



Global Distributed Storage Engineering
Citigroup Architecture & Technology Engineering

Cisco MDS FCIP v2.0

GDSE-07057-PS

Project Scope

0.1

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1. Version Control

Version	Date	Author	Reviewed	Comments
0.1	26-Nov-07	Scott Torgerson	Parul Jain, Kevin Hobaugh, Jason Makar - Cisco	Peer Review
0.5		Scott Torgerson	Global Stakeholders	RFC
1.0		Scott Torgerson	Global Stakeholders	Production Release

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3. Contact

Please address any comments or questions regarding the information contained in this document via email to the “*GT Global Distributed Storage Engineering” distribution list or alternatively to gdse@citigroup.com.

4. Latest Versions

It is recommended that the latest version of the document be used from the GDSE website <http://engineering.citigroup.net/gdse>. Newer versions may include certification on additional platforms, or comments on issues discovered after deployment.

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6. Introduction

The Cisco MDS 9000's with the Multi-protocol Service Modules (MPSM) provides Citigroup the ability to extend SAN traffic to great distances and any number of sites across the existing Citigroup IP infrastructure. The Cisco MDS 9000 Multi-protocol Services Modules extend the reach of Fibre Channel SANs by using Fibre Channel over IP (FCIP). This provides new opportunities for Citigroup to implement secure enterprise-wide SAN strategies that are stable, interoperable, and scalable.

In v1.0 of this project the 14/2 Multi-protocol Services Module (MPSM) was certified for all Citigroup approved Cisco MDS 9000 directors and switches. In this new version of the Cisco MDS FCIP project the 18/4 MPSM will be certified for use which provides the following functionality.

- Gigabit Ethernet line-rate performance for FCIP
- Generation 2 Hardware which removes the port index limitations introduced when the 14/2 MPSM (generation 1 hardware) was certified.
- (18) 4Gbps Fiber Channel ports
- (4) GigE ports
- Full support of value added MDS 9000 Fibre Channel features such as Virtual SANs (VSAN), Inter VSAN routing, port bindings, High availability Port Channeling and VSAN Trunking TE_Port functionality.
- Write Acceleration to improve synchronous and asynchronous disk write (data replication) performance over long distances.

Using Cisco FCIP with the 18/4 MPSM Citigroup can connect local SANs to remote SANs in other locations via the existing IP network across large geographical distances. Once connected the following project types could possibly take advantage of Cisco MDS FCIP.

- Asynchronous Data Replication (SRDF/A)
- Host initiator to remote pooled storage (for Data Migrations purposes only)

7. Project Scope

This project will occur in (3) phases with this being phase I. The 3 phases are based on product releases and will occur with the following hardware releases from Cisco Corporation.

- Phase I (v1.0) – Certification of the 14/2 MPSM.
- **Phase II (v2.0) – Additional certification of the new 18/4 MPSM.**
- Phase III (v3.0) – Additional certification of the Cisco MDS 9222i switch.

For this phase of the project the following items will be in scope. These items will be tested, certified, and have a documented configuration delivered.

- Cisco SAN O.S.
- Cisco Fabric Manager
- FCIP Topologies
- 18/4 Multi-Protocol Service Module for Citigroup certified MDS 9000 products.
- Hardware based compression and encryption.
- FCIP TCP Optimization
- Cross-site VSANs
- Inter VSAN Routing
- Port Channels
- Write Acceleration
- Port Tracking
- Jumbo Frames¹

For further details on the phased implementation of this project refer to the [Project Road Map](#) section of this document.

¹ In v1.0 of the Cisco MDS FCIP Project, Global Network Engineering approved the use of Jumbo frames on all dedicated replication networks.

7.1 Cisco MDS FCIP Project Road Map

Implementation Schedule by feature functionality	N (v1.0)	N+1 (This Project) (v2.0)	N+2 (v3.0)
GDSE version	1.0	2.0	3.0
GDSE Project ETA	Q2 2007	Q1 2008	Q3 2008
SAN OS version	3.1.2	3.2.1a	4.X or TBD
Fabric Manager Version	3.1.2	3.2.2c	4.X or TBD
Device Manager Version	3.1.2	3.2.1a	4.X or TBD
Performance Manager	3.1.2	3.2.1a	4.X or TBD
Hardware Functionality			
Compression & Encryption ²	✓	✓	✓
14/2 MPSM	✓	✓	✓
18/4 MPSM		✓	✓
MDS 9222i			✓
Security			
ICQ Process ³	N/A	N/A	✓
Standard Build	N/A	N/A	✓
Software Functionality			
FCIP TCP/IP Optimization ⁴	✓	✓	✓
Inter VSAN Routing ⁵	✓	✓	✓
TE Ports/E-Port Trunking	✓	✓	✓
Write Acceleration	✓	✓	✓
Port Tracking	✓	✓	✓
FCIP QOS	✓	✓	✓
Jumbo Frames	TBD	✓	✓
Tape Read/Write Acceleration		TBD	TBD

² GDSE attempted to certify compression in Phase I of this project but a bug was found that would not allow line rate speeds when compression was enabled. GDSE will attempt to certify compression again because this bug was fixed in SAN O.S. 3.1.2b.

³ Since the MPSM cards are components of the Cisco MDS and the 9222i is an MDS, the components of this project will not go through the ICQ or standard build process. Instead it will be covered by the Cisco MDS FC Switch ICQ and Standard Build.

⁴ TCP/IP Optimization will include best practices for tuning the Rate Limiting, RTT, Jumbo frames, and SACK parameters.

⁵ Inter VSAN Routing will be required when connecting two fabrics that have any duplicate domain IDs. A best practice will be determined on if Inter VSAN Routing will be used when connecting fabrics without duplicate domain IDs.

8. Project Classification

This project is classified as “a2: Recertify” under the WTS Project Management System.

9. Project Deliverables

This project will result in the creation and of the following documents:

- **GDSE-07057-PS** – Cisco MDS FCIP v2.0 Project Scope (*This Document*)
- **GDSE-07057-SG** – Cisco MDS FCIP v2.0 Solutions Guide
- **GDSE-07057-RN** – Cisco MDS FCIP v2.0 Release Notes
- **Cisco Product Matrix** – Update or create this on the GDSE website

10. Project Prerequisites

A test environment will need to be created that can be used to test basic functionality of the Cisco MDS FCIP 18/4 Multi Protocol Services Modules (MPSM). Basic functionality tests will include tests such as configuration, basic operations, and path failures. A more complex test environment may be required to load test the 18/4 MPSM. The environment used for testing load should include a real network between the FCIP connections. In order to test load Citigroup may need to make use of the Cisco Lab Environments in North Carolina.

The following test equipment will need to be borrowed, procured, or provided by Cisco Corporation in order for Citigroup to perform functional testing in the SAN Lab.

- 14/2 Multi-Protocol Services Module
- 18/4 Multi-Protocol Services Module (*This project*)
- (2) DMX-4 frames with at least 30 LUNs for grouping
- Empirix Latency Simulator