

# Brocade SAN Scalability Guidelines: Brocade Fabric OS v7.X

Version 7.3, update 1

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This document provides scalability guidelines that can be used to design and deploy extremely stable Fibre Channel (FC) storage networks. It is impossible to test all potential configurations, but by keeping within the limits noted in this document, the utmost reliability can be all but guaranteed.

The guidelines included in this document cover the most recent Brocade® Fabric OS® (FOS) products.

**CAUTION:** Extreme or unusual configurations may lead to unexpected or undesirable results.

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## **BROCADE**

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## SUPPORTED PLATFORMS

Brocade Fabric OS (FOS) version 7.x supports only 8 Gbps and 16 Gbps hardware platforms. This document provides scalability information for these platforms and does not cover hardware operating with Brocade FOS versions prior to v7.0. Refer to Release Notes documents for specific hardware models supported by a particular version of Brocade FOS.

For scalability guidelines related to Brocade FOS v6.x, refer to the Brocade SAN Scalability Guidelines for Brocade Fabric OS v6.x.

Other Brocade products may participate in Storage Area Networks (SANs) with products using Brocade FOS v7.x either via Fibre Channel Routing (FCR) or direct Layer 2 (E\_Port) fabric interoperability. In general, Brocade recommends following the recommendations from your equipment vendor along with published Target Path release guidelines to select the ideal code level to run on a product.

Refer to the latest Brocade Fabric OS Release Notes for recommended and minimum versions required for fabric compatibility.

## BROCADE FOS LAYER 2 SCALABILITY LIMITS

Fabric scalability is typically based on the least capable switch participating in the fabric. Table 1 provides the limits for products running Brocade Fabric OS v7.x. If a fabric has products participating that are operating with an older version of Brocade FOS, the limits of the fabric must not exceed the maximum limits of that older version of Brocade FOS. Refer to the specific Brocade FOS release notes and appropriate SAN Scalability Guidelines for the appropriate limits.

Table 1 provides two numbers for each fabric metric:

- The first number (“Tested”) is the limit that has been explicitly tested by Brocade during the qualification process. This number is the maximum recommended limit to ensure the utmost stability and reliability.
- The second number (“Supported”) is the maximum limit that Brocade supports. These values exceed what has been explicitly tested by Brocade, but they fall within reasonable limits for use in production environments. Brocade recommends that any deployment of a fabric that exceeds the tested limits be verified first in a non-production environment to ensure reliable behavior.

When only a single value is listed, it means that both values are the same.

**Table 1.** Brocade FOS Layer 2 Scalability Limits

Metric	Tested/Supported Limits for Brocade FOS v7.0.x (and Later)
Maximum number of domains per fabric in Brocade Fabric OS Native mode	56/56
Number of device connections in fabric (initiators, targets, or NPIV [N-Port ID Virtualization] devices logged into the fabric) in Brocade Fabric OS Native mode (interopmode 0)	4096 (for all platforms supported by FOS v7.x) 6000/6000 (for fabrics with only the following platforms: Brocade DCX/DCX-4S/DCX 8510 and Brocade 6520/6510/6505/5300/5100/300/7800/7840/Encryption Switch)
Maximum number of logged in devices per fabric with management server enabled	1000
Maximum number of NPIV devices per port	255 127 (for the shared area ports on the Brocade FC8-48 and FC8-64 Blades)

Metric	Tested/Supported Limits for Brocade FOS v7.0.x (and Later)
Maximum number of devices (initiators, targets, or NPIV devices) per switch	1000/1000 2048/2048 (Brocade DCX/DCX-4S/DCX 8510/6520/6510/6505/5300/Encryption Switch in a fabric with other platforms <u>not</u> listed here) 2048/4096 (for Brocade DCX/DCX-4S/DCX 8510/6520/6510/6505/5300/Encryption Switch in a fabric with only the platforms listed here)
Maximum number of NPIV devices per fabric	Refer to <i>Number of device connections in fabric</i>
Maximum number of unique zone members (2 members per zone) <sup>1</sup>	Refer to Table 2 Brocade FOS Zoning Database Limits
Maximum number of unique zone members (16 members per zone) <sup>1</sup>	Refer to Table 2 Brocade FOS Zoning Database Limits
Maximum number of zones (2 members per zone) <sup>1</sup>	Refer to Table 2 Brocade FOS Zoning Database Limits
Maximum number of zones (16 members per zone) <sup>1</sup>	Refer to Table 2 Brocade FOS Zoning Database Limits
Maximum number of zone sets <sup>1</sup>	Total of all zone sets cannot exceed overall 1 or 2 MB zoning database size. <sup>2</sup>
Security database: SCC and DCC policies <sup>4</sup>	56 switch WWNs 2560/6000 end device WWNs (should not exceed fabric device connection limit for fabric)
Maximum number of admin domains	254
Maximum number of hops from source to destination	7 (19 for routed fabrics)
Maximum Inter-Switch Links (ISLs) per switch	No limit (maximum port count)
Maximum number of Brocade Access Gateways per fabric	50/300
Maximum number of F_Ports mapped to single N_Port per Brocade Access Gateway	40/100
Maximum number of N_Ports per Brocade Access Gateway	8/8
Maximum number of N_Ports (connected to Brocade Access Gateways) per hosting switch <sup>3</sup>	60/maximum switch port count/maximum switch port count

The number of zones and zone members that can be configured in the zoning database on a switch depends on several factors. Table 2 below gives some guidelines on the limits that can be supported based on examples with several different average zone name lengths and number of members per zone. Actual limits will vary depending on actual name lengths and other factors noted below. Use the `cfgSize` command to display the total usage of zoning configuration applied.

**Table 2.** Brocade FOS Zoning Database Limits

<b>Average Zone Name Length 25 Characters</b>	<b>Maximum Zoning Database Size<sup>1</sup> 1MB</b>	<b>Maximum Zoning Database Size<sup>1</sup> 2MB</b>
Maximum number of unique zone members (2 members per zone)	20594 (WWN) 10048 (using aliases (1 WWN per alias, 2 aliases per zone)) 13506 (using aliases (2 WWN per alias, 1 alias per zone)) 33015 (D,P)	41188 (WWN) 20096 (using aliases (1 WWN per alias, 2 aliases per zone)) 27013 (using aliases (2 WWN per alias, 1 alias per zone)) 66031 (D,P)
Maximum number of unique zone members (16 members per zone)	38077 (WWN) 12949 (using aliases (1 WWN per alias, 16 aliases per zone)) 33958 (using aliases (16 WWN per alias, 1 aliases per zone)) 125110 (D,P)	76155 (WWN) 25898 (using aliases (1 WWN per alias, 16 aliases per zone)) 67917 (using aliases (16 WWN per alias, 1 alias per zone)) 250222 (D,P)
Maximum number of zones (2 members per zone)	10297 (WWN) 5024 (using aliases (1 WWN per alias, 2 aliases per zone)) 6753 (using aliases (2 WWN per alias, 1 aliases per zone)) 16508 (D,P)	20594 (WWN) 10048 (using aliases (1 WWN per alias, 2 aliases per zone)) 13506 (using aliases (2 WWN per alias, 1 alias per zone)) 33015 (D,P)
Maximum number of zones (16 members per zone)	2380 (WWN) 809 (using aliases (1 WWN per alias, 16 aliases per zone)) 2122 (using aliases (2 WWN per alias, 1 alias per zone)) 7819 (D,P)	4760 (WWN) 1619 (using aliases (1 WWN per alias, 16 aliases per zone)) 4245 (using aliases (16 WWN per alias, 1 alias per zone)) 15639 (D,P)
<b>Average Zone Name Length 64 Characters</b>	<b>Maximum Zoning Database Size<sup>1</sup> 1MB</b>	<b>Maximum Zoning Database Size<sup>1</sup> 2MB</b>
Maximum number of unique zone members (2 members per zone)	11619 (WWN) 4716 (using aliases (1 WWN per alias, 2 aliases per zone)) 6709 (using aliases (2 WWN per alias, 1 alias per zone)) 14751 (D,P)	23239 (WWN) 9433 (using aliases (1 WWN per alias, 2 aliases per zone)) 13419 (using aliases (2 WWN per alias, 1 alias per zone)) 29503 (D,P)
Maximum number of unique zone members (16 members per zone)	32309 (WWN) 6373 (using aliases (1 WWN per alias, 16 aliases per zone)) 25757 (using aliases (16 WWN per alias, 1 alias per zone)) 78858 (D,P)	64619 (WWN) 12746 (using aliases (1 WWN per alias, 16 aliases per zone)) 51515 (using aliases (16 WWN per alias, 1 alias per zone)) 157720 (D,P)
Maximum number of zones (2 members per zone)	5810 (WWN) 2358 (using aliases (1 WWN per alias, 2 aliases per zone)) 3355 (using aliases (2 WWN per alias, 1 alias per zone)) 7375 (D,P)	11620 (WWN) 4716 (using aliases (1 WWN per alias, 2 aliases per zone)) 6709 (using aliases (2 WWN per alias, 1 alias per zone)) 14751 (D,P)
Maximum number of zones (16 members per zone)	2019 (WWN) 398 (using aliases (1 WWN per alias, 16 aliases per zone)) 1610 (using aliases (16 WWN per alias, 1 alias per zone)) 4929 (D,P)	4039 (WWN) 797 (using aliases (1 WWN per alias, 16 aliases per zone)) 3220 (using aliases (16 WWN per alias, 1 alias per zone)) 9858 (D,P)

**Table Notes:**

- 1 Brocade FOS 6.0+ supports a 1 MB zoning database. Brocade FOS v7.1 and later supports a 2 MB zoning database for Brocade DCX Backbone platforms only. If any other platforms exist in a fabric, the zoning database is limited to 1 MB. The number of zone sets, zones, and zone members that can be stored in the database depends on a number of interrelated factors, including the number of members in each zone, the number of characters used in each zone name, and the type of zoning used (World Wide Name [WWN] or Domain/Port [D/P] members). Zone members that have aliases defined also require additional memory. The numbers in Table 1 are guidelines that assume the same number of members per zone and the same type of members in the zones.
- 2 Use the `cfgSize` command to display the total usage of zoning configuration applied.
- 3 A hosting switch is a fabric switch to which a Brocade Access Gateway is connected. Typically, each Brocade Access Gateway has multiple connections to the host switch, and it may have multiple connections to multiple host switches, each in a different fabric.
- 4 SCC and DCC = Switch Connection Control and Device Connection Control

**Other Notes:**

The Brocade 6505 Switch is supported with Brocade FOS v7.0.1 and later.  
The Brocade 6520 Switch is supported with Brocade FOS v7.1.0 and later.

**BROCADE VIRTUAL FABRICS SCALABILITY**

Virtual Fabrics capabilities introduce additional factors to consider when assessing scalability. Specifically, when looking at the limits that an individual chassis or switch can support, it is no longer just a factor of the size of the Layer 2 fabric or the number of devices being imported from edge fabrics. Virtual Fabrics allows a single physical chassis to participate in up to eight separate Layer 2 fabrics, not including additional impact from imported devices from FCR.

To account for Virtual Fabrics, each physical switch has limits that are supported for the aggregate environment. This means that if a single physical switch has three individual logical switches, each one participating in an independent logical fabric, the total number of domains and logged-in host/storage devices in all three logical fabrics must be counted and compared against the physical switch limits.

The limits for individual logical fabrics are the same as those noted in the previous section for a traditional Layer 2 fabric.

Table 3 lists supported limits specific to Virtual Fabrics-enabled environments.

**Table 3.** Brocade Virtual Fabrics Scalability Limits

Virtual Fabrics Supported Limits for Brocade FOS v7.0 (and Later)	
Maximum number of logical switches per chassis/switch (including default and base switch if defined)	Brocade DCX/DCX-4S/DCX 8510: 8 Brocade 5300 Switch: 4 Brocade 5100 Switch: 3 Brocade 6520 Switch: 4 Brocade 6510 Switch: 3 Brocade 7800 Extension Switch: 4 Brocade 7840 Extension Switch: 4
Total logged in devices (from all logical fabrics) per chassis	9000
Total number of fabrics (logical switches and FCR-connected edge fabrics) per chassis	48 (Brocade DCX/DCX-4S/DCX 8510) 32 (Brocade 5300/5100/6520/6510/7800/7840)
Total number of base switches creating a single base fabric	12

Virtual Fabrics Supported Limits for Brocade FOS v7.0 (and Later)	
Total number of logical fabrics utilizing a single base fabric	48

## FIBRE CHANNEL ROUTING SCALABILITY

FCR scalability limits for Brocade Fabric OS v7.x are listed in Table 4. This table provides two numbers for each fabric or metaSAN metric.

- The first number (“Tested”) is the limit that has been explicitly tested by Brocade during the qualification process. This maximum recommended limit ensures the greatest stability and reliability.
- The second number (“Supported”) exceeds what has been explicitly tested by Brocade, but is believed to be within reasonable limits for production deployments, based on testing that has been performed. Brocade recommends that any deployment of a fabric or metaSAN that exceeds the Tested limits be verified first in a non-production environment to ensure reliable behavior.  
Brocade will support customers that deploy configurations up to, but not exceeding, the noted Supported limits.
- If only a single number is listed, the Tested and Supported limits are the same.

**Note:** In metaSAN configurations utilizing a backbone fabric with multiple routers and many Inter-Fabric Link (IFL) connections to edge fabrics, the IFLs should be evenly balanced across routers as much as possible. Failure to do so may cause problems with synchronization of information among the routers in the fabric.

**Table 4.** Fibre Channel Routing Scalability Limits

Fibre Channel Routing Scalability	
Metric	Tested/Supported Limits for Brocade FOS v7.0 (and Later)
Maximum number of Brocade FOS edge fabrics per metaSAN (with edge fabrics containing up to 1500 WWNs)	48 (Brocade DCX/DCX-4S/DCX 8510) 24 (Brocade 5100/5300/7800/7840/6520/6510)
Maximum number of Brocade FOS edge fabrics per metaSAN (with edge fabrics containing up to 2000 WWNs)	32 (Brocade DCX/DCX-4S/DCX 8510) 12 (Brocade 5100/5300/7800/7840/6520/6510)
Maximum number of Brocade FOS edge fabrics per metaSAN (with one or more edge fabrics exceeding 2000 WWNs) <sup>4</sup>	24 (Brocade DCX/DCX-4S/DCX 8510) <sup>4</sup> 8 (Brocade 5100/5300/7800/7840/6520/6510) <sup>4</sup>
Maximum number of Brocade FOS edge fabrics per metaSAN with more than 2000 local WWNs <sup>4</sup>	4 (Brocade DCX/DCX-4S/DCX 8510) <sup>4</sup> 2 (Brocade 5100/5300/7800/7840/6520/6510) <sup>4</sup>
Maximum number of edge fabrics per metaSAN with Brocade M-Enterprise OS (M-EOS) switches in one or more edge fabrics (with edge fabrics containing up to 1500 WWNs) <sup>1</sup>	16 (Brocade DCX/DCX-4S/DCX 8510) 16 (Brocade 5100/5300/7800/7840/6520/6510)
Maximum number of edge fabrics per metaSAN with Brocade M-EOS switches in one or more edge fabrics (with any pure Brocade FOS edge fabrics containing up to 2000 WWNs) <sup>1</sup>	12 (Brocade DCX/DCX-4S/DCX 8510) 12 (Brocade 5100/5300/7800/7840/6520/6510)

Fibre Channel Routing Scalability	
Metric	Tested/Supported Limits for Brocade FOS v7.0 (and Later)
Maximum number of edge fabrics per chassis (Edge fabrics <i>per chassis</i> may never exceed maximum number of edge fabrics <i>per metaSAN</i> noted above. In some cases, depending on the number of devices in an edge fabric or type of switches, the maximum number of edge fabrics per metaSAN may be less than that supported per chassis. In these cases, the lower number applies.)	12 (Brocade FR4-18i Blade in Brocade DCX/DCX-4S) <sup>2</sup> 12 (Brocade 5100/5300/7800/7840/6520/6510) 24 (Brocade DCX/DCX-4S/DCX 8510)
Maximum number of switches per edge fabric (only Brocade FOS switches in edge fabric )	26
Maximum number of switches per edge fabric (any Brocade M-EOS switches in edge fabric) <sup>1</sup>	16
Maximum number of WWNs per edge fabric (only Brocade FOS switches in edge fabric )	1200/1500 1200/2000 (with reduced edge fabric count) 4000/6000 <sup>4, 5</sup> (with reduced edge fabric count)
Maximum number of WWNs per edge fabric (any Brocade M-EOS switches in edge fabric) <sup>1</sup>	800/1500
Maximum number of imported devices from each edge fabric	1000
Maximum number of imported devices from each edge fabric (any Brocade M-EOS switches in edge fabric) <sup>1</sup>	300/1000
Maximum number of Layer 2 switches participating in backbone fabric	12
Maximum number of FCRs per backbone fabric	12
Maximum number of local WWNs per backbone fabric (not including imported devices)	512
Maximum number of LSAN devices per metaSAN (total number of devices imported from all edge fabrics)	10000 (with only Brocade DCX/DCX-4S/DCX 8510-8/DCX 8510-4 as routers) 5000 (with any Brocade 5100/5300/7800/7840/6520/6510 as routers)
Maximum number of LSAN zones per metaSAN	3000/5000 <sup>3</sup>
Maximum number of devices per LSAN zone	64
Maximum number of hops between edge switches	12/19
EX_Ports per FCR (Brocade DCX with Brocade FR4-18i) <sup>2</sup>	32
EX_Ports per chassis with Integrated Routing	128 (Brocade DCX/DCX-4S/DCX 8510) Maximum port count (Brocade 5300/5100/7800/7840/6520/6510)

**Table Notes:**

<sup>1</sup> Routing (via EX\_Port connectivity) for M-EOS edge fabrics is only supported from Brocade FOS-based platforms using Brocade FOS v7.0.x. Brocade FOS v7.1.0 and later do not support FCR to M-EOS edge fabrics. Brocade M-EOS fabrics must



be running Brocade M-EOSn 9.6.2 firmware or later or M-EOSc 9.9.0 firmware or later. When using a Brocade 7800 as a router attached to an edge fabric with Brocade Mi10ks, Brocade M-EOSn 9.9.7 or later must be used. Brocade M-EOS fabrics may not be configured in Logical SAN (LSAN) zones with Brocade VCS Fabric technology devices. (FCR between Brocade M-EOS and VCS fabrics is not supported.)

- <sup>2</sup> The Brocade FR4-18i is supported only in DCX and DCX-4S with Brocade FOS v7.0.x. Brocade FOS v7.1 does not support the Brocade FR4-18i in any chassis.
- <sup>3</sup> All backbone FCRs with Brocade FOS v6.0.0 and later.
- <sup>4</sup> Requires both FCR edge and backbone fabrics to be running FOS v7.2 or later.
- <sup>5</sup> When deploying very large edge fabrics, note that the maximum number of local devices (WWNs) and imported devices (WWNs) in any single edge fabric cannot exceed the Layer2 fabric limit.

#### Other Notes:

IPFC over FCR is supported only for edge to edge.

Brocade FC Fast Write is supported only for edge to edge.

The backbone fabric cannot run in interopmode 2 (McDATA Native Mode) or interopmode 3 (McDATA Open Fabric Mode). It must be in Brocade FOS Native Mode.

### FIBRE CHANNEL ROUTING SCALABILITY FOR BROCADE VCS CONNECTIVITY

Brocade FOS v7.0.1 includes new support for FCR to Brocade VCS fabrics containing Brocade VDX® Data Center Switches operating with Brocade Network OS v2.1.1 or later. If only edge to edge routing is being used, or if the FCR backbone fabric contains 512 or fewer locally attached devices, all limits specified in the previous section are still applicable when routing to/from Brocade VCS fabrics as edge fabrics. Table 5 specifies unique scalability limits supported when interoperating via FCR to Brocade VCS fabrics, where the FCR backbone fabric contains more than 512 locally attached devices.

All support noted in Table 5 requires Brocade FOS v7.0.1 or later on the FC router platforms.

**Table 5.** Fibre Channel Routing Scalability Limits for Brocade VCS Connectivity

Fibre Channel Routing Scalability for Brocade VDX/VCS Fabric Interoperability with Large FCR Backbone Fabric	
Metric	Supported Limits for Brocade FOS v7.0.1 (and Later)
Brocade FOS platforms that may be deployed as FC Routers (FCRs) when the FCR backbone fabric contains greater than 512 locally attached devices	Brocade 5300, DCX, DCX-4S, DCX 8510, 6520, 6510
Maximum number of local WWNs per backbone fabric (not including imported devices) with only Brocade Network OS edge fabrics	2000
Maximum number of edge fabrics connected to FCR switch	8
Maximum number of Brocade VCS edge fabrics per metaSAN	8
Maximum number of Brocade FOS edge fabrics per metaSAN	0 (Brocade FOS fabrics may not be deployed as edge fabrics when the FCR backbone fabric exceeds 512 locally attached devices.)
Maximum number of Brocade M-EOS edge fabrics per metaSAN	0 (Routing between Brocade M-EOS and VCS fabrics is not supported.)
Maximum number of switches in backbone acting as FCRs	2

Fibre Channel Routing Scalability for Brocade VDX/VCS Fabric Interoperability with Large FCR Backbone Fabric	
Metric	Supported Limits for Brocade FOS v7.0.1 (and Later)
Maximum number of switches per edge Brocade VCS fabric	24 (Brocade VCS fabrics support a maximum of 28 total domains, including FCR translate/front domains. A maximum of 24 of these 28 domains can be actual Brocade VDX switches.)
Maximum number of WWNs (FC over Ethernet [FCoE] devices) per Brocade VCS edge fabric	2000 3000 (router must be at FOS v7.2.0 or later)
Maximum number of imported devices from each edge fabric or backbone fabric	1000
Maximum number of Layer 2 switches participating in FCR backbone fabric	40 (This does not include up to 8 translate domains from edge Brocade VCS fabrics.)
Maximum number of LSAN zones per metaSAN	5000

#### Other Considerations/Requirements for Using Fibre Channel Routing for VCS Fabric Connectivity:

- An Integrated Routing license is *not* required for EX\_Port connections on Brocade FOS-based platforms, if all routing is done between VCS and FC fabrics. Routing between two FC fabrics requires an Integrated Routing license on the platform acting as the FCR.
- EX\_Port connections to VCS fabrics may only be formed with E\_Ports on the Brocade VDX 6730 Data Center Switch.
- The EX\_Ports on FCRs connected to Brocade VDX 6730 switches must be set to mode 5. (Refer to the Brocade FOS Administration Guide for details.)
- Brocade VDX 6730 switches connected to FCR routers (Brocade FOS-based switches) must be operating with Brocade Network OS v2.1.1 or later.
- An E\_Port on a Brocade VDX 6730 is only supported for connectivity to an EX\_Port on an FCR switch and cannot connect to an E\_Port on another Brocade VDX 6730.
- FC host/storage cannot be directly attached to FC ports on the Brocade VDX 6730 with Brocade Network OS v2.1.1.
- Sharing devices between two VCS fabrics using FCR is not supported.
- Sharing devices between an M-EOS fabric and a VCS fabric is not supported.
- Communication between FCoE devices connected to a Brocade 8000 Switch/Brocade FCOE10-24 Blade with FCoE devices in a VCS fabric is not supported.
- Routing between VCS fabrics and FC fabrics is not supported if Admin Domains is enabled in the FC fabric.
- Sharing devices between VCS/VDX and an FC fabric across FCIP connection (within the FC fabric) is not supported in Brocade FOS v7.X and Brocade Network OS v2.1.1. (A VCS fabric connected via FCR to a backbone fabric cannot share devices with a FC SAN connected to a VEX\_Port).
- Long distance links between the Brocade VDX 6730 and FOS-based FCR switch are not supported. (The IFL cannot be configured for Long Distance mode.)

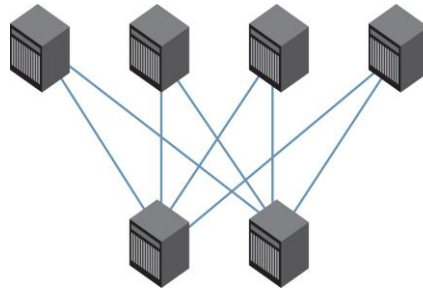
## TOPOLOGIES SUPPORTED USING INTER-CHASSIS LINKS

This section describes various topologies supported for deploying fabrics with Inter-Chassis Links (ICLs), the high-density interconnections available on the Brocade DCX, DCX-4S, DCX 8510-8, and DCX 8510-4 Backbone platforms. The topologies supported include:

### 1. Core-edge topology

In a core-edge ICL topology, every edge chassis is connected to every core chassis, but there are no direct ICL or ISL interconnections between the core chassis or the edge chassis themselves.

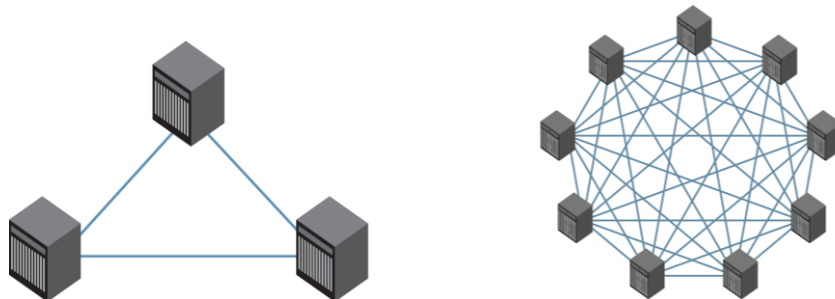
This diagram shows a core-edge topology with two core chassis and four edge chassis.



### 2. Full-mesh topology

In a full-mesh ICL topology, every chassis is connected to every other chassis in the fabric using ICLs.

These diagrams show full-mesh topologies of three chassis and nine chassis.



**Table 6.** Brocade DCX/DCX-4S ICL Topology Support

Brocade DCX/DCX-4S ICL Topology Support	
Metric	Brocade FOS v7.x
Maximum number of chassis that can be connected in a core-edge topology using ICLs	N/A
Maximum number of chassis that can be connected in a full-mesh topology using ICLs	3

**Table 7. Brocade DCX 8510 ICL Topology Support**

<b>Brocade DCX 8510-8/DCS 8510-4 ICL Topology Support <sup>1</sup></b>			
<b>Metric</b>	<b>Brocade FOS v7.0.0x</b>	<b>Brocade FOS v7.0.1x to FOS v7.2.x</b>	<b>Brocade FOS v7.3.0x</b>
Maximum number of chassis that can be connected in a core-edge topology using ICLs <sup>2</sup>	6	10	12
Maximum number of chassis that can be connected in a full-mesh topology using ICLs <sup>3</sup>	3	9	9

**Table Notes:**

- <sup>1</sup> For fabric topologies with more than four ICL-connected Brocade DCX 8510 chassis, an Enterprise ICL license is required on each Brocade DCX 8510 that is directly connected via ICLs (either as ISLs or IFLs) to four or more other DCX 8510 chassis. This applies on an individual chassis basis. In core-edge topologies, it is possible to have EICL licenses required on some but not all chassis in the fabric.
- <sup>2</sup> When deploying core-edge topologies, additional switches can be added by connecting them via *ISL* to the core Brocade DCX 8510s in the fabric. Care should be taken never to create equal cost routes between any host/target device pair that traverse an ISL in one route and an ICL in the other route. The maximum domain count in the fabric should not exceed the limits listed in Table 1.
- <sup>3</sup> When deploying full-mesh topologies with more than three chassis, Brocade recommends not deploying additional switches (domains) in the fabric. Additional switches can be deployed in Access Gateway mode to facilitate additional host device connectivity.

**Other Notes:**

For ICL interconnections, at least two ICL connections must be made from each core blade in one chassis going to the corresponding core blade in every other chassis that it is connected to. A minimum of four ICL connections is made between any pair of interconnected chassis. Therefore, the maximum number of neighboring Brocade DCX 8510s that can be directly connected to a single Brocade DCX 8510-8 via ICLs is eight, and to a single Brocade DCX 8510-4 is four.

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