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### Cisco NX-OS 5.2.2 E4 and Cisco Data Center Network Manager (DCNM) 5.2 Qualification on System z

International Business Machines Corporation (IBM) and Cisco Systems have successfully completed connectivity testing of NX-OS 5.2.2 on switches and directors listed in **Table 1** with IBM System z servers listed in **Table 2**. This release contains the initial support for the fabric 3 modules (DS-13SLT-FAB3) and the new full line rate 8 Gb/sec 32-port card (DS-X9232-256K9) and 48-port card (DS-X9248-256K9). The release also has support for 10 Gb/sec optics installed in the new port blades for use as ISLs. The release also provides the initial support for the SSN-16 in a FICON environment.

<b>Table 1) Cisco switches and directors supported on machines from Table 2</b>				
Cisco Name	Code Release	Graphical User Interface (GUI)	IBM Machine Type	Supported Small Form Factor Pluggable (SFP) Optics
MDS-9513	NX-OS 5.2.2 E4	DCNM 5.2	2062-D11 or 2054-E11	2, 4, 8, and 10 Gb/sec
MDS-9509	NX-OS 5.2.2 E4	DCNM 5.2	2062-D07 or 2054-E07	2, 4, 8, and 10 Gb/sec
MDS-9506	NX-OS 5.2.2 E4	DCNM 5.2	2062-D04 or 2054-E04	2, 4, 8, and 10 Gb/sec
MDS-9222i	NX-OS 5.2.2 E4	DCNM 5.2	2054-E01	2, 4 and 8 Gb/sec
MDS-9134	NX-OS 5.2.2 E4	DCNM 5.2	2053-434	2, 4, and 10 Gb/sec

<b>Table 2) FICON (CHPID type FC) and FCP (CHPID type FCP) attachment of the tested switches and directors is supported on the following</b>
zEnterprise EC12 and BC12 at driver 12K or 15F
zEnterprise 196 (z196) at driver 86E and driver 93G
zEnterprise 114 (z114) at driver 93G
System z10 Enterprise Class and System z10 Business Class (z10 EC and z10 BC) at driver 76D or 79F
System z9 Enterprise Class and System z9 Business Class (z9 EC and z9 BC) at driver 67L
zSeries 990 (z990) and zSeries 890 (z890) at driver 55K
zSeries 900 (z900) and zSeries 800 (z800) at driver 3GF
Note: Check with IBM service personnel to ensure all required Machine Change Levels (MCLs) have been applied to System z machines.

<b>Table 3) Supported System z functions/features and environments</b>
High Performance FICON for System z (zHPF)
All FICON / FCP data rates (1, 2, 4, and 8 Gb/sec) are supported on the switches and directors in <b>Table 1</b> .
Fibre Channel Protocol (FCP) attached to System z machines that support FCP listed in <b>Table 2</b> running with Linux on System z
<ul style="list-style-type: none"><li>Novell SUSE SLES 10 and SLES 11</li><li>Red Hat RHEL 5 and 6</li></ul>
Note: FCP is also supported by z/VM and z/VSE.
FCP N-Port ID Virtualization (NPIV) on System z machines listed in <b>Table 2</b> .
Intermix of FICON and FCP traffic within the same fabric

<b>Table 4) Supported Input/Output (I/O) devices</b>
TotalStorage Enterprise Storage Server (ESS) (2105-800)
IBM System Storage DS8000 series
IBM System Storage DS6000 (1750)
IBM Virtualization Engine TS-7700 (3957-VEA and 3957-V06)
IBM TotalStorage Virtual Tape Server (3494)
IBM TotalStorage Enterprise Tape Controller model J70 (3592-J70)
IBM System Storage TS1120 Tape Controller model C06 (3592-C06)
Optica PRIZM for FICON to ESCON conversion
Note: It is anticipated that the Cisco switches and directors could attach to any System z FICON / FCP supported device and other FICON / FCP devices that adhere to the FICON / FCP architecture.

<b>Table 5) Supported distance for non-repeated and non-amplified switch/director optics</b>	
<b>Small Form Factor (SFP) optic</b>	<b>Distance Supported</b>
2 Gb/sec LX, 10 km optics	10 km
4 Gb/sec LX, 10 km optics	10 km
4 Gb/sec LX, 4 km optics	4 km
8 Gb/sec LX, 10 km optics	10 km
8 Gb/sec Extended Reach (ER) optics	40 km
10 Gb/sec LX, 10 km optics	10 km
10 Gb/sec Extended Reach (ER) optics	40 km

Note: Short wavelength (SX) optics are supported. The preferred method of connection for 8 Gb/sec short wavelength (SX) small form factor pluggable optics (SFPs) is through 50 micron multimode fiber optic cabling rated at 2000 MHz-km (OM3 fiber) or better. Other 50 micron and 62.5 micron multimode fiber may be used as an alternative, but distance limitations exist.

<b>Table 6) Supported distance extension</b>	
<b>Feature</b>	<b>Supported Distance</b>
IBM System Storage Metro Mirror (formerly PPRC) using Fibre Channel Protocol (FCP)	Synchronous mirroring is supported to up to 300 km
z/OS Global Mirror (formerly XRC) environments using FICON channels	Asynchronous mirroring is supported to up to 300 km
Fibre Channel over IP (FCIP) Note: See <b>Table 8</b> for supported configurations.	Up to 300 km
Optical 2, 4, 8 and 10 Gb/sec InterSwitch Links (ISLs) extended through qualified DWDM extension products	Up to 300 km
Optical 4 Gb/sec ISLs extended through Cisco 4 Gb/sec CWDM optics	Up to 40 km
ISLs extended over optical 8 Gb/sec extended reach optics	Up to 40 km
Optical 10 Gb/sec ISLs extended through Cisco Extended Reach optics	Up to 40 km
DWDM optics installed in MDS series switches and directors may be used for 2 and 4 Gb/sec links	Up to 300 km
DWDM optics installed in 9200/9500 series switches and directors may be used for 10 Gb/sec links	Up to 100 km

<b>Table 7) Supported Software</b>
It is anticipated that the tested switches and directors will operate with in service releases of System z operating systems - z/OS, z/VM, z/VSE, z/TPF, and Linux on System z that support FICON.
It is anticipated that the tested switches and directors will operate with in service releases of System z operating systems - z/VM, z/VSE, and Linux on System z that support FCP.
System Automation for OS/390 (SA OS/390) is supported for in band management.

<b>Table 8) Supported FCIP Configurations</b>
(MDS 95xx with 18+4 or 9222i) ⇔ 9222i
MDS 95xx with 18+4 ⇔ MDS 95xx with 18+4
MDS 95xx ⇔ 9222i ⇔ 9222i ⇔ MDS 95xx (use VSAN to isolate traffic to prevent multi-hop)
(MDS 95xx with SSN-16) ⇔ 9222i
(MDS 95xx with SSN-16) ⇔ (MDS95xx with SSN-16)
(MDS 95xx with SSN-16) ⇔ (MDS95xx with 18+4)
Notes:
1. FCIP distance support is for up to 300 km. Testing was performed with both emulated distance and with real fiber over DWDM.
2. Performance characteristics can vary depending on environment. Professional assistance should be sought when implementing this technology.
3. Contact Cisco for further extending FCIP links through use of the FICON XRC Acceleration (XRCA) feature.
4. Contact Cisco for further extending FCIP links through use of the FICON Tape Acceleration (FTA) for tape writes and reads feature.

**Release Notes:**

- \* Cascading of directors and switches is limited to one hop for a FICON environment.
- \* When a zone with more than 250 members is created, there is a rare chance that all ports in a switch can fail to log in during a System z processor Power On Reset (POR) in an FCP environment. This problem has not been seen in FICON environments. To work around this issue, customers can bring ports up after the POR in smaller groups or use smaller zones per Cisco's recommended best-practices for zoning.
- \* Encryption on ISLs is supported on 8 Gb/sec line cards only and can not be used in Port Channel configurations.
- \* With many CHPIDs plugged into a switch, there is a limited risk of taking a few IFCCs on the CUP during CEC IML.s.
- \* 8 Gb/sec optics should not be attached directly to 1 Gb/sec optics. Auto-negotiation is from 8 Gb/sec to 2 or 4 Gb/sec or from 4 Gb/sec to 1 or 2 Gb/sec.
- \* NX-OS 5.2 no longer supports 2 Gb/sec CWDM SFPs.
- \* The new fabric 3 module is only supported in the MDS-9513. Full line rate can be obtained with the new port cards in the MDS-9506 and MDS-9509 by running in local switching mode.
- \* Be sure to follow the Cisco recommended installation for the new fabric 3 module and port cards so that the upgrade to full 8 Gb/sec is concurrent.

**This document and future qualification letters may be found on the IBM Resource Link Web site:**

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Locate the listing of "Hardware products for servers" around the middle of the Web page  
Click on the link "Switches and directors qualified for IBM System z FICON and FCP channels"

<b>Table 9) Other Cisco supported FICON switches and directors for attachment to System z</b>		
<b>Cisco Name</b>	<b>IBM Machine Type</b>	<b>Supported SFP Optics</b>
9216 (see note 1 and 2)	2062-D01	2 Gb/sec
9216a (see note 1 and 2)	2062-D1A or 2054-D1A	2, 4, and 10 Gb/sec
9216i (see note 3)	2062-D1H or 2054-D1H	2, 4, and 10 Gb/sec
Notes: 1. Support for these products remains at Cisco SAN-OS 3.3.1c. 2. This product can be used at its supported FM level in a fabric with other switches and directors at the current NX-OS level. 3. Support for the 9216i remains at NX-OS 4.2.7b.		

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