CHAPTER 5

Using the CFS Infrastructure

The Cisco SAN-OS software uses the Cisco Fabric Services (CFS) infrastructure to enable efficient database distribution and to foster device flexibility. It simplifies SAN provisioning by automatically distributing configuration information to all switches in a fabric.

Several Cisco SAN-OS applications use the CFS infrastructure to maintain and distribute the contents of a particular application's database.

About CFS

Many features in the Cisco MDS switches require configuration synchronization in all switches in the fabric. Maintaining configuration synchronization across a fabric is important to maintain fabric consistency. In the absence of a common infrastructure, such synchronization is achieved through manual configuration at each switch in the fabric. This process is tedious and error prone.

Cisco Fabric Services (CFS) provides a common infrastructure for automatic configuration synchronization in the fabric. It provides the transport function as well as a rich set of common services to the applications. CFS has the ability to discover CFS capable switches in the fabric and discovering application capabilities in all CFS capable switches.

Cisco SAN-OS Features Using CFS

The following Cisco SAN-OS features use the CFS infrastructure:

- NTP (see "NTP Configuration Distribution" section on page 4-20).

  Dynamic Port VSAN Membership (see Chapter 17, "Creating Dynamic VSANs").

  Distributed Device Alias Services (see Chapter 20, "Distributing Device Alias Services").

  IVR topology (see "Database Merge Guidelines" section on page 18-29).

  TACACS and RADIUS (see the "Distributing AAA Server Configuration" section on page 28-15).

  User and administrator roles (see "Role-Based Authorization" section on page 26-1).

  Port security (see "Port Security Configuration Distribution" section on page 32-9).

  iSNS (see "About iSCSI Storage Name Services" section on page 35-58).

  Call Home (see "Call Home Configuration Distribution" section on page 45-12).

  Syslog (see "System Message Logging Configuration Distribution" section on page 44-8).

  Fctimer (see "fctimer Distribution" section on page 25-3).

  SCSI Flow Services (see "Enabling SCSI Flow Configuration Distribution" section on page 38-4).

  Saving startup configurations in the fabric using the Fabric Startup Configuration Manager (FSCM) (see "Saving Startup Configurations in the Fabric" section on page 7-5).

CFS has the following features:

Three modes of distribution

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CFS Protocol

information to other switches. CFS uses a proprietary SW_ILS (0x77434653) protocol for all CFS packets. CFS packets are sent to/from the switch domain controller addresses.

Applications that use CFS are completely unaware of the lower layer transport.

CFS Distribution Scopes

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CFS Distribution Modes

Uncoordinated Distribution

Coordinated Distribution

1.
2.
3.

- CFS driven —the stages are executed by CFS in response to an application request without intervention from the application.
- Application driven—the stages are under the complete control of the application.

  Coordinated distributions are used to distribute information that can be manipulated and distributed from multiple switches, for example, the port security configuration.

Disabling CFS Distribution on a Switch

	Command	Purpose
Step 1	switch# **config t** switch(config)#	
	switch(config)# **no cfs distribution**	
	cfs distribution	

CFS Application Requirements

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-
-
-

Enabling CFS for an Application

Locking the Fabric

attempts are rejected.

Committing Changes

A commit operation saves the pending database for all application peers and releases the lock for all switches.

In general, the commit function does not start a session—only a lock function starts a session. However, an empty commit is allowed, if configuration changes are not previously made. In this case, a commit operation results in a session that acquires locks and distributes the current database.

When you commit configuration changes to a feature using the CFS infrastructure, you receive a notification about one of the following responses:

- One or more external switches report a successful status—The application applies the changes locally and releases the fabric lock.
- None of the external switches report a successful state—The application considers this state as a failure and does not apply the changes to any switch in the fabric. The fabric lock is not released.

You can commit changes for a specified feature by using the **commit**

abort

Saving the Configuration

Caution

Cisco MDS 9000 Family MIB Quick Reference

a application triggers a merge action on every such notification, a link up event results in M*N merges in the fabric

CFS supports a protocol that reduces the number of merges required to one by handling the complexity of the merge at the CFS layer. This protocol runs per application per scope. The protocol involves selecting one switch in a fabric as the merge manager for that fabric. The other switches do not play any role in the merge process.

During a merge, the merge manager in the two fabrics exchange their configuration databases with each other. The application on one of them merges the information, decides if the merge is successful and informs all switches in the combined fabric of the status of the merge.

In case of a successful merge, the merged database is distributed to all switches in the combined fabric and the entire new fabric remains in a consistent state. You can recover from a merge failure by starting a distribution from any of the switches in the new fabric. This distribution restores all peers in the fabric to the same configuration database.

Displaying CFS Configuration Information

show cfs status

Example 5-1 Displays CFS Distribution Status

```
show cfs status
Fabric distribution Enabled
```

show cfs application

logical, physical both

Note

Note

vsan

fctimer

Example 5-2 Displays the Currently Registered Applications Using CFS

```
show cfs application

----------------------------------------------
 Application    Enabled   Scope
----------------------------------------------
 ntp            No        Physical
 fscm           Yes       Physical
 role           No        Physical
 radius         No        Physical
 tacacs         No        Physical
 fctimer        No        Physical
 syslogd        No        Physical
 callhome       No        Physical
 device-alias   Yes       Physical
 port-security  No        Logical

Total number of entries = 10
```

show cfs application name

Example 5-3 Displays a Specified CFS Application

```
show cfs application name ntp

 Enabled        : Yes
 Timeout        : 5s
 Merge Capable  : Yes
 Scope          : Physical
```

show cfs lock

Example 5-4 Displays the Currently Locked Applications

```
show cfs lock
```

```
 Switch WWN               IP Address       User Name    User Type
-----------------------------------------------------------------------
 20:00:00:05:30:00:6b:9e  10.76.100.167    admin        CLI/SNMP v3
 Total number of entries = 1

Application: port-security
Scope      : Logical
-------------------------------------------------------------
 VSAN   Domain   IP Address       User Name    User Type
-------------------------------------------------------------
 1      238      10.76.100.167    admin        CLI/SNMP v3
 2      211      10.76.100.167    admin        CLI/SNMP v3
 Total number of entries = 2
```

Displays the Lock Information for the Specified Application

```
switch#
Scope      : Physical
-----------------------------------------------------------------------
 Switch WWN               IP Address       User Name    User Type
-----------------------------------------------------------------------
 20:00:00:05:30:00:6b:9e  10.76.100.167    admin        CLI/SNMP v3

 Total number of entries = 1
```

show cfs merge status name

Example 5-6 Displays the Merge Status for the Specified Application

```
show cfs merge status name port-security

Logical [VSAN 1] Merge Status: Failed
Local Fabric
----------------------------------------------------------------
 Domain Switch WWN               IP Address
----------------------------------------------------------------
 238    20:00:00:05:30:00:6b:9e  10.76.100.167   [Merge Master]

Remote Fabric
----------------------------------------------------------------
 Domain Switch WWN               IP Address
----------------------------------------------------------------
 236    20:00:00:0e:d7:00:3c:9e  10.76.100.169    [Merge Master]

Logical [VSAN 2] Merge Status: Success
Local Fabric
----------------------------------------------------------------
 Domain Switch WWN               IP Address
----------------------------------------------------------------
 211    20:00:00:05:30:00:6b:9e  10.76.100.167    [Merge Master]
 1      20:00:00:0e:d7:00:3c:9e  10.76.100.169

Logical [VSAN 3] Merge Status: Success
Local Fabric
----------------------------------------------------------------
 Domain Switch WWN               IP Address
----------------------------------------------------------------
 221    20:00:00:05:30:00:6b:9e  10.76.100.167    [Merge Master]
 103    20:00:00:0e:d7:00:3c:9e  10.76.100.169
```

Example 5-7 Displays the Merge Status for a Physical Scope with Merge Failure

Example 5-8 Displays Peers in the Fabric

Example 5-9 Displays Peers for a Specified CFS-Registered Application

```
20:00:00:44:22:00:4a:9e  172.22.92.27    [Local]
20:00:00:05:30:01:1b:c2  172.22.92.215
```

```
                                                                Local
```

Example 5-10 Displays Logical Scope for Each VSAN

Table 5-1 lists the default settings for CFS configurations.

Table 5-1 Default CFS Parameters

Parameters	Default