UNH-IOL
FIBRE CHANNEL CONSORTIUM

Fabric Build
Interoperability Test Suite
Version 2.11

Technical Document

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MODIFICATION RECORD

August 19, 2001	(Version 1.0)	Initial version (Ryan Long)
October 12, 2001	(Version 1.1)	Fixed Test Setup. Edited Test Procedures (Ryan Long)
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Kurtis Kofler	UNH InterOperability Laboratory
Ryan Long	UNH InterOperability Laboratory
John Ogembo	UNH InterOperability Laboratory
David Woolf	UNH InterOperability Laboratory

INTRODUCTION

Overview
The University of New Hampshire's InterOperability Laboratory (IOL) is an institution designed to improve the interoperability of standards based products by providing an environment where a product can be tested against other implementations of a standard. This Fabric Build procedure has been developed to isolate communication issues within a Fabric environment. It should be clear that successful completion of this test process does not guarantee that the tested device will operate with other Fibre Channel devices. However, it does provide a good opportunity to observe the behavior of an Initiator, Target, and Switch in a multi-vendor, Fibre Channel Fabric. This test procedure primarily focuses on the implementation of the FC-DA, FC-GS-4, and FC-SW-3 standards.

Test Number and Title
The test number is given based on the order of the test within the test group. Groups are arranged according to similar test setups or similar observable results. The title is a basic description of the test.

Purpose
The purpose is a short statement describing what the test attempts to achieve. The test is written at the functional level.

References
The references section lists cross-references to the Fibre Channel standards and other documentation that might be helpful in understanding and evaluating the test and results.

Resource Requirements
The requirements section specifies the software, hardware, and test equipment that will be needed to perform the test. The items contained in this section are special test devices, software that must reside on the DUT, or other facilities that may not be available on all devices.

Last Modification
This specifies the date of the last modification to this test.

Discussion
The discussion covers the assumptions made in the design or implementation of the test as well as known limitations. Other items specific to the test are covered here. It also contains additional information that may be helpful in understanding the operation of the test.

Test Setup
The setup section describes in detail the configuration of the test environment and includes a block diagram for clarification as well as information such as the interconnection of devices, what monitoring equipment should capture, what the generation equipment should send, and any other configuration information vital to carrying out the test. Small changes in the configuration are included in the procedure section.

Procedure
The procedure section of the test description contains the step-by-step instructions for carrying out the test. It provides a cookbook approach to testing, and will often be interspersed with observable results.

Observable Results
The observable results section lists observables that can be examined by the tester to verify that the DUT is operating properly. When multiple values are possible for an observable, this section provides a short discussion on how to interpret them.

Possible Problems
This section provides some clues to look for if the test does not yield the expected results.

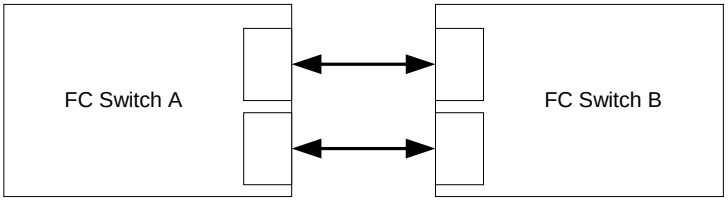
REFERENCES

The following documents are referenced in this text:

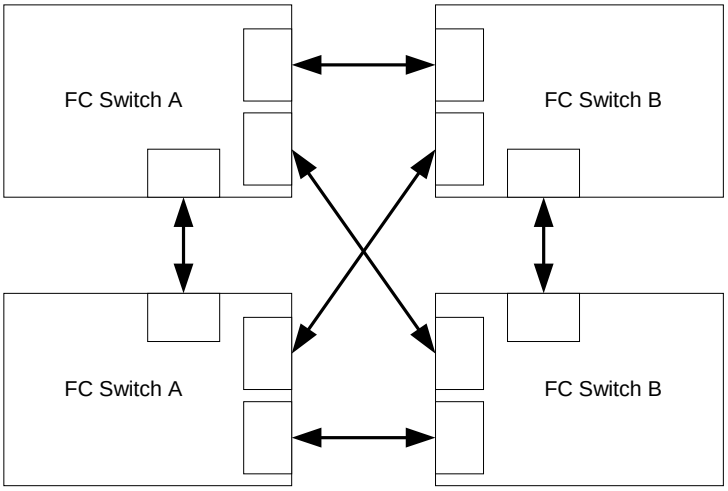
[1] T11/Project 1508-D/Rev 6.6 – Fibre Channel – Switch Fabric 3 – (FC-SW-3)
[2] T11/Project 1513-DT/Rev 3.1 – Fibre Channel – Device Attach (FC-DA)
[3] T11/Project 1505-D/Rev 7.91 – Fibre Channel – Generic Services 4 (FC-GS-4)

TEST SETUPS

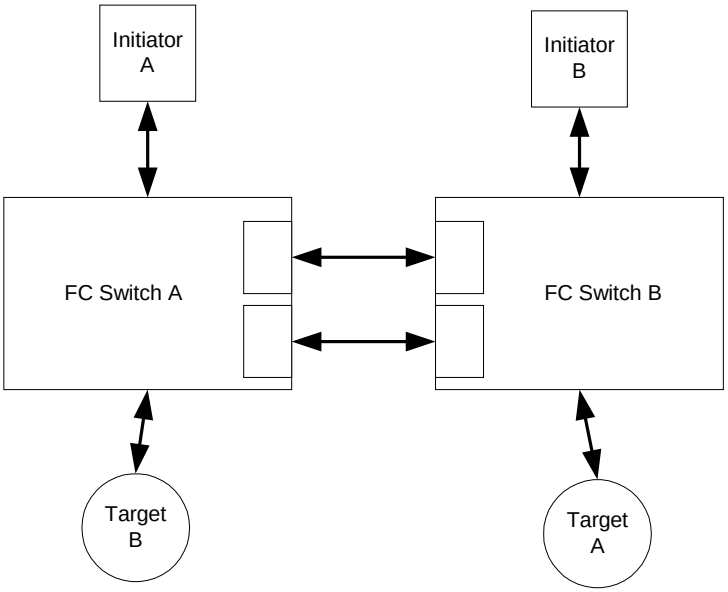
Test Setup 1 (Two switches):



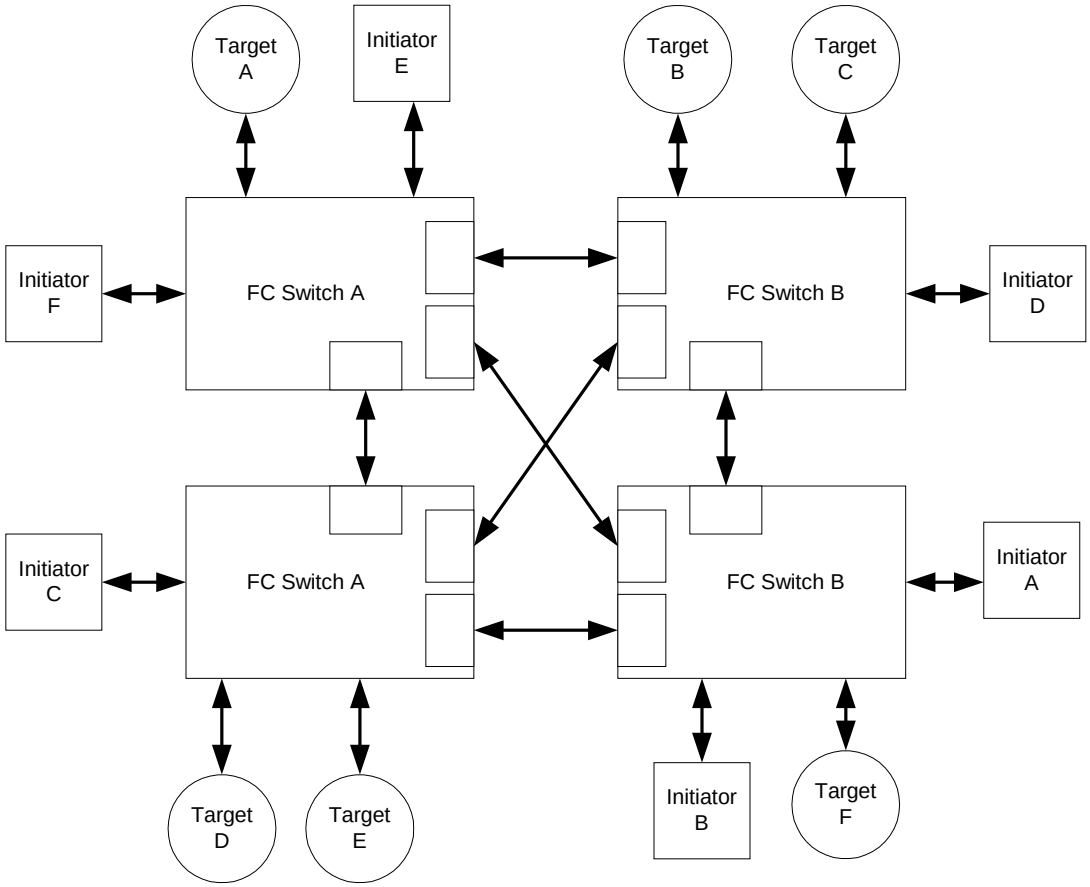
Test Setup 2 (example with 4 switches):



Test Setup 3 (example with 2 switches and 2 device pairs):



Test Setup 4 (example with 4 switches and 6 device pairs):



Group 1: E_Port to E_Port

Overview: The following tests cover the transitions made by a switch on power-on and on an ISL removal/reinsertion. The following tests must be completed on every switch in the Fabric. The goal of this group of tests is to build a Large Fabric.

Test 1.1: Initial Switch Power on

Purpose: To confirm proper switch initialization after power on.

References:

[1] FC-SW-3 – Clause 6
[2] FC-SW-3 – Clause 7
[3] Appendix A

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.

Last Modification: September 21, 2005

Discussion: An E_Port is the point at which a Switch is connected to another Switch to create a multi-Switch Fabric. Also, an E_Port is the point at which a Switch is connected to a Bridge device. It normally functions as a conduit between the Switches for frames destined for remote N_Ports and NL_Ports. An E_Port is also used to carry frames between Switches for purposes of configuring and maintaining the Fabric. An E_Port shall support the Class F service. An E_Port shall also be capable of routing one or more of the following classes of service: Class 1 service, Class 2 service, Class 3 service. An E_Port shall not admit to the Fabric any Primitive Sequences, or any Primitive Signals other than Idle, that the E_Port receives on its inbound fibre.

Test Setup: *Test Setup 1 or Test Setup 2.* All of the switches are powered off and all ISLs are connected.

Procedure:

1. Power on first switch.
2. Power on an additional switch. Verify the Observable Results below.
3. Repeat step 2 until all switches are powered on.

Observable results:

- Verify that each Switch is recognized in the management interface of the other Switch in the fabric.
- Verify Switch power on observable results as shown in Appendix A.

Possible Problems: None

Test 1.2: Inter-Switch Link Removal/Reinsertion

Purpose: To verify that when a switch attached to a Fabric has an ISL removed and reinserted, the Fabric remains stable.

References:

[1] FC-SW-3 – Clause 6
[2] FC-SW-3 – Clause 7
[3] Appendix A

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.
- A working, full-mesh Fabric of switches

Last Modification: September 21, 2005

Discussion: Inter-Switch Links (ISLs) are used by Switches to transmit and receive frames with other Switches. An ISL always connects one E_Port on a Switch to exactly one E_Port on another Switch.

Test Setup: *Test Setup 1 or Test Setup 2.* All of the switches are powered on and the Fabric is stable, with all switches recognizing all of the other switches on the Fabric.

Procedure:

For every switch on the Fabric:

1. Remove a switch ISL and verify that the fabric stabilizes.
2. After 2 seconds, reinsert the switch ISL and verify that the fabric stabilizes.
3. Repeat for each ISL on the switch.

Observable results:

- Verify that the fabric stabilized after the removal and reinsertion of the ISL.
- Verify that each Switch is recognized in the management interface of the other Switch in the fabric.
- Verify ISL removal and reinsertion observable results as shown in Appendix A.

Possible Problems: None

Group 2: Single Pair Testing

Overview: The following tests cover the transitions made by a pair of end devices when attached to the Large Fabric constructed in Group 1, and when an end device's connection is disrupted. The following group of tests must be completed for each end device pair. Each pair is tested independently, as the only device pair on the fabric.

Test 2.1: Addition of Target to Fabric

Purpose: To verify that upon the addition of a Target to a Fabric, the Fabric remains stable and each switch within the Fabric recognizes the Target.

References:

[1] FC-DA – Clause 4
[2] FC-SW-3 – Clause 6

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.
- A working, full-mesh Fabric of switches

Last Modification: October 17, 2005

Discussion: When a Target is added to the fabric, the fabric initializes properly with the attached Fx_Port and address resolution occurs. If there are other initiators attached to the fabric, the initiators shall complete PLOGI with affected Nx_Port.

Test Setup: *Test Setup 3 or Test Setup 4.* All of the switches and their end devices are stable and seen in the name server database of each switch.

Procedure:

1. Power on a Target.

Observable results:

Confirm that:

- The Target properly initializes with the attached Fx_Port. To confirm this, verify that:
  - The Fx_Port and Nx_Port achieve word synchronization.
  - If the Target is an N_Port, Link Initialization is completed.
  - If the Target is an NL_Port, Loop Initialization is completed.
  - The Target transmits FLOGI to the Fabric Controller.
  - The Fabric Controller transmits FLOGI ACC to the Target.
  - The Target transmits PLOGI to the Directory Server.
  - The Directory Server transmits PLOGI ACC to the Target.
  - The Target transmits the Register FC-4 Type Common Fibre Channel Service (RFC-4) to the Directory Server.
  - The Directory Server transmits an ACC to that RFC-4 request to the Target.
- Address Resolution occurs. To do this, confirm that:
  - The local Switch transmits Registered State Change Notification to the remote Switch.
  - The remote Switch transmits SW_ACC to that SW_RSCN.
  - Each Switch transmits RSCN to all devices registered for this service by transmitting State Change Registration (SCR) during the initialization phase.
  - If an Initiator queries the remote Switch for the nature of the state change, it forwards that request to the local Switch.
  - If the remote Switch queries the local the Switch for a new Address Map, the local Switch supports the request and responds to the query with correct information.
  - Each Switch responds to every Nx_Port who queried for the nature of the State Change.
- If there are other initiators attached to the Fabric, verify that each Initiator completes PLOGI with the affected Nx_Port.

Possible Problems: None.

Test 2.2: Addition of Initiator to Fabric

Purpose: To verify that upon the addition of an Initiator to a Fabric, the Fabric remains stable and each switch within the Fabric recognizes the Initiator.

References:

[1] FC-DA Clause 4
[2] FC-SW-3 – Clause 6

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.
- A working, full-mesh Fabric of switches
- A corresponding Target attached to the Fabric and powered on

Last Modification: October 17, 2005

Discussion: When the initiator is added to the fabric, the initiator initializes properly with the attached Fx_Port and address resolution occurs. Other initiators in the Fabric complete PLOGI with the affected Nx_Port.

Test Setup: *Test Setup 3 or Test Setup 4.* All of the switches and their end devices are stable and seen in the name server database of each switch.

Procedure:

1. Power on an Initiator.

Observable results:

Confirm that:

- The Initiator properly initializes with the attached Fx_Port. To confirm this, verify that:
  - The Fx_Port and Initiator achieve word synchronization.
  - Link or Loop Initialization is completed.
  - The Initiator transmits FLOGI to the Fabric Controller.
  - The Fabric Controller transmits FLOGI ACC to the Initiator.
  - The Initiator transmits PLOGI to the Directory Server.
  - The Directory Server transmits PLOGI ACC to the Initiator.
  - The Initiator transmits RFC-4 to the Directory Server.
  - The Directory Server transmits an RFC-4 ACC to the Initiator.
  - The Initiator transmits an SCR request to the Fabric Controller.
  - The Fabric Controller responds by transmitting an SCR ACC to the Initiator.
- Address Resolution occurs. To do this, confirm that:
  - The local Switch transmits SW_RSCN to the remote Switch.
  - The remote Switch transmits SW_ACC to that SW_RSCN.
  - Each Switch transmits RSCN to all devices registered for this service by transmitting SCR during the initialization phase.
  - If an Initiator queries the remote Switch for the nature of the state change, it forwards that request to the local Switch.
  - If the remote Switch queries the local Switch for a new Address Map, the local Switch supports the request and responds to the query with correct information.
  - Each Switch responds to every Nx_Port who queried for the nature of the State Change.
- If there are other initiators attached to the Fabric, verify that each Initiator completes PLOGI with the affected Nx_Port.
- The host machine for the initiator should show all Targets currently attached to the Fabric in the OS device management.

Possible Problems: None.

Test 2.3: End Device Fiber Removal/Reinsertion

Purpose: To verify that when an end devices connection to the Fabric is removed and reinserted, traffic running on the pair that includes that end device does not terminate indefinitely.

References:

[1] FC-DA – Clause 4

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.
- A working, full-mesh Fabric of switches
- A working pair of Initiator/Target on the Fabric

Last Modification: October 17, 2005

Discussion: When end devices are unplugged from a fabric, notifications will be send to each switch in a fabric and all end devices that have registered to receive such notifications. The same will occur when a device is reintroduced to the fabric. When the Nx_Port properly initializes with the attached Fx_Port, it should become visible to all other switches and registered end devices in the fabric.

Test Setup: *Test Setup 3 or Test Setup 4.* All of the switches and their end devices are stable and seen in the name server database of each switch.

Procedure:

1. Start SCSI I/Os with the end device pair being tested.
2. Remove the connection of the Initiator end device from the fabric for 2 seconds and then reattach the connection to the fabric. Check Observable Results.
3. Remove the connection of the Target end device from the fabric for 2 seconds and then reattach the connection to the fabric. Check Observable Results.

Observable results:

When an end device on a fabric has its fiber removed and reinserted, the following should be seen:

- The unplugged Nx_Port properly initializes with the attached Fx_Port. To confirm this, verify that:
    - The Fx_Port and Nx_Port achieve word synchronization.
    - If the Nx_Port is an N_Port, Link Initialization is completed.
    - If the Nx_Port is an NL_Port, Loop Initialization is completed.
    - The Nx_Port transmits FLOGI to the Fabric Controller.
    - The Fabric Controller transmits FLOGI ACC to the Nx_Port.
    - The Nx_Port transmits PLOGI to the Directory Server.
    - The Directory Server transmits PLOGI ACC to the Nx_Port.
    - The Nx_Port transmits RFC-4 to the Directory Server.
    - The Directory Server transmits an RFC-4 ACC to the Nx_Port.
    - If the Nx_Port is an initiator, it transmits an SCR request to the Fabric Controller.
    - The Fabric Controller responds by transmitting an SCR ACC to the Initiator.

- Confirm that the SCSI I/Os continue to run after the reattachment of each end device's connection to the analyzer. Verify that all end devices on the Fabric are still visible in the name server database of each switch.

Possible Problem: None.

Test 2.4: End Device Switch Port Change

Purpose: To verify that when an end device's connection to the Fabric is removed and reinserted to another Fx_Port on the same switch that is was previously attached to, traffic running on the pair that includes that end device does not terminate indefinitely.

References:

[1] FC-DA – Clause 5

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.
- A working, full-mesh Fabric of switches
- A working pair of Initiator/Target on the Fabric

Last Modification: October 17, 2005

Discussion: When end devices are unplugged from a fabric, notifications will be send to each switch in a fabric and all end devices that have registered to receive such notifications. The same will occur when a device is reintroduced to the fabric. When the Nx_Port properly initializes with the attached Fx_Port, it should become visible to all other switches and registered end devices in the fabric.

Test Setup: *Test Setup 3 or Test Setup 4.* All of the switches and their end devices are stable and seen the name server database of each switch.

Procedure:

1. With the end device pair, start SCSI I/Os.
2. Remove the connection of the Initiator end device for 2 seconds and then reattach the connection to a different Fx_Port on the switch that the Initiator end device was previously attached. Check the Observable Results.
3. Remove the connection of the Target end device for 2 seconds and then reattach the connection to a different Fx_Port on the switch that the Target end device was previously attached. Check the Observable Results.

Observable results:

- The unplugged Nx_Port properly initializes with the attached Fx_Port. To confirm this, verify that:
    - The Fx_Port and Nx_Port achieve word synchronization.
    - If the Nx_Port is an N_Port, Link Initialization is completed.
    - If the Nx_Port is an NL_Port, Loop Initialization is completed.
    - The Nx_Port transmits FLOGI to the Fabric Controller.
    - The Fabric Controller transmits FLOGI ACC to the Nx_Port.
    - The Nx_Port transmits PLOGI to the Directory Server.
    - The Directory Server transmits PLOGI ACC to the Nx_Port.
    - The Nx_Port transmits RFC-4 to the Directory Server.
    - The Directory Server transmits an RFC-4 ACC to the Nx_Port.
    - If the Nx_Port is an initiator, it transmits an SCR request to the Fabric Controller.
    - The Fabric Controller responds by transmitting an SCR ACC to the Initiator.
- Confirm that the SCSI I/Os continue to run after the reattachment of each end device's connection to the analyzer. Verify that all end devices on the Fabric are still visible in the name server database of each switch.

Possible Problems: None.

Group 3: Multiple Pair Testing

Overview: The following tests cover the transitions made by multiple end devices attached to a fabric when their connections are disrupted. All functioning end device pairs tested in Group 2 should be added to the fabric before any of the tests in Group 3 are performed. All end device pairs should be powered on and recognized by each switch in the Large Fabric. The following tests must be completed for every Initiator/Target pair on the Fabric while every other Initiator/Target pair is connected across the Fabric.

Test 3.1: End Device Connection Removal/Reinsertion Disruption

Purpose: To verify that when an end devices connection to the Fabric is removed and reinserted, traffic running on the pair that includes that end device and all other pairs does not terminate indefinitely.

References:

[1] FC-DA – Clause 4

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.
- A working, full-mesh Fabric of switches
- A working pair of Initiator/Target on the Fabric

Last Modification: October 17, 2005

Discussion: When end devices are unplugged from a fabric, notifications will be send to each switch in a fabric and all end devices that have registered to receive such notifications. The same will occur when a device is reintroduced to the fabric. When the Nx_Port properly initializes with the attached Fx_Port, it should become visible to all other switches and registered end devices in the fabric.

Test Setup: *Test Setup 3 or Test Setup 4.* All of the switches and their end devices are stable and seen in all of the switches name server databases.

Procedure:

1. With all pairs, start SCSI I/Os.
2. Verify that traffic is running across the Fabric on all pairs.
3. Remove the connection of the Initiator end device from the fabric for 2 seconds and then reattach the connection to the fabric. Check Observable Results.
4. Remove the connection of the Target end device from the fabric for 2 seconds and then reattach the connection to the fabric. Check Observable Results.
5. Repeat for each end device pair.

Observable results:

- Confirm that the unplugged Nx_Port properly initializes with the attached Fx_Port. To confirm this, verify that:
    - The Fx_Port and Nx_Port achieve word synchronization.
    - If the Nx_Port is an N_Port, Link Initialization is completed.
    - If the Nx_Port is an NL_Port, Loop Initialization is completed.
    - The Nx_Port transmits FLOGI to the Fabric Controller.
    - The Fabric Controller transmits FLOGI ACC to the Nx_Port.
    - The Nx_Port transmits PLOGI to the Directory Server.
    - The Directory Server transmits PLOGI ACC to the Nx_Port.
    - The Nx_Port transmits RFC-4 to the Directory Server.
    - The Directory Server transmits an RFC-4 ACC to the Nx_Port.
    - If the Nx_Port is an initiator, it transmits an SCR request to the Fabric Controller.
    - The Fabric Controller responds by transmitting an SCR ACC to the Initiator.
- Confirm that the SCSI I/Os continue to run on all pairs after the reattachment of each end device's fiber connection to the analyzer. Verify that all end devices on the Fabric are still visible in the name server databases of all the Fabric switches.

Possible Problems: None.

Test 3.2: End Device Switch Port Change Disruption

Purpose: To verify that when an end devices fiber connection to the Fabric is removed and reinserted to another Fx_Port on the same switch that is was previously attached to, traffic running on the pair that includes that end device and all other pairs does not terminate indefinitely.

References:

[1] FC-DA – Clause 4

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.
- A working, full-mesh Fabric of switches
- A working pair of Initiator/Target on the Fabric

Last Modification: October 17, 2005

Discussion: When end devices are unplugged from a fabric, notifications will be send to each switch in a fabric and all end devices that have registered to receive such notifications. The same will occur when a device is reintroduced to the fabric. When the Nx_Port properly initializes with the attached Fx_Port, it should become visible to all other switches and registered end devices in the fabric.

Test Setup: *Test Setup 3 or Test Setup 4.* All of the switches and their end devices are stable and seen in all of the switches name server databases.

Procedure:

1. With all pairs, start SCSI I/Os.
2. Verify that traffic is running across the Fabric on all pairs.
3. Remove the connection of the Initiator end device for 2 seconds and then reattach the connection to a different Fx_Port on the switch that the Initiator end device was previously attached. Check the Observable Results.
4. Remove the connection of the Target end device for 2 seconds and then reattach the connection to a different Fx_Port on the switch that the Target end device was previously attached. Check the Observable Results.
5. Repeat for each end device pair.

Observable results:

- The unplugged Nx_Port properly initializes with the attached Fx_Port. To confirm this, verify that:
    - The Fx_Port and Nx_Port achieve word synchronization.
    - If the Nx_Port is an N_Port, Link Initialization is completed.
    - If the Nx_Port is an NL_Port, Loop Initialization is completed.
    - The Nx_Port transmits FLOGI to the Fabric Controller.
    - The Fabric Controller transmits FLOGI ACC to the Nx_Port.
    - The Nx_Port transmits PLOGI to the Directory Server.
    - The Directory Server transmits PLOGI ACC to the Nx_Port.
    - The Nx_Port transmits RFC-4 to the Directory Server.
    - The Directory Server transmits an RFC-4 ACC to the Nx_Port.
    - If the Nx_Port is an initiator, it transmits an SCR request to the Fabric Controller.
    - The Fabric Controller responds by transmitting an SCR ACC to the Initiator.
- Confirm that the SCSI I/Os continue to run on all pairs after the reattachment of each end device's fiber connection to the analyzer. Verify that all end devices on the Fabric are still visible in the name server databases of all the Fabric switches.

Possible Problems: None

Group 4: ISL Disruption.

Overview: The following tests cover the transitions that are made when a populated fabric has its switch ISLs disrupted. The following test must be completed on every ISL in the Fabric.

Test 4.1: Switch ISL Removal/Reinsertion on Populated Fabric

Purpose: To verify that when a switch attached to a Fabric has an ISL removed and reinserted, traffic that was running on the Fabric continues to run.

References:

[1] FC-SW-3 – Clause 6
[2] FC-SW-3 – Clause 7
[3] Appendix A

Resource Requirements:

- Analyzer to capture Primitive Signals, Primitive Sequences, FC-2 layer frames, and errors.
- A working, full-mesh Fabric of switches
- Working pairs of Initiator/Target on the Fabric

Last Modification: October 17, 2005

Discussion: Inter-Switch Links (ISLs) are used by Switches to transmit and receive frames with other Switches. An ISL always connects exactly one E_Port on a Switch to exactly one E_Port on another Switch. In a full mesh fabric configuration the removal of one ISL in the fabric should not cause traffic between end device to cease, rather the fabric should re-route traffic to the working ISLs within the fabric such that traffic between end devices can continue.

Test Setup: *Test Setup 3 or Test Setup 4.* All of the switches and their end devices are stable and seen in the name server database of each switch.

Procedure:

For every switch on the Fabric:

1. With all end device pairs, start SCSI I/Os.
2. Verify that traffic is running across the Fabric on all end device pairs.
3. Remove a switch ISL and verify that the SCSI I/Os continue to run.
4. After 2 seconds, reinsert the switch ISL and verify that SCSI I/Os continue to run.
5. Repeat for each ISL on the switch.

Observables:

- Verify the ISL observables as shown in Appendix A.
- Confirm that the SCSI I/Os continue to run on all pairs after the removal and reattachment of the ISL.
- Verify that the name server database on each switch continues to contain all end devices and that each switch is seen in the management interface of all switches.

Possible Problems: None

APPENDICES:

Appendix A:
The following is observed during switch power on and ISL removal and reinsertion.

1) Each switch port achieves word synchronization.
2) Each port comes up as E_Port operational. To confirm this, verify that:
   a) Link initialization is attempted and completed.
   b) Exchange Link Parameter (ELP) Switch_Interlink_Service (SW_ILS) is sent from one switch to another.
   c) If the switches do not transmit ELP at the same time, both Ports agree on the operating conditions and SW_ACC is sent from the responder of the ELP SW_ILS to the originator.
   d) If each switch transmits ELP at the same time, the switch with a lower Switch_Name transmits SW_RJT and the switch with a higher Switch_Name transmits SW_ACC.
   e) No FLOGI's are transmitted during this exchange.
   f) The originator of the ELP SW_ILS performs the Link Reset Protocol.
   g) The Link Reset Protocol completes.
   h) If both Ports support Exchange Switch Capabilities (ESC), the ELP originator shall become the ESC originator and the ELP responder shall become the ESC responder. Verify that:
      i. The originator transmits ESC SW_ILS.
      ii. If the receiving switch does not support any of the protocols listed in the ESC SW_ILS, it responds with a SW_RJT and a reason code of "Unable to perform command request"
      iii. If the receiving switch does support one of the protocols listed, it chooses a single protocol from the list presented in the ESC SW_ILS and responds with this protocol in the payload of the ESC SW_ACC.
3) A Principal Switch is selected. To confirm this, verify that:
   a) Build Fabric (BF) or Reconfigure Fabric (RCF) is generated.
      i. SW_ACC is sent back to the originator.
      ii. F_S_TOVexpires.
   b) Exchange Fabric Parameters (EFP) is completed.
4) Address Distribution occurs. To confirm this, verify that:
   a) The Principal Switch granted itself a Domain_ID and generated an EFP SW_ILS request that includes the Principal Switch Switch Priority and Switch Name in the Domain_ID List.
   b) The Non-principal Switch transmits an SW_ACC to the EFP SW_ILS request.
   c) The Principal Switch transmits a Domain Identifier Assigned (DIA) request.
   d) The Non-principal Switch transmits an SW_ACC to the DIA SW_ILS request.
   e) The Non-principal Switch transmits a Request Domain_ID (RDI).
   f) The Principal Switch grants the non-principal Switch a Domain_ID in its SW_ACC to the RDI SW_ILS.
   g) The Principal Switch transmits an EFP SW_ILS request with a Domain_ID List that includes both the Principal Switch and the Non-principal Switch.
   h) The Non-principal Switch transmits an SW_ACC to the received EFP SW_ILS request with a Domain_ID List that includes both the Principal Switch and the Non-principal Switch.
5) The link is maintained. To confirm this, verify that:
   a) Hello (HLO) frames are transmitted every hello interval.
6) The link database is maintained. To confirm this, verify that:
   a) Link State Updates (LSU) are transmitted consistently at an appropriate time interval determined by each port.