC ID	Enabled
Allowed domain ID list configuration distribution	Disabled