



CHAPTER 5

Distributing Device Alias Services

All switches in the Cisco MDS 9000 Family support Distributed Device Alias Services (device alias) on a per-VSAN basis and on a fabric-wide basis. Device alias distribution allows you to move host bus adapters (HBAs) between VSANs without manually reentering alias names.

This chapter includes the following sections:

- [About Device Aliases, page 5-1](#)
- [About Device Alias Modes, page 5-1](#)
- [Device Alias Databases, page 5-4](#)
- [About Legacy Zone Alias Configuration Conversion, page 5-8](#)
- [Device Alias Statistics Cleanup, page 5-9](#)
- [Device Alias Configuration Verification, page 5-10](#)
- [Default Settings, page 5-12](#)

About Device Aliases

When the port WWN (pWWN) of a device must be specified to configure different features (zoning, QoS, port security) in a Cisco MDS 9000 Family switch, you must assign the correct device name each time you configure these features. An incorrect device name may cause unexpected results. You can avoid this problem if you define a user-friendly name for a port WWN and use this name in all of the configuration commands as required. These user-friendly names are referred to as *device aliases* in this chapter.

About Device Alias Modes

Device alias supports two modes: basic and enhanced mode.

- When device alias runs in the basic mode, all applications function like the applications on the 3.0 switches. When you configure the basic mode using device aliases, the application immediately expands to pWWNs. This operation continues until the mode is changed to enhanced.
- When device alias runs in the enhanced mode, all applications accept the device-alias configuration in the native format. The applications store the device alias name in the configuration and distribute it in the device alias format instead of expanding to pWWN. The applications track the device alias database changes and take actions to enforce it.

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A native device-alias configuration is not accepted in the interop mode VSAN. IVR zoneset activation will fail in interop mode VSANs if the corresponding twilight zones being injected are native device alias members.

When the device alias is in basic mode, when you try to add a device alias member to a zone, it will be added as a PWWN member and not as a device alias member. Hence when you change the PWWN for device-alias entry it will not get updated. You have to manually edit the zones containing that device alias by removing the old entry and reconfiguring the zones with the same device alias and then activating it. The update happens in Enhanced device-alias mode. In this mode, since the configuration is accepted in the native form, when the pwwn for the device alias is changed, the zones containing that device alias are automatically updated with the new pwwn.

Changing Mode Settings

When the device alias mode is changed from basic to enhanced mode, the applications are informed about the change. The applications start accepting the device alias-based configuration in the native format.



Note

Because the device alias was previously running in the basic mode, the applications do not have any prior native device alias configuration.

The applications check for an existing device alias configuration in the native format. If the device alias is in the native format, the applications reject the request and device alias mode cannot be changed to basic.

All native device alias configurations (both on local and remote switches) must be explicitly removed, or all device alias members must be replaced with the corresponding pWWN before changing the mode back to basic.

Device Alias Mode Distribution

If the device alias distribution is turned on, it is distributed to the other switches in the network whenever there is a change in the mode. You cannot change the mode from basic to enhanced unless all the switches are upgraded to Release 3.1. The device alias enhancements will not apply unless the entire fabric is upgraded to Release 3.1.



Note

When all the switches are upgraded to Release 3.1, you cannot automatically convert to enhanced mode. You do not need to change to enhanced mode, you can continue working in the basic mode.

Merging Device Alias

If two fabrics are running different device alias modes and are joined together, the device alias merge will fail. There is no automatic conversion of one mode to the other during the merge process. You will need to resolve the issue.



Note

Release 3.0 switches run in basic mode.

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At the application level, a merger takes place between the applications and the fabric. For example, zone merge occurs when the E port is up and the IVR/PSM/DPVM merge occurs due to CFS. This merge is completely independent of the device alias merge.

If the application running on an enhanced fabric has a native device alias configuration, the application must fail the merge. The application has to fail the merge even though the other fabric is can support the native device alias-based configuration, but is running in the basic mode. You will need to resolve the issue. Once the device alias merge issue is resolved, each application must be fixed accordingly.

Resolving Merge and Device Alias Mode Mismatch

If two fabrics are running in different modes and the device alias merge fails between the fabrics, the conflict can be resolved by selecting one mode or the other. If you choose the enhanced mode, ensure that all the switches are running at least the Release 3.1 version. Otherwise, the enhanced mode cannot be turned on. If you choose the basic mode, the applications running on the enhanced fabric have to comply with the device alias merge.

The device alias merge fails because of mode mismatch, but the application merge succeeds if it does not have any native device alias configurations.

If the native device alias configuration is attempted on an application from a Release 3.1 switch, the commit must be rejected because of device alias mode mismatch on some of the applications.



Note

The applications should not accept any native device alias configuration over SNMP if the device alias is running in the basic mode on that particular switch.



Note

Confcheck will be added when the enhanced mode is turned on and removed when it is turned off. Applications have to add confcheck if they have a device alias configuration in the native format. They have to remove confcheck once the configuration is removed.

Device Alias Features

Device aliases have the following features:

- The device alias information is independent of your VSAN configuration.
- The device alias configuration and distribution is independent of the zone server and the zone server database.
- You can import legacy zone alias configurations without losing data.
- The device alias application uses the Cisco Fabric Services (CFS) infrastructure to enable efficient database management and distribution. Device aliases use the coordinated distribution mode and the fabric-wide distribution scope (refer to the *Cisco MDS 9000 Family NX-OS System Management Configuration Guide*).
- When you configure zones, IVR zones, or QoS features using device aliases, and if you display these configurations, you will automatically see that the device aliases are displayed along with their respective pWWNs.

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Device Alias Requirements

Device aliases have the following requirements:

- You can only assign device aliases to pWWNs.
- The mapping between the pWWN and the device alias to which it is mapped must have a one-to-one relationship. A pWWN can be mapped to only one device alias and vice versa.
- A device alias name is restricted to 64 alphanumeric characters and may include one or more of the following characters:
 - a to z and A to Z
 - 1 to 9
 - - (hyphen) and _ (underscore)
 - \$ (dollar sign) and ^ (up caret)

Zone Aliases Versus Device Aliases

[Table 5-1](#) compares the configuration differences between zone-based alias configuration and device alias configuration.

Table 5-1 Comparison Between Zone Aliases and Device Aliases

Zone-Based Aliases	Device Aliases
Aliases are limited to the specified VSAN.	You can define device aliases without specifying the VSAN number. You can also use the same definition in one or more VSANs without any restrictions.
Zone aliases are part of the zoning configuration. The alias mapping cannot be used to configure other features.	Device aliases can be used with any feature that uses the pWWN.
You can use any zone member type to specify the end devices.	Only pWWNs are supported along with new device aliases such as IP addresses.
Configuration is contained within the Zone Server database and is not available to other features.	Device aliases are not restricted to zoning. Device alias configuration is available to the FCNS, zone, fcping, traceroute, and IVR applications.
FC aliases are not displayed with the associated WWNs in the show command outputs like show zoneset active, show flogi database, and show fcns database.	Device aliases are displayed with the associated WWNs in the show command outputs like show zoneset active, show flogi database, and show fcns database.
FC aliases are not distributed as part of active zoneset and are only distributed as part of full zone database as per the FC standards.	Device Aliases are distributed through CFS.

Device Alias Databases

The device alias feature uses two databases to accept and implement device alias configurations.

- Effective database—The database currently used by the fabric.
- Pending database—Your subsequent device alias configuration changes are stored in the pending database.

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If you modify the device alias configuration, you need to commit or discard the changes as the fabric remains locked during this period.

This section includes the following sections:

- [Creating Device Aliases, page 5-5](#)
- [About Device Alias Distribution, page 5-5](#)
- [Committing Changes, page 5-6](#)
- [Discarding Changes, page 5-6](#)
- [About Legacy Zone Alias Configuration Conversion, page 5-8](#)
- [Disabling and Enabling Device Alias Distribution, page 5-7](#)

Creating Device Aliases

To create a device alias in the pending database, follow these steps:

	Command	Purpose
Step 1	switch# config t switch(config)#	Enters configuration mode.
Step 2	switch(config)# device-alias database switch(config-device-alias-db)#	Enters the pending database configuration submode.
Step 3	switch(config-device-alias-db)# device-alias name Device1 pwwn 21:01:00:e0:8b:2e:80:93	Specifies a device name (Device1) for the device that is identified by its pWWN. Starts writing to the pending database and simultaneously locks the fabric as this is the first-issued device alias configuration command.
	switch(config-device-alias-db)# no device-alias name Device1	Removes the device name (Device1) for the device that is identified by its pWWN.
	switch(config-device-alias-db)# device-alias rename Device1 Device2	Renames an existing device alias (Device1) with a new name (Device2).

To display the device alias configuration, use the **show device-alias name** command.

```
switch# show device-alias name x
device-alias name x pwwn 21:01:00:e0:8b:2e:80:93
```

About Device Alias Distribution

By default, device alias distribution is enabled. The device alias feature uses the coordinated distribution mechanism to distribute the modifications to all switches in a fabric.

If you have not committed the changes and you disable distribution, then a commit task will fail.

Example 5-1 Displays a Failed Status

```
switch# show device-alias status
Fabric Distribution: Disabled
Database:- Device Aliases 25
```

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```
Status of the last CFS operation issued from this switch:
=====
Operation: Commit
Status: Failed (Reason: Operation is not permitted as the fabric distribution is
currently disabled.)
```

About Creating a Device Alias

When you perform the first device alias task (regardless of which device alias task), the fabric is automatically locked for the device alias feature. Once you lock the fabric, the following situations apply:

- No other user can make any configuration changes to this feature.
- A copy of the effective database is obtained and used as the pending database. Modifications from this point on are made to the pending database. The pending database remains in effect until you commit the modifications to the pending database or discard (**abort**) the changes to the pending database.

Committing Changes

If you commit the changes made to the pending database, the following events occur:

1. The pending database contents overwrites the effective database contents.
2. The pending database is emptied of its contents.
3. The fabric lock is released for this feature.

To commit the changes, follow these steps:

	Command	Purpose
Step 1	switch# config t switch(config)#	Enters configuration mode.
Step 2	switch(config)# device-alias commit	Commits the changes made to the currently active session.

Discarding Changes

If you discard the changes made to the pending database, the following events occur:

1. The effective database contents remain unaffected.
2. The pending database is emptied of its contents.
3. The fabric lock is released for this feature.

To discard the device alias session, perform this task:

	Command	Purpose
Step 1	switch# config t switch(config)#	Enters configuration mode.
Step 2	switch(config)# device-alias abort	Discards the currently active session.

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To display the status of the discard operation, use the **show device alias status** command.

```
switch# show device-alias status
Fabric Distribution: Enabled
Database:- Device Aliases 24
Status of the last CFS operation issued from this switch:
=====
Operation: Abort
Status: Success
```

Fabric Lock Override

If you have performed a device alias task and have forgotten to release 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 changes to the pending database are discarded and the fabric lock is released.



Tip

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

To use administrative privileges and release a locked device alias session, use the **clear device-name session** command in EXEC mode.

```
switch# clear device-alias session
```

To display the status of the clear operation, use the **show device-alias status** command.

```
switch# show device-alias status
Fabric Distribution: Enabled
Database:- Device Aliases 24
Status of the last CFS operation issued from this switch:
=====
Operation: Clear Session <-----Lock released by administrator
Status: Success <-----Successful status of the operation
```

Disabling and Enabling Device Alias Distribution

To disable or enable the device alias distribution, follow these steps:

	Command	Purpose
Step 1	switch# config t switch(config)#	Enters configuration mode.
Step 2	switch(config)# no device-alias distribute	Disables the distribution.
	switch(config)# device-alias distribute	Enables the distribution (default).

To display the status of device alias distribution, use the **show device-alias status** command (see [Example 5-2](#) and [Example 5-3](#)).

Example 5-2 Displays Device Alias Status When Distribution Is Enabled

```
switch# show device-alias status
```

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```
Fabric Distribution: Enabled <-----Distribution is enabled
Database:-Device Aliases 24
Locked By:-User "Test" SWWN 20:00:00:0c:cf:f4:02:83<-Lock holder's user name and switch ID
Pending Database:- Device Aliases 24
Status of the last CFS operation issued from this switch:
=====
Operation: Enable Fabric Distribution
Status: Success
```

Example 5-3 *Displays Device Alias Status When Distribution Is Disabled*

```
switch# show device-alias status
Fabric Distribution: Disabled
Database:- Device Aliases 24
Status of the last CFS operation issued from this switch:
=====
Operation: Disable Fabric Distribution
Status: Success
```

About Legacy Zone Alias Configuration Conversion

You can import legacy zone alias configurations to use this feature without losing data, if they satisfy the following restrictions:

- Each zone alias has only one member.
- The member type is pWWN.
- The name and definition of the zone alias should not be the same as any existing device alias name.

If any name conflict exists, the zone aliases are not imported.



Tip

Ensure to copy any required zone aliases to the device alias database as required by your configuration.

When an import operation is complete, the modified alias database is distributed to all other switches in the physical fabric when you perform the **commit** operation. At this time if you do not want to distribute the configuration to other switches in the fabric, you can perform the **abort** operation and the merge changes are completely discarded.

This section includes the following topics:

- [Importing a Zone Alias, page 5-9](#)
- [Device Alias Statistics Cleanup, page 5-9](#)

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Importing a Zone Alias

To import the zone alias for a specific VSAN, follow these steps:

	Command	Purpose
Step 1	switch# config t switch(config)#	Enters configuration mode.
Step 2	switch(config)# device-alias import fcalias vsan 3	Imports the fcalias information for the specified VSAN.

To display device alias information in zone sets, use the **show zoneset** command (see [Example 5-4](#) and [Example 5-5](#)).

Example 5-4 Displays the Device Aliases in the Zone Set Information

```
switch# show zoneset
zoneset name s1 vsan 1
  zone name z1 vsan 1
    pwn 21:01:00:e0:8b:2e:80:93 [x] <-----Device alias displayed for each pWWN.
    pwn 21:00:00:20:37:39:ab:5f [y]
  zone name z2 vsan 1
    pwn 21:00:00:e0:8b:0b:66:56 [SampleName]
    pwn 21:00:00:20:37:39:ac:0d [z]
```

Example 5-5 Displays the Device Aliases in the Active Zone Set

```
switch# show zoneset active
zoneset name s1 vsan 1
  zone name z1 vsan 1
    * fcid 0x670100 [pwn 21:01:00:e0:8b:2e:80:93] [x]
    pwn 21:00:00:20:37:39:ab:5f [y]

  zone name z2 vsan 1
    * fcid 0x670200 [pwn 21:00:00:e0:8b:0b:66:56] [SampleName]
    pwn 21:00:00:20:37:39:ac:0d [z]
```

Device Alias Statistics Cleanup

Use the **clear device-name statistics** command to clear device alias statistics (for debugging purposes):

```
switch# clear device-alias statistics
```

Database Merge Guidelines

For information about CFS merge support, refer to the *Cisco MDS 9000 Family NX-OS System Management Configuration Guide* for detailed concepts.

When merging two device alias databases, follow these guidelines:

- Verify that two device aliases with different names are not mapped to the same pWWN.

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- Verify that two different pWWNs are not mapped to the same device aliases.
- Verify that the combined number of device aliases in both databases cannot exceed 8191 (8K) in fabrics running SAN-OS Release 3.0(x) and earlier, and 20K in fabrics running SAN-OS Release 3.1(x) and later. If the combined number of device entries exceeds the supported limit, then the merge will fail.
- Ensure the device -alias mode is similar for the both the fabrics being merged.

Device Alias Configuration Verification

You can view device alias information by using the **show device-alias** command. See Examples 5-6 to 5-17.

Example 5-6 *Displays All Configured Device Aliases from the Effective Database*

```
switch# show device-alias database
device-alias name SampleName pwwn 21:00:00:e0:8b:0b:66:56
device-alias name x pwwn 21:01:00:e0:8b:2e:80:93
```

Total number of entries = 2

Example 5-7 *Displays the Pending Database with No Modifications*

```
switch# show device-alias database pending
There are no pending changes
```

Example 5-8 *Displays the Pending Database with Modifications*

```
switch# show device-alias database pending
device-alias name x pwwn 21:01:00:e0:8b:2e:80:93
device-alias name SampleName pwwn 21:00:00:e0:8b:0b:66:56
device-alias name y pwwn 21:00:00:20:37:39:ab:5f
device-alias name z pwwn 21:00:00:20:37:39:ac:0d
```

Total number of entries = 4

Example 5-9 *Displays the Specified Device Name in the Pending Database*

```
switch# show device-alias name x pending
device-alias name x pwwn 21:01:00:e0:8b:2e:80:93
```

Example 5-10 *Displays the Specified pWWN in the Pending Database*

```
switch# show device-alias pwwn 21:01:00:e0:8b:2e:80:93 pending
device-alias name x pwwn 21:01:00:e0:8b:2e:80:93
```

Example 5-11 *Displays the Difference Between the Pending and Effective Databases*

```
switch# show device-alias database pending-diff
- device-alias name Doc pwwn 21:01:02:03:00:01:01:01
+ device-alias name SampleName pwwn 21:00:00:e0:8b:0b:66:56
```

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Example 5-12 Displays the Specified pWWN

```
switch# show device-alias pwwn 21:01:01:01:01:11:01:01
device-alias name Doc pwwn 21:01:01:01:01:11:01:01
```

Example 5-13 Displays the Device Alias in the FLOGI Database

```
switch# show flogi database
```

INTERFACE	VSAN	FCID	PORT NAME	NODE NAME
fc2/9	1	0x670100	21:01:00:e0:8b:2e:80:93	20:01:00:e0:8b:2e:80:93
			[x] <-----	Device alias name
fc2/12	1	0x670200	21:00:00:e0:8b:0b:66:56	20:00:00:e0:8b:0b:66:56
			[SampleName] <-----	Device alias name

Total number of flogi = 2

Example 5-14 Displays the Device Alias in the FCNS Database

```
switch# show fcns database
```

VSAN 1:

FCID	TYPE	PWWN	(VENDOR)	FC4-TYPE:FEATURE
0x670100	N	21:01:00:e0:8b:2e:80:93	(Qlogic)	scsi-fcp:init
		[x]		
0x670200	N	21:00:00:e0:8b:0b:66:56	(Qlogic)	scsi-fcp:init
		[SampleName]		

Total number of entries = 2

Example 5-15 Displays the fcping Statistics for the Specified Device Alias

```
switch# fcping device-alias x vsan 1
28 bytes from 21:01:00:e0:8b:2e:80:93 time = 358 usec
28 bytes from 21:01:00:e0:8b:2e:80:93 time = 226 usec
28 bytes from 21:01:00:e0:8b:2e:80:93 time = 372 usec
```

Example 5-16 Displays the fctrace Information for the Specified Device Alias

```
switch# fctrace device-alias x vsan 1
Route present for : 21:01:00:e0:8b:2e:80:93
20:00:00:05:30:00:4a:e2(0xffffc67)
```

Where available, device aliases are displayed regardless of a member being configured using a **device-alias** command or a zone-specific **member pwwn** command (see [Example 5-4](#) and [Example 5-5](#)).

Example 5-17 Displays Statistics for the Device Alias Application

```
switch# show device-alias statistics
```

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```

Device Alias Statistics
=====
Lock requests sent: 2
Database update requests sent: 1
Unlock requests sent: 1
Lock requests received: 1
Database update requests received: 1
Unlock requests received: 1
Lock rejects sent: 0
Database update rejects sent: 0
Unlock rejects sent: 0
Lock rejects received: 0
Database update rejects received: 0
Unlock rejects received: 0
Merge requests received: 0
Merge request rejects sent: 0
Merge responses received: 2
Merge response rejects sent: 0
Activation requests received: 0
Activation request rejects sent: 0
Activation requests sent: 2
Activation request rejects received: 0

```

Default Settings

Table 5-2 lists the default settings for device alias parameters.

Table 5-2 **Default Device Alias Parameters**

Parameters	Default
Database in use	Effective database.
Database to accept changes	Pending database.
Device alias fabric lock state	Locked with the first device alias task.