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# CHAPTER 1

## Distributing Device Alias Services

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Switches in the Cisco Nexus 5000 Series support Distributed Device Alias Services (device aliases) on a fabric-wide basis.

This chapter includes the following sections:

- [Information About Device Aliases, page 1-1](#)
- [Device Alias Databases, page 1-3](#)
- [About Legacy Zone Alias Configuration, page 1-8](#)
- [Database Merge Guidelines, page 1-8](#)
- [Verifying Device Alias Configuration, page 1-9](#)
- [Default Settings, page 1-10](#)

## Information About Device Aliases

When the port WWN (pWWN) of a device must be specified to configure features (for example, zoning, DPVM, or port security) in a Cisco Nexus 5000 Series switch, you must assign the correct device name each time you configure these features. An inaccurate device name may cause unexpected results. You can circumvent this problem if you define a user-friendly name for a pWWN and use this name in all the configuration commands as required. These user-friendly names are referred to as *device aliases*.

This section includes the following topics:

- [Device Alias Features, page 1-1](#)
- [Device Alias Requirements, page 1-2](#)
- [Zone Aliases Versus Device Aliases, page 1-2](#)

## Device Alias Features

Device aliases have the following features:

- The device alias information is independent of the 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.

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- 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 (see [Chapter 1, “Using Cisco Fabric Services”](#)).
- Basic and enhanced modes. See the [“Device Alias Modes” section on page 1-4](#).
- Device aliases used to configure zones, IVR zones, or port security features are displayed automatically with their respective pWWNs in the **show** command output.

## Device Alias Requirements

Device aliases have the following requirements:

- You can only assign device aliases to pWWNs.
- There must be a one-to-one relationship between the pWWN and the device alias that maps to it.
- 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
  - Device alias names must begin with an alphabetic character (a to z or A to Z).
  - 1 to 9
  - - (hyphen) and \_ (underscore)
  - \$ (dollar sign) and ^ (up caret)

## Zone Aliases Versus Device Aliases

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

**Table 1-1** *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.
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, and traceroute applications.

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## 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.

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

Device alias database changes are validated with the applications. If any of the applications cannot accept the device alias database changes, then those changes are rejected; this applies to device alias database changes resulting from either a commit or merge operation.

This section includes the following topics:

- [Creating Device Aliases, page 1-3](#)
- [Device Alias Modes, page 1-4](#)
- [Changing Device Alias Mode Guidelines, page 1-4](#)
- [Configuring Device Alias Modes, page 1-5](#)
- [About Device Alias Distribution, page 1-5](#)
- [Locking the Fabric, page 1-6](#)
- [Committing Changes, page 1-6](#)
- [Discarding Changes, page 1-6](#)
- [Fabric Lock Override, page 1-7](#)
- [Disabling and Enabling Device Alias Distribution, page 1-7](#)

## Creating Device Aliases

To create a device alias in the pending database, perform this task:

	Command	Purpose
Step 1	switch# <b>configuration terminal</b> switch(config)#	Enters configuration mode.
Step 2	switch(config)# <b>device-alias database</b> switch(config-device-alias-db)#	Enters the pending database configuration submode.
Step 3	switch(config-device-alias-db)# <b>device-alias name device-name pwwn pwwn-id</b>	Specifies a device name 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)# <b>no device-alias name device-name</b>	Removes the device name for the device that is identified by its pWWN.
	switch(config-device-alias-db)# <b>device-alias rename old-device-name new-device-name</b>	Renames an existing device alias with a new name.

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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
```

## Device Alias Modes

You can specify that aliases operate in basic or enhanced modes.

When operating in basic mode, which is the default mode, the device alias is immediately expanded to a pWWN. In basic mode, when device aliases are changed to point to a new HBA, for example, that change is not reflected in the zone server. Users must remove the previous HBA's pWWN, add the new HBA's pWWN, and then reactivate the zoneset.

When operating in enhanced mode, applications accept a device alias name in its "native" format. Instead of expanding the device alias to a pWWN, the device alias name is stored in the configuration and distributed in its native device alias format. So applications such as zone server, PSM or DPVM can automatically keep track of the device alias membership changes and enforce them accordingly. The primary benefit of operating in enhanced mode is that you have a single point of change.

Whenever you change device alias modes, the change is distributed to other switches in the network only if device alias distribution is enabled or on. Otherwise, the mode change only takes place on the local switch.



### Note

Enhanced mode, or native device alias-based configurations are not accepted in interop mode VSANs. IVR zoneset activation will fail in interop mode VSANs if the corresponding zones have native device alias-based members.

## Changing Device Alias Mode Guidelines

When changing device alias modes, follow these guidelines:

- If two fabrics running in different device alias modes are joined together, the device alias merge will fail. There is no automatic conversion to one mode or the other during the merge process. In this situation, you must select one mode over the other.
- Before changing from enhanced to basic mode, you must first explicitly remove all native device alias-based configurations from both local and remote switches, or, replace all device alias-based configuration members with the corresponding pWWN.
- If you remove a device alias from the device alias database, all applications will automatically stop enforcing the corresponding device alias. If that corresponding device alias is part of an active zoneset, all the traffic to and from that pWWN is disrupted.
- Renaming the device alias not only changes the device alias name in the device alias database, but also replaces the corresponding device alias configuration in all the applications.
- When a new device alias is added to the device alias database, and the application configuration is present on that device alias, it automatically takes effect. For example, if the corresponding device alias is part of the active zoneset and the device is online, then zoning is enforced automatically. You do not have to reactivate the zoneset.
- If a device alias name is mapped to a new HBA's pWWN, then the application's enforcement changes accordingly. In this case, the zone server automatically enforces zoning based on the new HBA's pWWN.

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## Configuring Device Alias Modes

To configure device aliases to operate in enhanced mode, perform this task:

	Command	Purpose
Step 1	switch# <b>configuration terminal</b> switch(config)#	Enters configuration mode.
Step 2	switch(config)# <b>device-alias mode enhanced</b> switch(config)#	Assigns the device alias to operate in enhanced mode.
	switch(config)# <b>no device-alias mode enhance</b>	Assigns the device alias to operate in basic mode.

To view the current device alias mode setting, enter the **show device-alias status** command.

```
switch# show device-alias status
Fabric Distribution: Enabled
Database:- Device Aliases 0 Mode: Basic
Locked By:- User "admin" SWWN 20:00:00:0d:ec:30:90:40
Pending Database:- Device Aliases 0 Mode: Basic
```

## About Device Alias Distribution

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

If device alias distribution is disabled, database changes are not distributed to the switches in the fabric. The same changes would have to be performed manually on all switches in the fabric to keep the device alias database up-to-date. Database changes immediately take effect, so there would not be any pending database and commit or abort operations either. If you have not committed the changes and you disable distribution, then a commit task will fail.

The following example displays a failed device alias status:

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

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## Locking the Fabric

When you perform any device alias configuration 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. Subsequent modifications are made to the pending database. The pending database remains in use 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 content overwrites the effective database content.
2. The pending database is distributed to the switches in the fabric and the effective database on those switches is overwritten with the new changes.
3. The pending database is emptied of its contents.
4. The fabric lock is released for this feature.

To commit the changes, perform this task:

	Command	Purpose
Step 1	switch# <b>configuration terminal</b> switch(config)#	Enters configuration mode.
Step 2	switch(config)# <b>device-alias commit</b>	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# <b>configuration terminal</b> switch(config)#	Enters configuration mode.
Step 2	switch(config)# <b>device-alias abort</b>	Discards the currently active session.

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:
```

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```
=====
Operation: Abort
Status: Success
```

## Fabric Lock Override

You can use locking operations (clear, commit, abort) only when device alias distribution is enabled. 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 may be discarded if the switch is restarted.

To use administrative privileges and release a locked device alias session, use the **clear device-alias 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, perform this task:

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

To display the status of device alias distribution, use the **show device-alias status** command. The following example shows the device alias display when distribution is enabled:

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

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The following example shows the device alias display 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

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.

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



**Tip**

Ensure that you 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. 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.

## Importing a Zone Alias

To import the zone alias for a specific VSAN, perform this task:

	Command	Purpose
Step 1	switch# <b>configuration terminal</b> switch(config)#	Enters configuration mode.
Step 2	switch(config)# <b>device-alias import fcalias</b> <b>vsan vlan-id</b>	Imports the fcalias information for the specified VSAN.

## Database Merge Guidelines

When merging two device alias databases, follow these guidelines:

- Verify that two device aliases with different names are not mapped to the same pWWN.
- Verify that two identical pWWNs are not mapped to two different device aliases.
- Verify that the combined number of device aliases in both databases does not exceed 8K (8191 device aliases) in fabrics running Cisco MDS SAN-OS release 3.0 (x) and earlier, and 20K in fabrics running Cisco MDS SAN-OS release 3.1(x) and later.

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If the combined number of device entries in both databases exceeds the supported configuration limit, then the merge will fail. For example, if database N has 6000 device aliases and database M has 2192 device aliases, and you are running SAN-OS 3.0(x) or earlier, then this merge operation will fail. Merge operations will also fail if there is a device alias mode mismatch.

For additional information, see the “CFS Merge Support” section on page 1-6.

## Verifying Device Alias Configuration

To display device alias information, perform one of the following tasks:

Command	Purpose
switch# <b>show zoneset</b> [active]	Displays the device aliases in the zone set information.
switch# <b>show device-alias database</b> [pending   pending-diffs]	Displays the device alias database.
switch# <b>show device-alias pwwn</b> pwwn-id [name device-name [pending]	Displays the device alias information for the specified pwwn or alias.
switch# <b>show flogi database</b> [pending]	Displays device alias information the the flogi database.
switch# <b>show fcns database</b> [pending]	Displays device alias information the the fcns database.

The following example shows how to display device alias information in the zone set:

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

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

The following example shows how to display pending changes in the device alias database:

```
switch# show device-alias database pending
```

The following example shows how to display a specific pWWN in the device alias database:

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

The following example shows how to display the difference between the pending and effective device alias 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
```

Where available, device aliases are displayed regardless of a member being configured using a **device-alias** command or a zone-specific **member pwwn** command.

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# Default Settings

Table 1-2 lists the default settings for device alias parameters.

*Table 1-2 Default Device Alias Parameters*

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