



## Additional Configuration

This chapter describes the advanced features provided in switches in the Cisco MDS 9000 Family.



**Note**

Click **Help > Contents** in Fabric Manager to access help topics not covered in this document.

This chapter includes the following sections:

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## Fibre Channel Time Out Values

To configure timers in Fabric Manager, choose **Switches > FC Services > Timers & Policies** on the Physical Attributes tree. You see the timers for multiple switches in the Information pane. Click the **Change Timeouts** button to configure the timeout values.

To configure timers in Device Manager, choose **FC > Advanced > Timers/Policies**. You see timers for a single switch in the dialog box.

You can modify Fibre Channel protocol related timer values for the switch by configuring the following time out values (TOVs):

- Distributed services TOV (D\_S\_TOV)—The valid range is from 5,000 to 10,000 milliseconds. The default is 5,000 milliseconds.
- Error detect TOV (E\_D\_TOV)—The valid range is from 1,000 to 10,000 milliseconds. The default is 2,000 milliseconds. This value is matched with the other end during port initialization.
- Resource allocation TOV (R\_A\_TOV)—The valid range is from 5,000 to 10,000 milliseconds. The default is 10,000 milliseconds. This value is matched with the other end during port initialization.



**Note**

The fabric stability TOV (F\_S\_TOV) constant cannot be configured.

**Step 1** Choose **Tools > Traceroute**. You see the fctrace dialog box.

**Step 2** Set the Source Switch, VSAN, and Target Endport for where you want the trace to begin and end.

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**Step 3** Click **Start** to start the fctrace. You see updates to the dialog box for each hop. This shows each switch the trace traverses from the source switch to the target end point. If the destination is unreachable, you see the hops that the trace traversed until the point where the target could not be found.

**Step 4** Click **Close** to close the dialog box.

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**Step 1** Choose **Tools > Ping**. You see the ping dialog box.

**Step 2** Set the Source Switch, VSAN, and Target Endport for where you want the ping to begin and end.

**Step 3** Click **Start** to start the fcping. You see the results of the ping in the dialog box.

**Step 4** Click **Close** to close the dialog box.

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## Configuring World Wide Names

The world wide name (WWN) in the switch is equivalent to the Ethernet MAC address. As with the MAC address, you must uniquely associate the WWN to a single device. The principal switch selection and the allocation of domain IDs rely on the WWN. The WWN manager, a process-level manager residing on the switch's supervisor module, assigns WWNs to each switch.

To access information on the WWN from Fabric Manager, choose **Switches > FC Services > WWN Manager**.

Cisco MDS 9000 Family switches support three network address authority (NAA) address formats (see [Table 24-1](#)).

**Table 24-1 Standardized NAA WWN Formats**

NAA Address	NAA Type	WWN Format	
IEEE 48-bit address	Type 1 = 0001b	000 0000 0000b	48-bit MAC address
IEEE extended	Type 2 = 0010b	Locally assigned	48-bit MAC address
IEEE registered	Type 5 = 0101b	IEEE company ID: 24 bits	VSID: 36 bits



### Caution

Changes to the world-wide names should be made by an administrator or individual who is completely familiar with switch operations.

## Link Initialization WWN Usage

Exchange Link Protocol (ELP) and Exchange Fabric Protocol (EFP) use WWNs during link initialization. The usage details differ based on the Cisco MDS SAN-OS software release:

- In Cisco MDS SAN-OS Release 1.0 and 1.1, both ELPs and EFPs use the VSAN WWN during link initialization.
- In Cisco MDS SAN-OS Releases 1.2 and 1.3, two different WWNs are used during the link initialization process:

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- ELPs use the switch WWN.
- EFPs use the VSAN WWN.
- In Cisco MDS SAN-OS Release 2.0, both ELPs and EFPs use the VSAN WWN by default during link initialization. However, the ELP usage changes based on the peer switch's usage:
  - If the peer switch ELP uses the switch WWN, then the local switch also uses the switch WWN.
  - If the peer switch ELP uses the VSAN WWN, then the local switch also uses the VSAN WWN.

This link initialization change between Cisco MDS SAN-OS releases is implicit and does not require any configuration.

## Flat FC ID Allocation

Fibre Channel standards require a unique FC ID to be allocated to an N port attached to a Fx port in any switch. To conserve the number of FC IDs used, Cisco MDS 9000 Family switches use a special allocation scheme.

Based on the assigned FC ID, some HBAs assume that no other ports have the same area bits and domain. When a target is assigned with an FC ID that has the same area bits, but different port bits, the HBA fails to discover these targets. To isolate these HBAs in a separate area, switches in the Cisco MDS 9000 Family follow a different FC ID allocation scheme. By default, the FC ID allocation mode is auto mode. In the auto mode, only HBAs without interop issues are assigned FCIDs with specific port bits. All other HBAs are assigned FC IDs with a whole area (port bits set to 0). The three options to allocate FCID are auto (default), none, and flat.



### Caution

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Changes to FC IDs should be made by an administrator or individual who is completely familiar with switch operations.

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## Switch Interoperability

Interoperability enables the products of multiple vendors to come into contact with each other. Fibre Channel standards guide vendors towards common external Fibre Channel interfaces.

If all vendors followed the standards in the same manner, then interconnecting different products would become a trivial exercise. However, not all vendors follow the standards in the same way thus resulting in interoperability modes. This section briefly explains the basic concepts of these modes.

Each vendor has a regular mode and an equivalent interoperability mode, which specifically turns off advanced or proprietary features and provides the product with a more interoperable standards compliant implementation.

[Table 24-2](#) lists the changes in switch behavior when you enable interoperability mode. These changes are specific to switches in the Cisco MDS 9000 Family while in interop mode.

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**Table 24-2 Changes in Switch Behavior When Interoperability Is Enabled**

Switch Feature	Changes if Interoperability Is Enabled
Domain IDs	Some vendors cannot use the full range of 239 domains within a fabric. Domain IDs are restricted to the range 97-127. This is to accommodate McData's nominal restriction to this same range. They can either be set up statically (the Cisco MDS switch accept only one domain ID, if it does not get that domain ID it isolates itself from the fabric) or preferred. (If it does not get its requested domain ID, it accepts any assigned domain ID.)
Timers	All Fibre Channel timers must be the same on all switches as these values are exchanged by E ports when establishing an ISL. The timers are F_S_TOV, D_S_TOV, E_D_TOV, and R_A_TOV.
F_S_TOV	Verify that the Fabric Stability Time Out Value timers match exactly.
D_S_TOV	Verify that the Distributed Services Time Out Value timers match exactly.
E_D_TOV	Verify that the Error Detect Time Out Value timers match exactly.
R_A_TOV	Verify that the Resource Allocation Time Out Value timers match exactly.
Trunking	Trunking is not supported between two different vendor's switches. This feature may be disabled on a per port or per switch basis.
Default zone	The default zone behavior of permit (all nodes can see all other nodes) or deny (all nodes are isolated when not explicitly placed in a zone) may change.
Zoning attributes	Zones may be limited to the pWWN and other proprietary zoning methods (physical port number) may be eliminated.  <b>Note</b> Brocade uses the <code>cfgsave</code> command to save fabric-wide zoning configuration. This command does not have any effect on Cisco MDS 9000 Family switches if they are part of the same fabric. You must explicitly save the configuration on each switch in the Cisco MDS 9000 Family.
Zone propagation	Some vendors do not pass the full zone configuration to other switches, only the active zone set gets passed.  Verify that the active zone set or zone configuration has correctly propagated to the other switches in the fabric.
VSAN	Interop mode only affects the specified VSAN.
TE ports and PortChannels	TE ports and PortChannels cannot be used to connect Cisco MDS to non-Cisco MDS switches. Only E ports can be used to connect to non-Cisco MDS switches. TE ports and PortChannels can still be used to connect an Cisco MDS to other Cisco MDS switches even when in interop mode.
FSPF	The routing of frames within the fabric is not changed by the introduction of interop mode. The switch continues to use src-id, dst-id, and ox-id to load balance across multiple ISL links.
Domain reconfiguration disruptive	This is a switch-wide impacting event. Brocade and McData require the entire switch to be placed in offline mode and/or rebooted when changing domain IDs.
Domain reconfiguration nondisruptive	This event is limited to the affected VSAN. Only Cisco MDS 9000 Family switches have this capability—only the domain manager process for the affected VSAN is restarted and not the entire switch.

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**Table 24-2** Changes in Switch Behavior When Interoperability Is Enabled (continued)

Switch Feature	Changes if Interoperability Is Enabled
Name server	Verify that all vendors have the correct values in their respective name server database.
IVR	IVR-enabled VSANs can be configured in any interop mode.

## Interoperability Configuration

The interop mode in Cisco MDS 9000 Family switches can be enabled disruptively or nondisruptively.



### Note

Brocade's `msplmgmtdeactivate` command must explicitly be run prior to connecting from a Brocade switch to either Cisco MDS 9000 Family switches or to McData switches. This command uses Brocade proprietary frames to exchange platform information, which Cisco MDS 9000 Family switches and McData switches do not understand. Rejecting these frames causes the common E ports to become isolated.

To configure the interop mode for a VSAN using Fabric Manager, follow these steps:

- Step 1** Choose **VSANxxx > VSAN Attributes** from the Logical Domains pane. You see the VSAN attributes in the Information pane.
- Step 2** Select **Interop-1** in the InterOp drop-down box.
- Step 3** Choose **Apply Changes** to save this interop mode.
- Step 4** Choose **VSANxxx > Domain Manager** from the Logical Domains pane. You see the Domain Manager configuration in the Information pane.
- Step 5** Set the domain ID in the range of 97 (0x61) through 127 (0x7F).



### Note

This is a limitation imposed by the McData switches.



### Note

When changing the domain ID, the FC IDs assigned to N ports also change.

- Step 6** Change the Fibre Channel timers (if they have been changed from the system defaults).



### Note

The Cisco MDS 9000, Brocade, and McData FC Error Detect (ED\_TOV) and Resource Allocation (RA\_TOV) timers default to the same values. They can be changed if needed. The RA\_TOV default is 10 seconds, and the ED\_TOV default is 2 seconds. Per the FC-SW2 standard, these values must be the same on each switch within the fabric.

- a. Choose **Switches > FC Services > Timers and Policies**. You see the timer settings in the Information pane.
- b. Click **Change Timeouts** to modify the timeout values.
- c. Click **Apply** to save the new timeout values.

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- Step 7** Optionally, choose **VSANxxx > Domain Manager** and select **disruptive** or **nonDisruptive** in the restart drop-down box to restart the domain.
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