



Cisco MDS NX-OS Release 6.2(13) Configuration Limits

Published: December 08, 2014
Part Number: OL-29292-02

This document discusses the configuration and scalability limits for various SAN switching parameters in Cisco MDS NX-OS Release 6.2(13) and has the following topics:

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Note

Beginning Cisco MDS NX-OS Release 6.2(7), Fibre Channel (FC) scale enhancements for zoning and device logins are introduced. However, these enhancements currently are available only on Cisco MDS 9700 Series switches that are running Cisco MDS NX-OS Release 6.2(7) or later and they are not available on fabrics that have switches other than Cisco MDS 9700 Series switches.

Switch-Level Fibre Channel Configuration Limits for Cisco MDS 9000 Series Switches

Table 1-1 lists the switch-level Fibre Channel configuration limits for Cisco MDS 9000 Series switches.

Table 1-1 *Switch-Level Fibre Channel Configuration Limits*

Feature	Parameters	MDS 9700 Series	MDS 9500 Series	MDS 9250i	MDS 9148/9148S	MDS 9396S
Logins (FLOGI or FDISC)	FLOGIs or FDISCs per port	256	256	256	256	256
	FLOGIs or FDISCs per module	1000	400	N/A	N/A	N/A
	FLOGIs or FDISC per switch ¹	4000	2000	400	1000 (MDS 9148S) 400 (MDS 9148)	1000
N-Port Virtualization (NPV)	NPV switches per NPIV core switch	105	105	N/A	N/A	N/A
Inter-Switch Links (ISLs)	ISL instances per switch	Up to 200 ISLs, each ISL with 16 VSANs, for a total number of 3200 port-VSAN instances	Up to 200 ISLs, each ISL with 16 VSANs, for a total number of 3200 port-VSAN instances	Up to 40 ISLs, each with 29 VSANs, for a total number of 1160 port-VSAN instances	Up to 48 ISLs, each with 29 VSANs, for a total number of 1392 port-VSAN instances	Up to 96 ISLs, each with 15 VSANs, for a total number of 1440 port-VSAN instances
PortChannels	PortChannels and member ports in port channels ²	256 PortChannels with a maximum of 16 members in each port channel	256 PortChannels with a maximum of 16 members in each port channel	40 PortChannels with a maximum of 16 members in each port channel and 8 Ethernet PortChannels with a maximum of 8 members in each Ethernet PortChannels	48 PortChannels with a maximum of 16 members in each port channel	96 PortChannels with a maximum of 16 members in each port channel
SSH	SSH ³	16	16	16	16	16

1. The number of FCIDs supported per switch and per fabric is same as FLOGI limit.

2. A system message appears in the user's session when the maximum supported limit of PortChannels and member ports is exceeded.

3. A system message appears on the user's session when the maximum supported number of SSH sessions is exceeded.

Fabric-Level Fibre Channel Configuration Limits for the Cisco MDS 9000 Series Switches

Table 1-2 lists the Fibre Channel configuration limits for the Cisco MDS 9000 Fibre Channel fabric network.

Table 1-2 *Fabric-level Fibre Channel Configuration Limits*

Feature	Parameters	MDS 9700-only Network (without MDS 9500, 9200, and 9100)	MDS Mixed Fabric Network (MDS 9700, 9500, 9200, 9148, 9148S, and 9396S)
VSANs	Number of VSANs per physical fabric	80	80 ¹
Logins and aliases	Number of FCNS entries in fabric ^{2 3}	20000	10000, 13000 ⁸
	Number of device alias entries in fabric	12000 ⁴	8000
Domains and Hops	Number of domains per physical fabric	60, 80 ⁵	60, 80 ⁵
	Number of switch hops from server to storage	7	7
Zones Note The preferred number of members per zone is 2, and the maximum recommended limit is 50.	Zone sets	1000	1000
	Zones ^{6 7}	16000	8000, 10400 ⁸
	Zone members ^{9 10}	32000	16000, 20800 ⁸
	Zone DB size ¹¹	3.8 MB	2 MB, 3.8 MB ⁸
IVR	IVR zone sets	32	32
	IVR zones ¹²	2000	2000
	IVR zone member	4000	4000
	IVR service groups	16	16
CFS	CFS Peers	80	80
	CFS Static Peers over IP	100 ¹³	100 ¹³

1. In a mixed fabric comprising Cisco MDS 9700 and 9500 director class switches and Cisco MDS 9148 and 9148S fabric switches, the fabric can have all the switches in the first 32 VSANs. The remaining VSANs include only those switches that support more than 32 VSANs.
2. An error message appears in the user's session if the number of FCNS entries exceeds 20000.
3. For platforms other than Cisco MDS 9700, a warning appears in the user's session if the number of FCNS entries exceeds 10000.
4. The number of device aliases has been enhanced from Release 6.2.11 onwards.
5. With Cisco MDS NX-OS Release 6.2(11) and later releases, the number of domains per physical fabric is increased to 80.
6. An error message and syslog appears in the user's session if the total number of zones exceeds 16000.
7. For platforms other than Cisco MDS 9700, a warning appears in the user's session if the number of zones exceeds 8000. However, further configurations are not blocked.
8. This increase in scale is applicable only to Cisco MDS 9500 Series Supervisor-2A Module.
9. An error message and syslog appears in the user's session if the total number of the unique zone members exceed 32000.

10. For platforms other than Cisco MDS 9700, a warning appears in the user's session if the number of unique zone member exceeds 16000.
11. Beginning Cisco MDS NX-OS 6.2(7) Release, the zone database size has been increased from 2 MB to 3.8 MB to provide zone scale enhancements. However, if there are any switches in the fabric running Cisco MDS NX-OS 6.2(5) or earlier releases, the previous 2-MB zone database limit prevails and the new zone scale enhancements are not available. We recommend that the 2-MB zone DB limit not be exceeded unless all the switches in the fabric run Release 6.2(7) or later releases. An error message appears in the user's console if the zone database size exceeds 3.8 MB. See [Example: To calculate Zone DB size](#).
12. 2000 IVR zones are across all VSANs. A single VSAN must not exceed 1000 IVR zones.
13. A system message appears in the user's session when the supported configuration limit of CFS peers is exceeded.

Example: To calculate Zone DB size

The following example shows how to calculate Zone DB size for a fabric:

```
(config)# show zone status vsan 310 | Inc "Db Size" P 1
Full Zoning Database :
    Db Size: 1040524 Bytes
--
Active Zoning Database :
    Db Size: 962156 Bytes

Now, Add 962156 with 1040524 = 2002680
2002680 / (1024 * 1024) = 1.9 MB.
```



Note

This database size does not include the pending changes in a session.

Fibre Channel Topology Combinations and Scaling

Beginning Cisco MDS NX-OS Release 6.2(7), the following configurable features to support scale enhancements are supported:

- Fibre Channel Name Server (FCNS) bulk notification
- Coalesce switch Registered State Change Notification (SW-RSCN)

For more information about the FCNS and SW-RSCN features, see the [Cisco MDS 9000 Family NX-OS Fabric Configuration Guide](#) and the [Cisco MDS 9000 Command Reference](#).



Note

In multidimensional scale configurations, supervisors with 1 Gb memory may experience sysmgr hap-reset.

[Table 1-3](#) provides the configuration limits with and without the FCNS and SW-RSCN optimizations.

Table 1-3 *Fibre Channel Topology Combination and Scaling*

Scale Topology	FCNS Bulk Notification	Coalesce Switch RSCN	Configuration Limits	Scale Optimizations
Cisco MDS NX-OS Release 6.2(9) and later on Cisco MDS 9700 Series-only Fabric	ON	ON	MDS NX-OS Release 6.2(7) and later	Enabled
			FLOGI per module: 1000 FLOGI node: 4000 FCNS: 20000 Zone: 16000 Zone members: 32000	
	OFF	OFF	MDS NX-OS Release 6.2(5) and earlier	Disabled (Disabled by default in MDS NX-OS Release 6.2(7))
			FLOGI per module: 500 FLOGI node: 2500 FCNS: 10000 Zone: 8000 Zone members: 16000	
Cisco MDS NX-OS Release 6.2(9) and later on MDS Mixed Fabric ¹ (Cisco MDS 9700 Series, 9500, 9250i, 9222i, and 9148)	ON/OFF	ON/OFF	FLOGI per module: 400 FLOGI node: 2000 FCNS: 10000, 13000 ² Zone: 8000, 10400 ² Zone members: 16000, 20800 ²	Enabled/Disabled

1. The scale enhancements introduced in MDS NX-OS 6.2(7) and later are available on MDS 9700 Series-only networks with Release 6.2(7) and later running on all the switches and the configurable optimizations: FCNS bulk notification and RSCN coalesce enabled. These enhancements are not available on mixed fabrics regardless of whether the FCNS and RSCN are enabled.

**Note**

In Cisco MDS NX-OS Release 6.2(9) and later, FCNS bulk notification is enabled by default. To disable FCNS bulk notification, use the **fcns no-bulk-notify** command. Coalesce switch RSCN is disabled by default.

2. This increase in scale is applicable only to Cisco MDS 9500 Series Supervisor-2A Module.

Fibre Channel Scale Limitations

Limitation 1

Beginning Cisco MDS NX-OS Release 6.2(7), the **fcns bulk-notify** and **rscn coalesce swrscn vsan** commands are available on all platforms. We recommend that you use these commands only on the Cisco MDS 9700 Series with the 48-Port 16-Gbps Fibre Channel switching module because the higher configuration limits are currently not supported on any other MDS platforms.

**Note**

The FCNS bulk notification and coalesce switch RSCN features are supported only in NX-OS Release 6.2(7) and later releases. The switch coalesce RSCN should be enabled only if all the switches in the fabric are Cisco MDS switches that are running MDS NX-OS Release 6.2(7) or later.

Limitation 2

The maximum zone database size has been increased from 2 MB to 3.8 MB in Cisco MDS Release 6.2(7) and later for all MDS 9700 Series switches to enable zone scale enhancements. The new limit of 16000 zones is supported on an MDS 9700-only fabric. Fabrics with Cisco MDS 9500, 9200, or 9100 Series switches continue to have the 2-MB zone database limit, supporting only up to 8000 zones.

Limitation 3

In a three-node serial topology, traffic imbalance may occur if the number of port channels configured between the switches are the same. It is recommended to have a single port channel between two switches with any number of member ports. If more than one port channel is configured, ensure that the count of port channels between the switches varies.

Syslog and Warnings for Fibre Channel Network Scale

[Table 1-4](#) provides syslogs and warnings for the Fibre Channel network.

Table 1-4 FC Fabric Scale-Related Syslog and Warning

Syslog and Warnings	Cisco MDS 9700 Series	Cisco MDS 9500, 9200, and 9100
Zone limit	<p>16000 zones – Hard limit: Syslog warning that states no more zones can be configured:</p> <p>"Maximum configurable zone limit of 16,000 reached. Creation of any more zones is not supported."</p>	<p>8000 zones – Hard limit: Syslog warning that states no more zones can be configured:</p> <p>"Maximum configurable zone limit of 8,000 reached. Creation of any more zones is not supported."</p> <p>10400 zones – Hard limit for Cisco MDS 9500 Series Supervisor-2A Module: Syslog warning that states no more zones can be configured:</p> <p>"Maximum configurable zone limit of 10,400 reached. Creation of any more zones is not supported."</p>
FCNS limit	<p>20000 FCNS entries – Hard limit: Syslog warning that states no more name server entries are supported:</p> <p>"Maximum Name-Server entry limit of 20,000 reached. No more entries are supported."</p>	<p>10000 FCNS entries – Soft limit: Syslog warning around validated limit:</p> <p>"Number of Name-Server entries has reached the maximum validated limit of 10,000. Any more entries could potentially destabilize the fabric."</p> <p>13000 FCNS entries – Soft limit for Cisco MDS 9500 Series Supervisor-2A Module: Syslog warning around validated limit:</p> <p>"Number of Name-Server entries has reached the maximum validated limit of 13,000. Any more entries could potentially destabilize the fabric."</p> <p>20000 FCNS entries – Hard limit: Syslog warning:</p> <p>"Maximum Name-Server entry limit of 20,000 reached. No more entries are supported."</p>

Switch-Level Configuration Limits for Fibre Channel over Ethernet (FCoE)

Table 1-5 lists the switch-level configuration limits for Fibre Channel over Ethernet (FCoE) on Cisco MDS.

Table 1-5 *Switch-Level Configuration Limits for Fibre Channel over Ethernet*

Feature	MDS 9710 with 48-Port 10-Gigabit Fibre Channel over Ethernet Module
FLOGIs per Port	256
FLOGIs per Module	1000
FLOGIs per Switch	4000
VSAN	80
VSAN-VLAN Mapping	80
vFC PortChannel and Member Ports	128 vFC PortChannel and a maximum number of 16 members in one vFC PortChannel

Fabric-Level Configuration Limits for Fibre Channel over Ethernet (FCoE) on MDS 9700 Series

Table 1-6 lists the fabric-level configuration limits for the Fibre Channel over Ethernet on MDS 9700 Series.

Table 1-6 *Fabric-Level Configuration Limits for Fibre Channel over Ethernet on MDS 9700 Series*

Feature	MDS 9700 Network with 48-Port 10-Gigabit Fibre Channel over Ethernet Module
Zones ¹	16000
Zone members ²	32000
Zone sets	1000
Zone DB size ³	3.8 MB
Number of FCNS entries in network ⁴	20000
Device alias	12000

1. A warning appears in the user's console if the number of zones exceeds 8000. However, further configurations are not blocked.
2. An error message appears in the user's console if the total number of the unique zone members exceed 16000.
3. Beginning Cisco MDS NX-OS Release 6.2(7), the Zone database size has been increased from 2 MB to 3.8 MB to provide zone scale enhancements. However, if there are any switches in the fabric running MDS NXOS 6.2(5) or lower releases, the previous 2 MB zone database limit would prevail and the new zone scale enhancements would not be available. We recommend that the 2-MB zone DB limit not be exceeded unless all the switches in the fabric run 6.2(7) or later releases. An error message appears in the user's console if the zone database size exceeds 3.8 MB.

4. An error message appears in the user's console if the number of FCNS entries exceeds 10000.

The following example shows how to calculate Zone DB size for a fabric:

```
(config)# show zone status vsan 310 | Inc "Db Size" P 1
Full Zoning Database :
    Db Size: 1040524 Bytes
--
Active Zoning Database :
    Db Size: 962156 Bytes

Now, Add 962156 with 1040524 = 2002680
2002680 / (1024 * 1024) = 1.9 MB.
```



Note

This database size does not include the pending changes in a session.

Cisco IOA Configuration Limits

Table 1-7 lists the IOA configurations and the corresponding limits.

Table 1-7 *Cisco I/O Accelerator Configuration Limits*

Parameter	MSM-18/4 or SSN-16 Module on MDS 9222i and MDS 9500 modular Chassis and MDS 9250i Fabric Switch
Number of switches in a cluster	4
Number of clusters per switch	16
Number of switches in a SAN fabric for FC-Redirect	34
Number of hosts per target	128
Number of concurrent flows per IOA service engine	128
Number of flows per IOA service engine (hard limit)	128 - Release 4.2(1) on MDS 9222i/MDS 9500 512 - Release 4.2(7) or later on MDS 9222i/MDS 9500 512 - Release 6.2(5) or later on MDS 9250i
Number of flows per IOA service engine (soft limit)	64 - Release 4.2(1) on MDS 9222i/MDS 9500 256 ¹ - Release 4.2(7) or later on MDS 9222i/MDS 9500 256 ²³ - Release 6.2(5) or later on MDS 9250i
Number of flows in a cluster	1024 - Release 4.2(7d) 1248 - Release 5.2(6b)

1. If initiators or targets participating in IOA are present on MDS 9250i switches, then the limit is 203 for tape and 160 for disk.

Fibre Channel Flow Configuration Limits

[Table 1-8](#) lists the FC flow configurations limits.

Table 1-8 FC Flow Limit

Cisco MDS Device	Aggregate Flow and Flow Statistics Limit	Flow Statements per Module
Generation 1 Modules	1000	1024
Generation 2 Modules	2000	2048
Generation 3 Modules	512	512
Generation 4 Modules	1919	1919