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International Business Machines Corporation (IBM®) and Cisco Systems, Inc. have successfully completed connectivity testing of the MDS family of switches (9216, 9216i, 9222i, and 9134) and Directors (9506, 9509 and 9513) at code level 3.2(2c) and Cisco Fabric Manager 3.2 in IBM.

**Intended support is for the following environments:**

- \* FICON® attached to the IBM eServer™ zSeries® 900 (z900) at driver 3GF
- \* FICON attached to the IBM eServer zSeries 890 and 990 (z890, z990) at driver 55K
- \* FICON attached to the IBM System z9™ at driver 67L including 4 Gbps FICON channel support
- \* Fibre Channel Protocol (FCP) mode attached to z900, z990, z890 with Linux on System z (either Novell SuSE SLES9 and SLES10 or Red Hat RHEL3, 4 or 5) using the same driver levels as above.
- \* Input/Output (I/O) attachment to the IBM TotalStorage® Enterprise Storage Server (ESS) 2105-800
- \* I/O attachment to the IBM TotalStorage DS8000
- \* I/O attachment to the IBM TotalStorage DS6000
- \* I/O attachment to the IBM 3590 and 3592/J70 tape products
- \* I/O attachment to the IBM 3592 C06
- \* FCP supporting IBM System Storage Metro Mirror (formerly PPRC) and FICON supporting IBM System Storage z/OS Global Mirror (formerly XRC)
- \* It is also anticipated that the Cisco switches and directors could attach to any IBM System z server FICON supported device and other FICON devices that adhere to the FICON architecture.
- \* It is also anticipated that the Cisco switches and directors will operate under IBM operating systems (OS) such as z/OS®, z/VM, z/VSE, and z/TPF that currently support FICON on IBM System z servers.
- \* Ficon Tape Acceleration with compression and encryption over FCIP links support up to 3000 Km for supported devices.

**Notes:**

- 1) Server environments mentioned previously should be at the latest release levels as of November 30<sup>th</sup>, 2007.
- 2) Cascading of directors and switches is limited to one hop for a FICON environment.

**Results Summary**

The identified Cisco directors and switches successfully passed IBM's connectivity testing for the following:

- o I/O attachment to IBM System z FICON supported devices listed below:
  - o Input/Output (I/O) attachment to the IBM TotalStorage Enterprise Storage Server (ESS) 2105-800 at 5.2.400.437
  - o I/O attachment to the IBM TotalStorage DS8000 (FICON and FCP 4 Gbps) at R11Y.9B070823 (2.4G) (bundle 62.42.83.0)
  - o I/O attachment to the IBM TotalStorage DS6000 at R10W.5B051003B
- o Fibre Channel Protocol (FCP) with Linux on System z Novell SuSE SLES9 and SLES10
- o FCP including N\_Port Identifier Virtualization (NPIV)
- o IBM z/OS V1.8 and V1.9
- o IBM System Automation (SA) for OS/390® (In band management feature using Control Unit Port [CUP] device)
- o Intermix of FICON and FCP traffic in either a single switch or cascaded switch environment
- o Optical (2, 4, and 10 Gbps) InterSwitch Links (ISLs) distances were extended up to 300 km through DWDM
- o Ficon Tape Acceleration testing was completed on IBM 3590-C06 at 1.21.3.22 EC L30905 and on IBM 3592-J70 at 1.19.7.15 EC L30834.
- o Optical 2 Gb Inter System Links (ISLs) distances were extended up to 100Km through Coarse Wave Division Multiplexing (CWDM).
- o Optical 4 Gb Inter System Links (ISLs) distances were extended up to 40Km through CWDM.
- o DWDM optics installed in the 9500 series switches and directors was tested at distances up to 300 Km.

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### **Considerations and Limitations**

The following considerations and limitations apply to the tested configurations:

- Concurrent code load on the MDS-9509 is subject to problems if an error occurs while performing the code load. This is due to the current flash size being able to hold only one image at this time. A fix for this is targeted for the next release. Till then, it is suggested that the unit be taken out of service to perform code load.

### **Considerations and Limitations noted in previous qualification testing:**

- There is limited risk that InterFace Control Checks (IFCCs) may be seen on the FC/IP 14+2 blade when using encryption and port channels with both IP ports. This problem appears to be seen when only small packets are used under high stress conditions. This was not seen with z/OS, but with a test program.

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The following table contains the test cases run against the Cisco switches and directors during IBM's testing:

Test Case Name	Testing Completed	Test Case Description
Unit Level Tests	✓	Verify some low level protocols (RSCN, RLIR, OLS, RNID...), concurrent code load, state save...
Fabric Security and Fabric Event Notification Tests	✓	Basic security tests for cascaded switches and fabric change notification (RSCN) tests in different configurations with concentration on 9134 and 9222i.
CEC IMLs	✓	Run EXEC that does system resets forcing light on channels up and down
Improvised Testing	✓	This is additional testing initiated by the Test Team Leader which is intended to uncover latent problems in the equipment under test. Concentration on Ficon Tape Pipelining.
Mixed Workload Test	✓	Combination of SAK and z/OS runs made in an LPAR environment with several partitions.
EXPING/INGCTV all configs		SAK exerciser for FTV (emulated I/O) which checks basic architecture.
SAK EXCITE / ICTVDR Non-RCV		EXCITE runs traffic at a maximum data rate (data pusher mode) followed by traffic with halts, clears, and resets. In recovery mode the program may also inject interface errors. The program is run with a high ratio of output ports in order to maximize switching.
SAK EXCITE / ICTVDR RCV		
SAK EXCTCP / IOCTCP		SAK exerciser for FiCon CTC.
All Applicable SAK EXDASD (IDASD0, IDSCAN, IDASDX)		Includes IDASD0, IDASDX, UDESSI all run to 2105-800/DS-8000/DS-6000 to maximize data transfer.
SAK OFCPIO		FCP I/O driver program under SAK.
PAWS (not SAK)		Stand alone FCP test program.
CHNLDRVR		zOS program to drive data on FiCon channels.
Verify 4 and 10 Gb speed on e-ports		✓
Extend 2 Gb ISL on CWDM	✓	Extend 2 Gb ISL up to 100 Km through a CWDM
Extend 4 Gb ISL on CWDM	✓	Extend 4 Gb ISL up to 40 Km through new 4 Gb/sec CWDM
Extend 4 Gb ISL on DWDM	✓	Extend 4 Gb ISL up to 100 Km through a DWDM
Extend 10 Gb ISL on DWDM	✓	Extend 10 Gb ISL up to 100 Km through a DWDM
NPIV	✓	NPIV tests including PAWS, OSASF, and OFCPIO with concentration on 9134 and 9222i.
Serviceability Test	✓	Fail different cards in switch to make sure error reporting is correct. 9513 TGT FC12 & FC48 also CP
SAK IRNDUP Single LPAR, Multi-channel Path, Single Switch VSAN, Single Copy, Full Port Range, and FAF	✓	SAK exerciser for switch CUP functions. A CU exerciser for the CUP. Run with full port range on a single path.
SAK IRNDUP Multiple LPARs, Multi-channel Path, Multiple Switch VSANs, Single Copy, Full Port Range, and No FAF	✓	SAK exerciser for switch CUP functions. A CU exerciser for the CUP. Run with full port range on a single path.
SAK IRNDUP Single LPAR, Multi-channel Path, Single Switch VSAN, Multiple Copies, Split Port Range, and FAF	✓	SAK exerciser for switch CUP functions. A CU exerciser for the CUP. Run on 2 partitions with 2 paths from each (requires MULT parm).
SA OS/390 (I/O Ops)	✓	This is the real program used for CUP control under zOS to make switch configuration changes.
Regression	✓	Verify that no breaks in code were introduced while fixing problems found during test.

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