

C-01 Switch Failover Test

ENGINEER: _____

DATE: _____

COMMENTS:

This test was supplanted by V02_DCOpen_node

C-01 Switch Failover Test

The CISCO Systems 3750 switches are equipped with the Stackwise redundancy feature which allows the backplanes of 2 switches to be connected with "cross connect" cables. This feature allows the switching fabric of each switch to be combined into one logical switching fabric.

The CISCO Systems 3750 switches employ ether-channel technology. This allows the bundling of more than one of the optical channels into one logical channel. \

- > The channels in the bundle may encompass more than one switch.
- > Due to the limited scope of the MARS node implementation we do not have extra ethernet optical links for inclusion into an etherchannel

If a single channel in the etherchannel bundle fails, the switch should continue to operate and route data at a throughput commensurate with the remaining channels in the bundle without interrupting end to end traffic. This need not be tested for MARS since it only uses a single ethernet link per channel as mentioned above.

If the complete etherchannel fails interrupting the optically routed path out of one switch, traffic from devices connected to that switch is routed via the second switch and its ether channel. This scenario is shown on the following page.

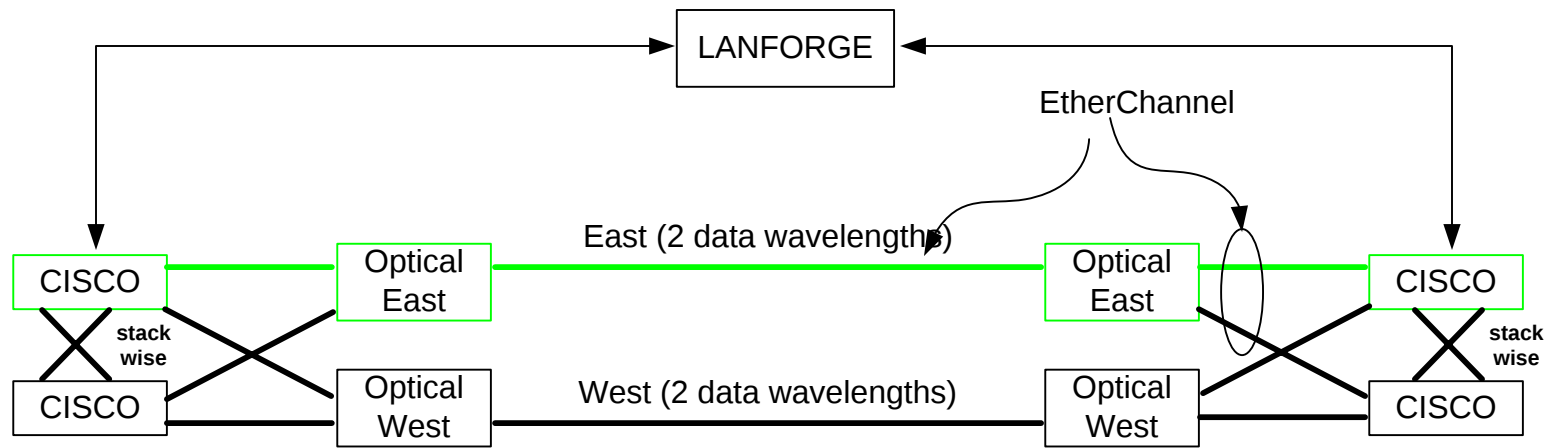
If a complete 3750 fails on either the shore or sea side the data should continue to flow over the second switch

The required equipment for this test is:

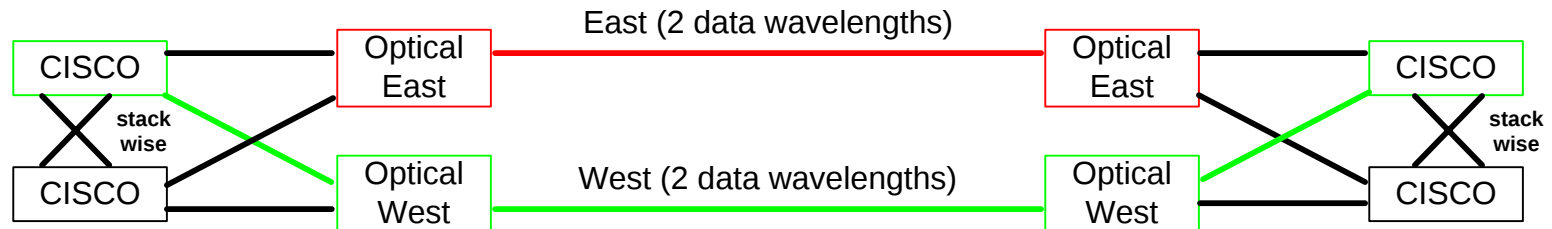
- 1) LanForge or equivalent high volume data generator to act as a scientific instrument
- 2) 2 pairs (2 shore and 2 sea) of 3750 CISCO Switches with cross connects installed.

MARS
Org: WHOI
Engr: Fritz Sonnichsen
Date: 03/15/05

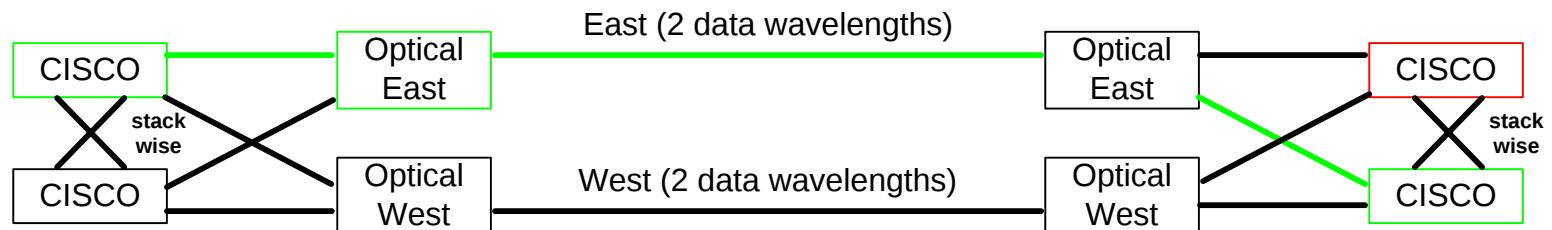
C-01 Switch Failover Modes Schematic



NORMAL



FAILED EAST Optical PATH (either Fiber or 1 Switch)



FAILED EAST ROUTER

SHORE
Node 91

SEA
node 1

Procedure:

1) The sea and shore nodes will be set up for normal operation including all optical equipment, EDFAs and 50km of fiber. The latter will introduce time delays typical of MARS to exercise the timing delays of the rouing tables.

2) Connect the switches as shown on the following page. The figure shows schematics for the optical assemblies. These must be constructed per the actual MARS fibering documents.

3) Configure the 4 switches according to CISCO. Download the 2 configurations and store it in the data section of this document

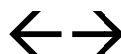
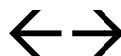
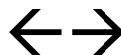
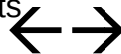
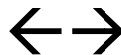
4) Configure the LanForge to have 6 dataflows.

10.91.11.100	10.1.11.101	001 Mbps
10.91.11.100	10.1.12.101	005 Mbps
10.91.11.100	10.1.13.101	010 Mbps
10.91.11.100	10.1.14.101	020 Mbps
10.91.11.100	10.1.15.101	100 Mbps
10.91.11.100	10.1.16.101	500 Mbps

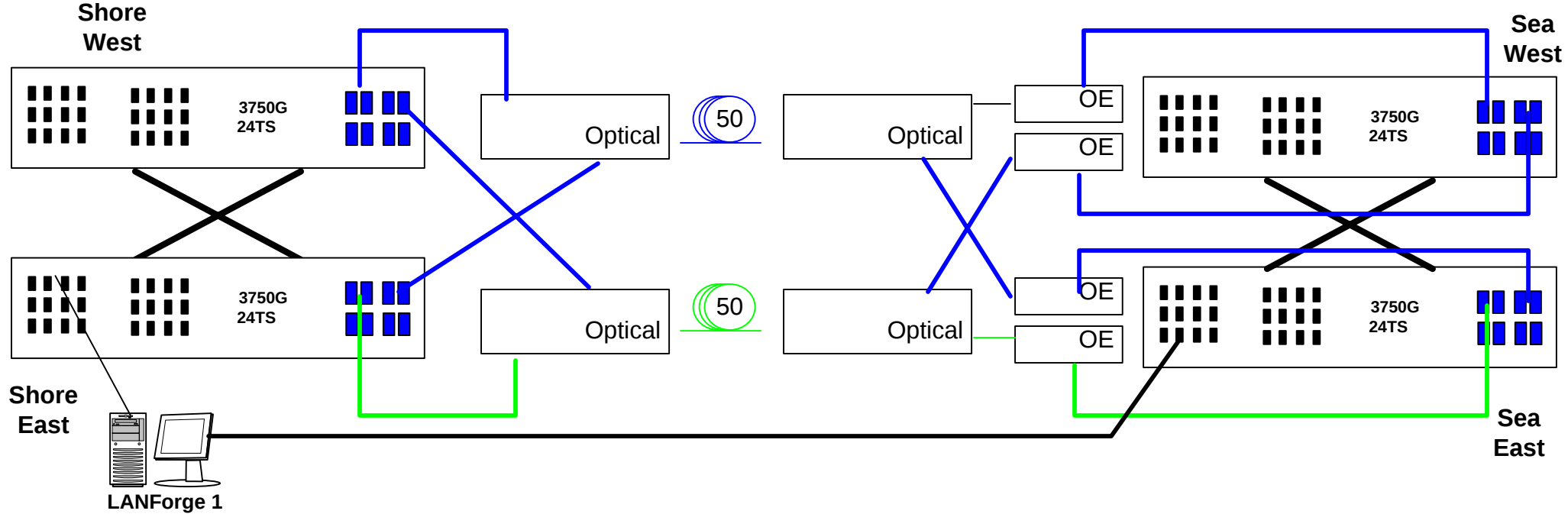
5) Start the LanForge. Using CISCO DISPLAY commands, insure that data is being properly routed via the Etherchannel on both fibers. Record the DISPLAY output in the data section.

6) Now proceed as the following setup sheets indicate. Each test will simulate failure of a key link or piece of equipment. It is important to do this since a failure in one downnstream component may not necessarily appear as a failure to the router. After doing the test for each setup record the outcome in the attached data sheets. For each sheet you will need to:

- 1) Reset the LanForge Stats
- 2) Run the LanForge for 1 minute
- 3) Fail the concerned device
- 4) Run 2 more minutes
- 5) Stop the LanForge and record the stats



C-01 Switch Failover Test - NORMAL OPERATION



C01-Failover

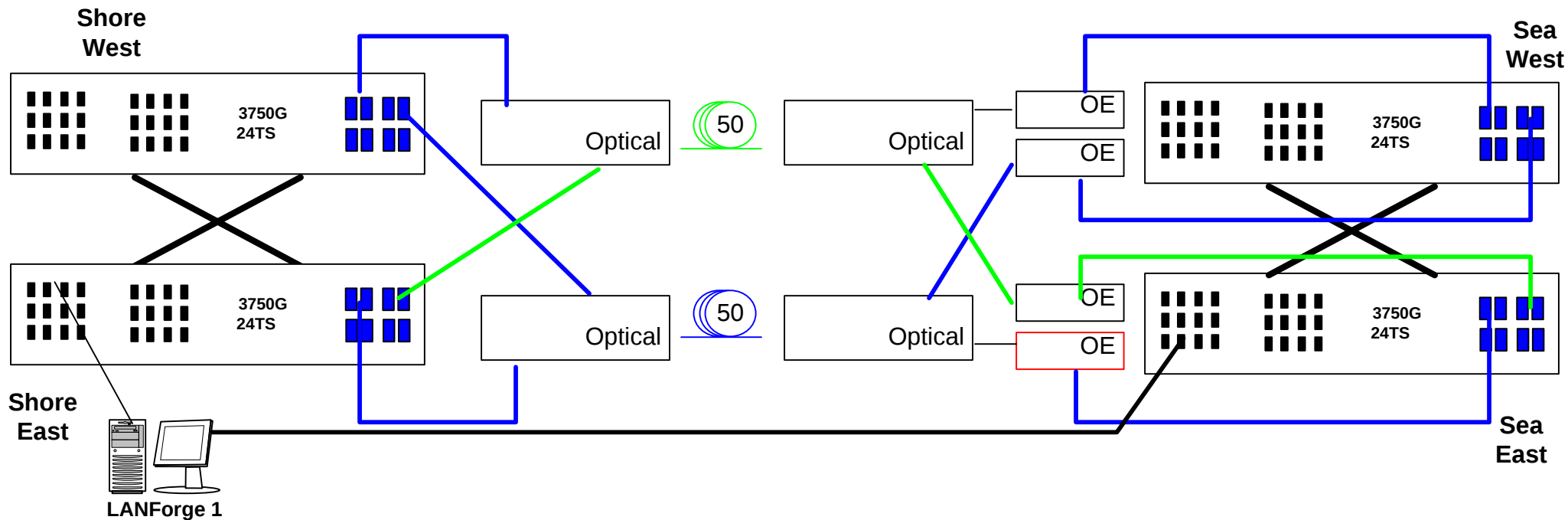
Purpose of Test:

To measure the recovery time of the data transfer after an optical or router failure, This setup is the default "NORMAL" setup.

Procedure:

Connect the equipment as shown. Use the MARS fibering diagrams for the optical details. DISPLAY and record each router configuration and store the output in the data sheets at the end of this document.

C-01 Switch Failover Test - FAILED OPTICAL PATH - OE



C01-Failover

Purpose of Test:

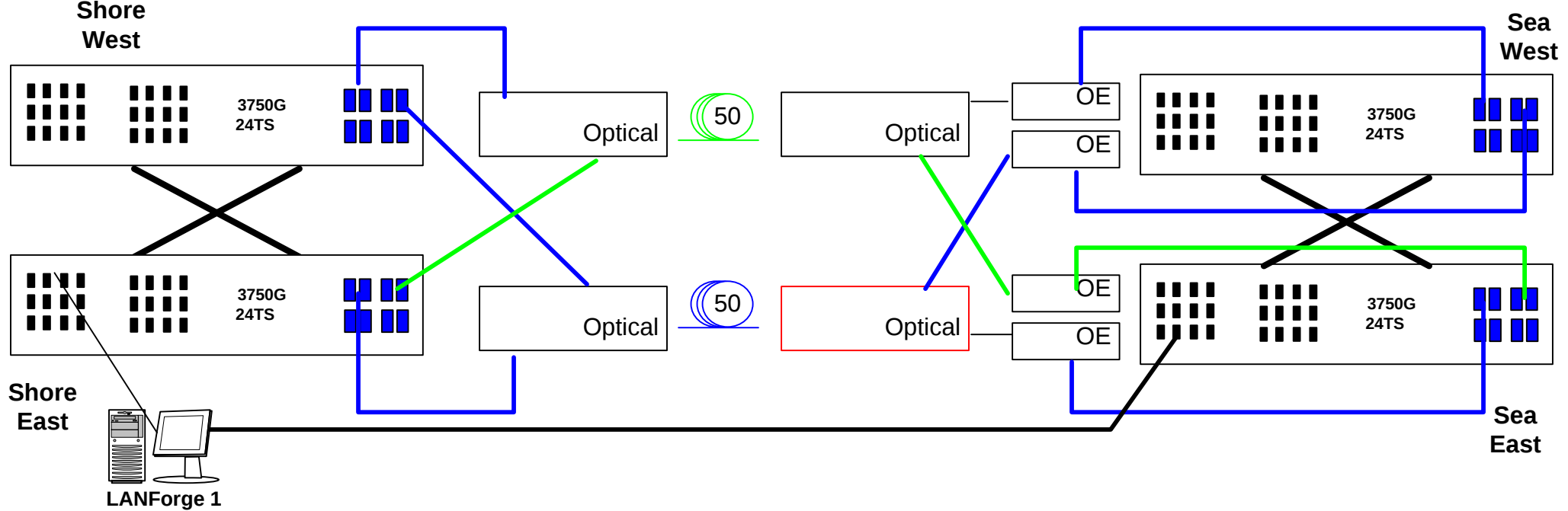
To measure the recovery time of the data transfer after a failure of an OE converter

Procedure:

Disable the OE converter (red). Measure failover time to resume rerouted traffic at LANFORGE

Enable OE converter. Measure recovery time resume normal traffic at LANFORGE.

C-01 Switch Failover Test - FAILED OPTICAL PATH - NE MRTR



C01-Failover

Purpose of Test:

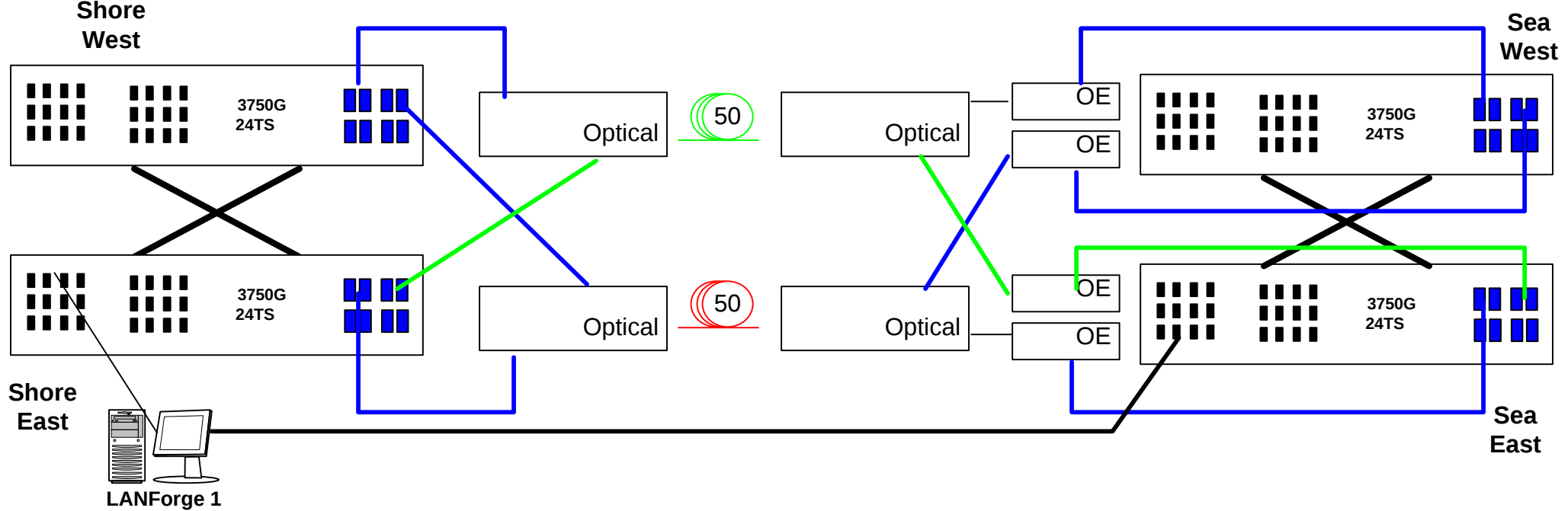
To measure the recovery time of the data transfer after a failure of an NE MRTR card

Procedure:

Unseat the NE MRTRd. Measure failover time to resume rerouted traffic at LANFORGE

Reseat the NE MRTRd. Measure recovery time resume normal traffic at LANFORGE.

C-01 Switch Failover Test - FAILED OPTICAL PATH - Submarine Cable Failure



C01-Failover

Purpose of Test:

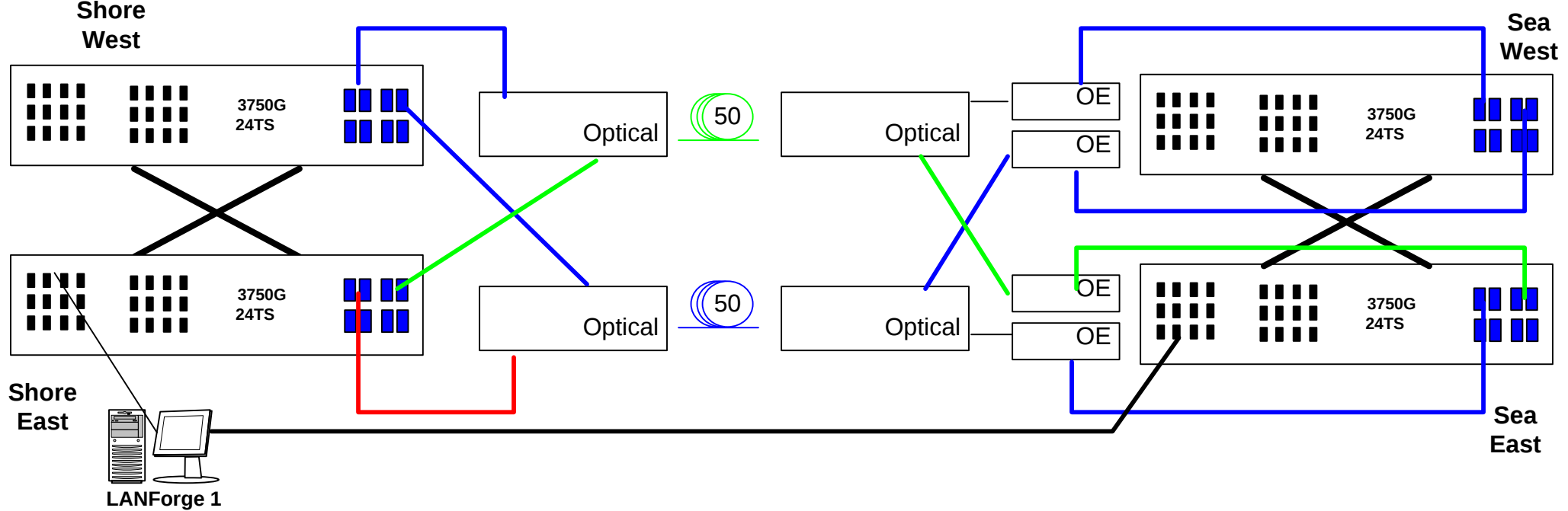
To measure the recovery time of the data transfer after a failure of the subsea cable

Procedure:

Disconnect the 50km spool of fiber (red). Measure failover time to resume rerouted traffic at LANFORGE

Reconnect the 50km spool of fiber (red). . Measure recovery time resume normal traffic at LANFORGE.

C-01 Switch Failover Test - FAILED OPTICAL PATH - Shore optical connection



C01-Failover

Purpose of Test:

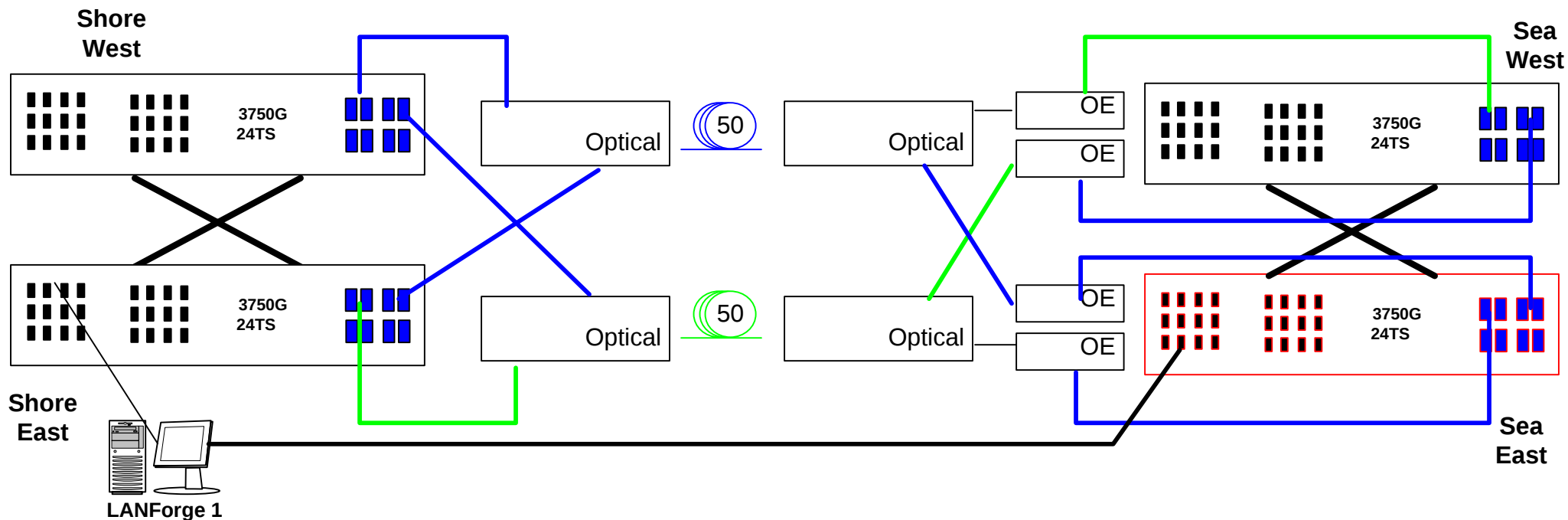
To measure the recovery time of the data transfer after a failure of an shore optical connection

Procedure:

Disconnect the jumper from the shore 3750 SFP. Measure failover time to resume rerouted traffic at LANFORGE

Reconnect the jumper from the shore 3750 SFP. Measure recovery time resume normal traffic at LANFORGE.

C-01 Switch Failover Test - FAILED SWITCH- SEA 3750 Failure



C01-Failover

Purpose of Test:

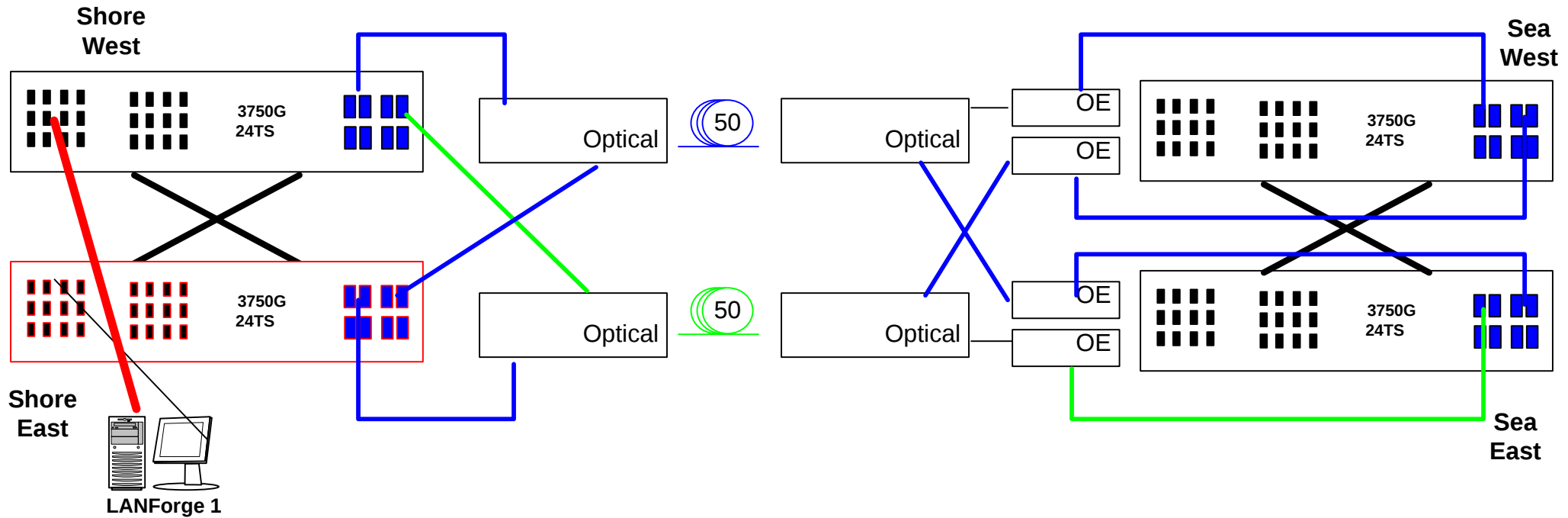
To measure the recovery time of the data transfer after a failure of a sea CISCO router

Procedure:

Power down the East 3750. Move the LANFORGE CAT5 cable to the West 3750. Measure failover time to resume rerouted traffic at LANFORGE.

Restart the 3750. Move the LANFORGE CAT5 cable back. Measure recovery time resume normal traffic at LANFORGE.

C-01 Switch Failover Test - FAILED SWITCH- SHORE 3750 Failure



C01-Failover

Purpose of Test:

To measure the recovery time of the data transfer after a failure of a shore CISCO router

Procedure:

Power down the East 3750. Move the LANFORGE CAT5 cable to the West 3750. Measure failover time to resume rerouted traffic at LANFORGE.

Restart the 3750. Move the LANFORGE CAT5 cable back. Measure recovery time resume normal traffic at LANFORGE.

C-01 Switch Failover Test

ROUTER CONFIGURATION - Shore East

C-01 Switch Failover Test

ROUTER CONFIGURATION - Shore West

C-01 Switch Failover Test

ROUTER CONFIGURATION - Sea East

C-01 Switch Failover Test

ROUTER CONFIGURATION - Sea West

C-01 Switch Failover Test

OUTPUT of NORMAL Ether Channel Display

C-01 Switch Failover Test

Record Outcome of One Fiber Loss

OUTPUT of Partially Failed Ether Channel Display (one fibre down)

Record Outcome of Complete Channel Loss

OUTPUT of Fully Failed Ether Channel Display (All fibres down)