

Applications Note

Configuring HDS AMS and UPS Storage Arrays with the QLogic iSR6250 Router, HUR, and TrueCopy for FCIP

Products Affected

Description	Part Number
QLogic iSR6250 Intelligent Storage Router	6250-C12-B-HD-S
QLogic FCIP for Single Blade	LK6200-1FCIP-HD
QLogic FCIP for Dual Blade	LK6200-2FCIP-HD

1 Introduction

This applications note provides step-by-step instructions for connecting two Fibre Channel storage area networks (SANs): the Hitachi Data Systems® (HDS) Adaptable Modular Storage (AMS) and Universal Storage Platform (USP). The configuration uses the Fibre Channel over IP (FCIP) routing feature of the QLogic iSR6250 Intelligent Storage Router (iSR6250), the Hitachi Universal Replicator (HUR), and Hitachi TrueCopy® Remote Replication software for FCIP. The iSR6250 provides the inter-switch link (ISL) between the Fibre Channel switches to connect the Fibre Channel switches (SANs) in a merged or non-merged configuration. The example in this document shows how to link two Fibre Channel SANs for data replication.

2 Configuration Examples

This applications note refers to the following configurations:

- QLogic iSR6250 FCIP merged configuration to E_Port extension, high availability (HA) configuration ([Figure 2-1](#))
- QLogic iSR6250 FCIP non-merged configuration to F_Port extension, HA configuration ([Figure 2-2](#))
- Both merged and non-merged SANs, referred to as *local* and *remote* configurations

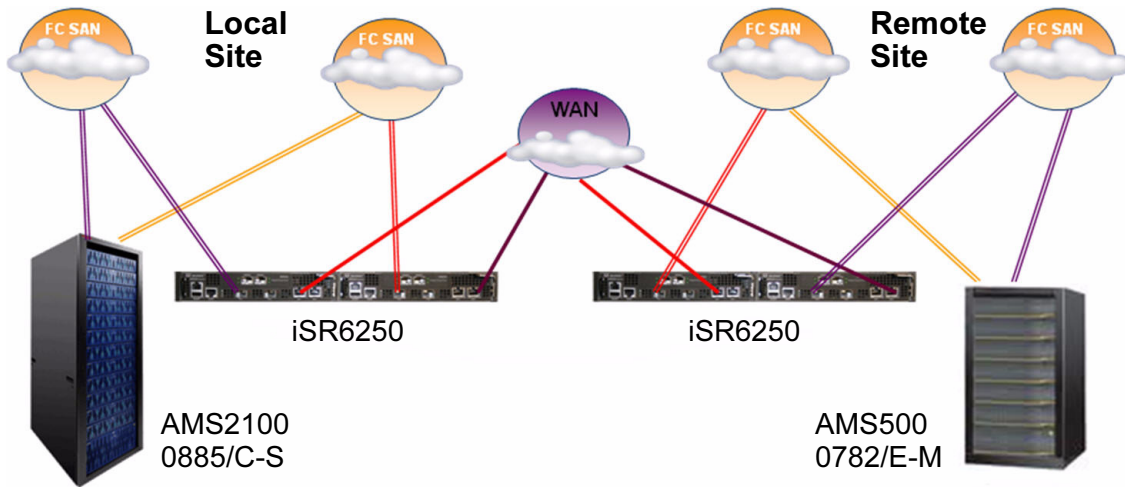


Figure 2-1. FCIP Merged, E_Port Extension, HA Configuration

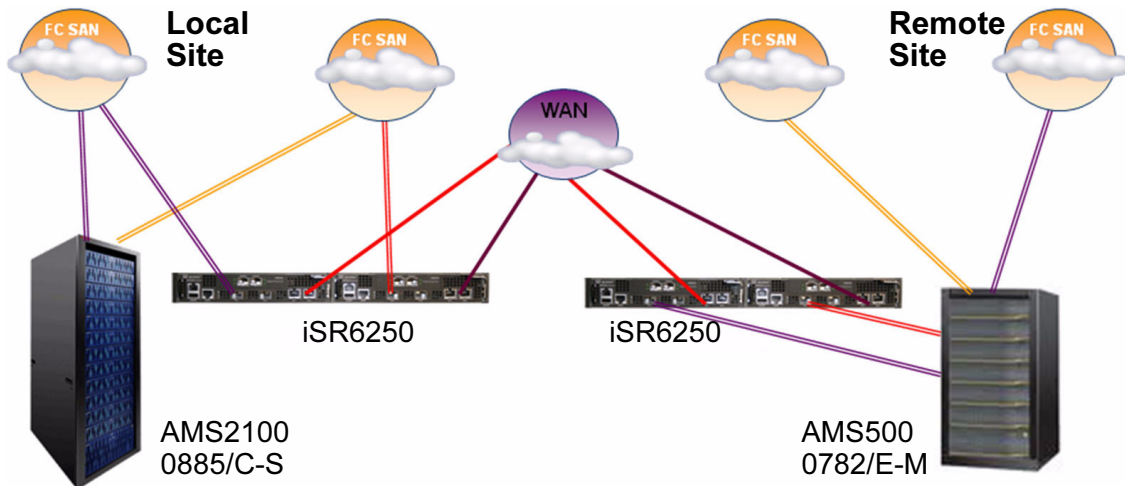


Figure 2-2. FCIP Non-Merged, F_Port Extension, HA Configuration

3 Configuring iSR6250 FCIP for HDS Storage Arrays

1. Gather the following information required to configure the iSR6250 routers (refer to the topology diagrams shown in [Figure 2-1](#) and [Figure 2-2](#)):

a. Local router management port:

IP address _____ . _____ . _____ . _____
Subnet mask _____ . _____ . _____ . _____
Gateway _____ . _____ . _____ . _____

b. Remote router management port:

IP address _____ . _____ . _____ . _____
Subnet mask _____ . _____ . _____ . _____
Gateway _____ . _____ . _____ . _____

c. Local router GbE ports to be used in FCIP connections:

GE1 IP address _____ . _____ . _____ . _____
GE1 subnet mask _____ . _____ . _____ . _____
GE1 gateway _____ . _____ . _____ . _____
GE2 IP address _____ . _____ . _____ . _____
GE2 subnet mask _____ . _____ . _____ . _____
GE2 gateway _____ . _____ . _____ . _____

d. Remote router GbE ports to be used in FCIP connections:

GE1 IP address _____ . _____ . _____ . _____
GE1 subnet mask _____ . _____ . _____ . _____
GE1 gateway _____ . _____ . _____ . _____
GE2 IP address _____ . _____ . _____ . _____
GE2 subnet mask _____ . _____ . _____ . _____
GE2 gateway _____ . _____ . _____ . _____

2. Install the SANSurfer® Router Manager utility on your workstation. For details, refer to the *iSR6200 Intelligent Storage Router Installation Guide*.

3. Configure the iSR6250 routers as follows:

a. Set up the management IP address, subnet mask, and gateway.

b. Set the time and date. (Or, the time and date are set up automatically when SANSurfer Router Manager connects to the router.)

4. Configure an FCIP route using either the command line interface (CLI) or SANsurfer Router Manager.

- To configure an FCIP route in the CLI, connect using a Telnet session or serial connection, and then issue the `fciproute add` command. For example:

```
iSR6200 <1> (admin) #> fciproute add
```

A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept the current value. If you wish to terminate this process before reaching the end of the list press 'q' or 'Q' and the ENTER key to do so.

WARNING:

The following command might cause a loss of connections to both GE ports.

```
Configuring FCIP Route: 1
```

```
-----
```

```
FCIP Interfaces FC & GE (0=Enable, 1=Disable) [Enabled      ]
FC Port (1=FC1 2=FC2)                        [                  ] 1
GE Port (1=GE1 2=GE2)                        [                  ] 1
IP Address (IPv4 or IPv6; 0=IPv6 Link Local) [0.0.0.0           ] 172.35.15.11
Subnet Mask                                  [0.0.0.0           ] 255.255.254.0
Gateway IP Address                          [0.0.0.0           ] 172.35.14.1
Remote IP Address                            [0.0.0.0           ] 172.17.136.18
MTU Size (0=Normal, 1=Jumbo, 2=Other)       [Normal            ]
TCP Window Size (0=8KB, 1=16KB, 2=32KB)     [32768             ]
Window Scaling (0=Enable, 1=Disable)        [Enabled           ]
Window Scaling Factor (Min=0, Max=9)         [7                 ]
TCP Port No. (Min=1024, Max=65535)          [3225              ]
GE Port Speed (0=Auto, 1=100Mb, 2=1Gb)      [Auto              ]
Bandwidth, Mbit/sec (Min=1, Max=1000)       [1000              ]
VLAN (0=Enable, 1=Disable)                  [Disabled          ]
FCIP SW Compression (0=Enable, 1=Disable)   [Disabled          ]
All attribute values for FCIP Route 1 will now be saved.
```

- To configure an FCIP route in SANsurfer Router Manager, refer to the settings shown in [Figure 3-1](#).

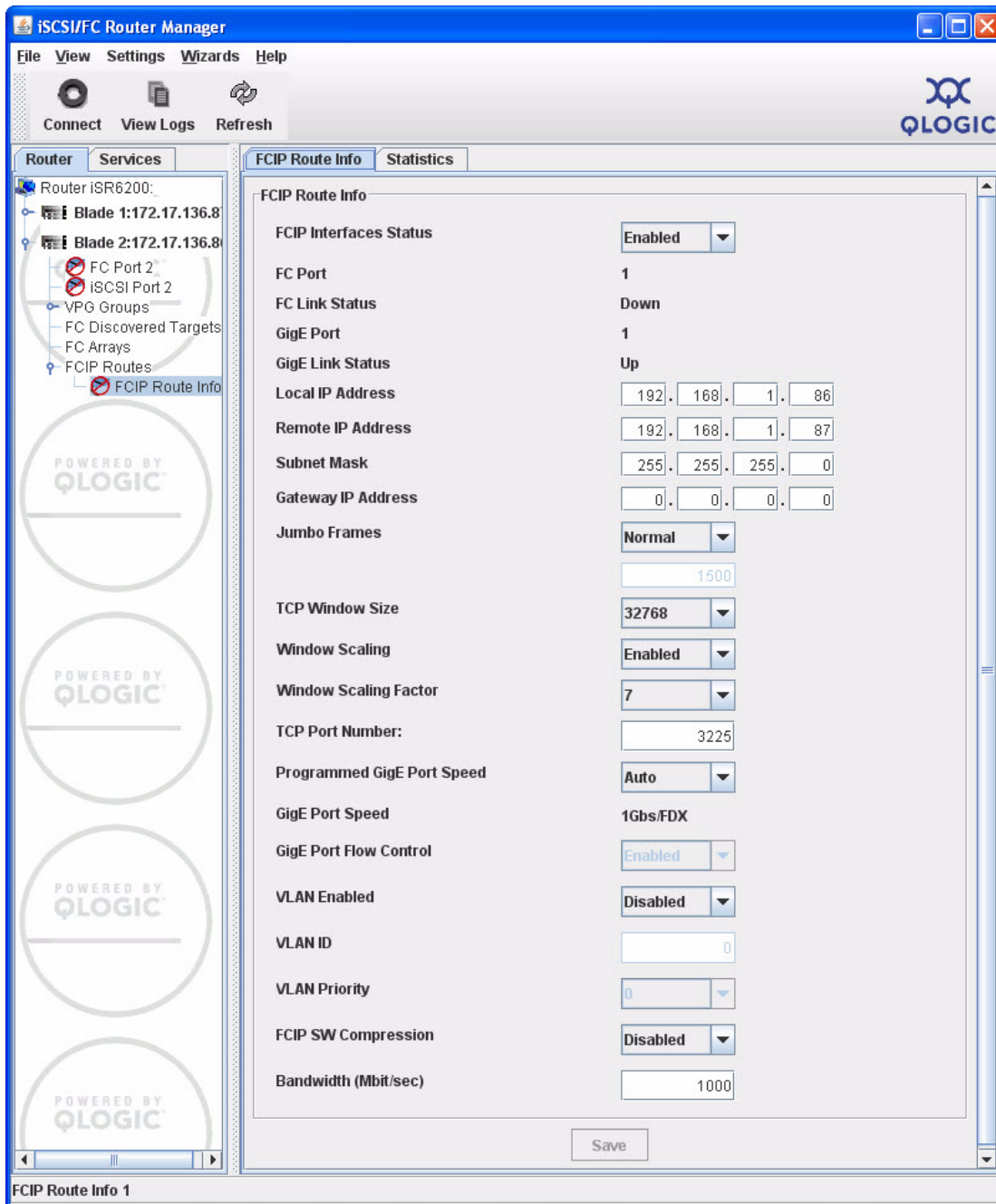


Figure 3-1. Configuring an FCIP Route in Router Manager

5. Configure the link rate on the Ethernet switches and the iSR6250 routers. Ensure that the router GbE port and the Ethernet switch port have identical duplex modes and link rates (in SANsurfer Router Manager, these are shown as **Programmed GigE Port Speed** and **GigE Port Speed**, respectively), as shown in [Table 3-1](#). If the duplex mode and link rate do not match, the end-to-end link will be unstable.

NOTE:

QLogic strongly recommends that you leave the link rate set to Auto. If you manually set the link rate, you must ensure that you also set the switch port.

Table 3-1. Link Rates

Router GE Port		Ethernet Switch Port Connected to the Router GbE Port	
Duplex	Link Rate	Duplex	Link Rate
Auto	Auto	Auto	Auto
Full	Auto	Full	Auto
Full	100	Full	100
Full	1000	Full	1000

6. Configure the iSR6250 Ethernet performance as follows:
 - a. **TCP Window Size.** In [Table 3-2](#), the TCP window size defines the maximum amount of data transmitted that was unacknowledged. The TCP window size is typically increased to compensate for distance (round trip delay) and link data rate. Additional tables in the *iSR6200 Intelligent Storage Router Installation Guide* provide configuration parameters for typical data rates and delays. The TCP window size configuration consists of two parameters: **TCP Window Size** and **Window Scaling Factor**.

Table 3-2. TCP Maximum Window Size

TCP Window Size (bytes)	TCP Maximum Window Size	Window Scaling Factor
8K	8,192	0
16K	16,384	0
32K	32,768	0
64K	32,768	1
128K	32,768	2
256K	32,768	3
512K	32,768	4
1M	32,768	5
2M	32,768	6
4M	32,768	7
8M	32,768	8
16M	32,768	9

- b. **FCIP SW Compression.** Generally, you should enable compression when the available WAN bandwidth is less than 600Mbps (60MBps).
 - c. **Bandwidth.** Configure the Ethernet transmit bandwidth used by the iSR6250 with a value ranging from 2Mbps to 1000Mbps. For example, if the WAN connection is capable of 45MBps, but you want to limit FCIP to 33 percent of the available bandwidth, set the iSR6250 bandwidth parameter to 15 (15 = 45×33 percent).
7. Verify the IP connections (management, GE1, and GE2) between the local and remote iSR6250 routers using the router's ping feature in either the CLI or SANsurfer Router Manager.

- To verify IP connections in the CLI, issue the `ping` command, and then specify the IP address, iteration count, outbound port, and packet size. For example:

```
iSR6200 <1> (admin) #> ping
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

IP Address (IPv4 or IPv6)           [0.0.0.0] 172.35.14.250
Iteration Count (0=Continuously)    [0        ] 10
Outbound Port (0=Mgmt, 1=GE1, 2=GE2) [Mgmt     ] 1
Size Of Packet (Min=1, Max=1472 Bytes) [56       ]

Pinging 172.35.14.250 with 56 bytes of data:

Reply from 172.35.14.250: bytes=64 time=284.2ms
Reply from 172.35.14.250: bytes=64 time=284.6ms
Reply from 172.35.14.250: bytes=64 time=283.9ms
Reply from 172.35.14.250: bytes=64 time=284.4ms
Reply from 172.35.14.250: bytes=64 time=283.8ms
Reply from 172.35.14.250: bytes=64 time=284.3ms
Reply from 172.35.14.250: bytes=64 time=284.0ms
Reply from 172.35.14.250: bytes=64 time=284.0ms
Reply from 172.35.14.250: bytes=64 time=283.9ms
Reply from 172.35.14.250: bytes=64 time=284.4ms

Ping Statistics for 172.35.14.250:
  Packets: Sent = 10, Received = 10, Lost = 0
Approximate round trip times in milliseconds:
  Minimum = 283.8ms, Maximum = 284.6ms, Average = 284.1ms
```

- To verify IP connections in SANsurfer Router Manager, follow these steps:
 - a. Right-click the system tree in the left pane, and then on the shortcut menu, click **Ping**.
 - b. On the Ping Remote System dialog box (see [Figure 3-2](#)), specify the IP address type, IP address, number of packets, packet size, and outbound port.
 - c. To start pinging the remote system, click **Ping**.

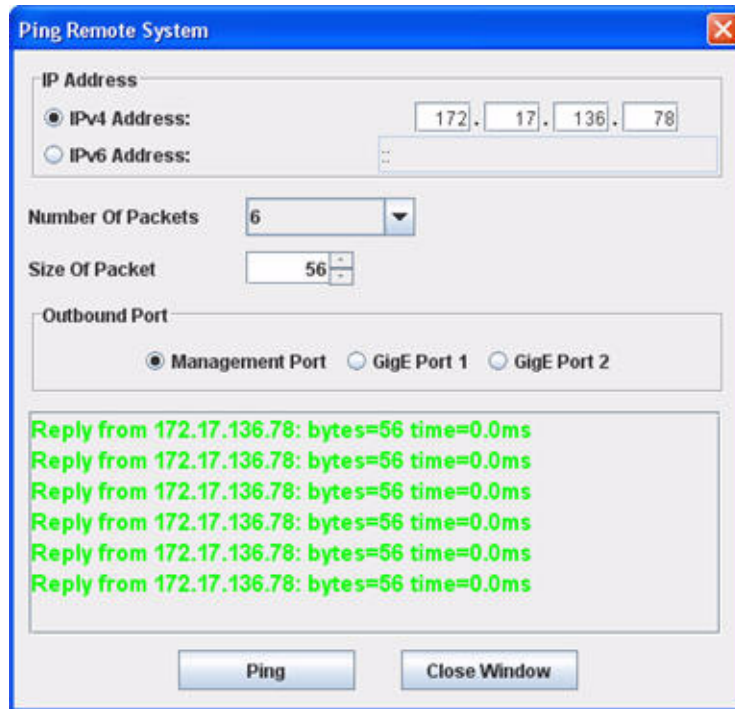


Figure 3-2. Pinging the Remote System

NOTE:

Both the CLI and SANsurfer Router Manager include options for selecting the destination IP address, packet size, and outbound port type to ping. Pinging the remote iSR6250 router's IP addresses from the local iSR6250 router verifies that the iSR6250 ports can communicate with each other.

8. Connect the iSR6250 to the Fibre Channel switches as shown in these sub-steps:

NOTE:

The Fibre Channel switches must be from the same manufacturer and must be compatible. You may need to set to E_Port the switch ports connected to the iSR6250 router. The FCIP link between the Fibre Channel switches becomes an ISL; consequently, the switches are merged into a single SAN. For the ISL to function correctly, the switches must be in auto-domain ID mode, or have been assigned different domain IDs. In addition, the zone names on the switches must be unique; the switches cannot have identical zone names before connecting the routers.

- ❑ On the iSR6250 routers, verify the connectivity using the CLI or SANsurfer Router Manager. In SANsurfer, you must refresh the display.

The Fibre Channel switches should now show an ISL between each other. Most Fibre Channel switch interfaces include a topology display that shows the ISL. [Figure 3-3](#) shows an example of the Switch Information page in the IBM® Web Tools utility.

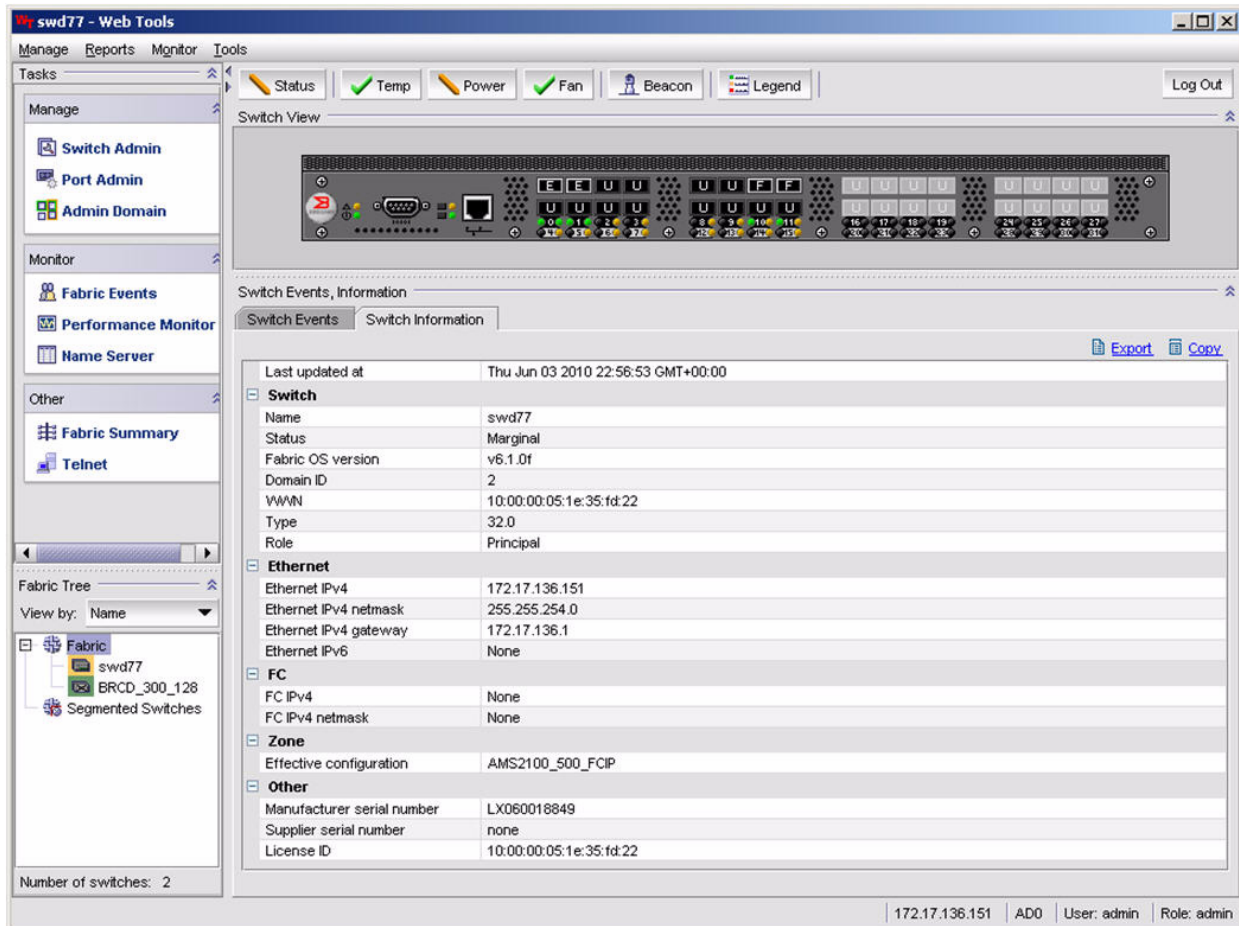


Figure 3-3. Viewing Fibre Channel Switch Information in Web Tools

9. Because Fibre Channel switch zoning is affected when the Fibre Channel switches are linked by a merged ISL, review the switch zoning and correct any inconsistencies. The FCIP route example in this document provides data replication between two storage arrays. Therefore, after the FCIP route (ISL) is established, you must zone together the storage array ports used for data replication.

NOTE:

The configuration between merged SANs versus non-merged SANs is similar, except that a non-merged SAN is configured through an F_Port rather than an E_Port. The F_Port configuration enables you to extend the F_Port from the remote array directly into the local fabric (see [Figure 2-2 on page 2](#)).

You have successfully completed iSR6250 installation and FCIP route configuration. Next, you must install the Hitachi TrueCopy Remote Replication Software to provide continuous, non-disruptive, host-independent data replication for disaster recovery. For installation and operation details, refer to the HDS TrueCopy user documentation. [Figure 3-4](#) and [Figure 3-5](#) identify the connection to AMS500 and AMS2100 storage arrays, respectively, through TrueCopy.

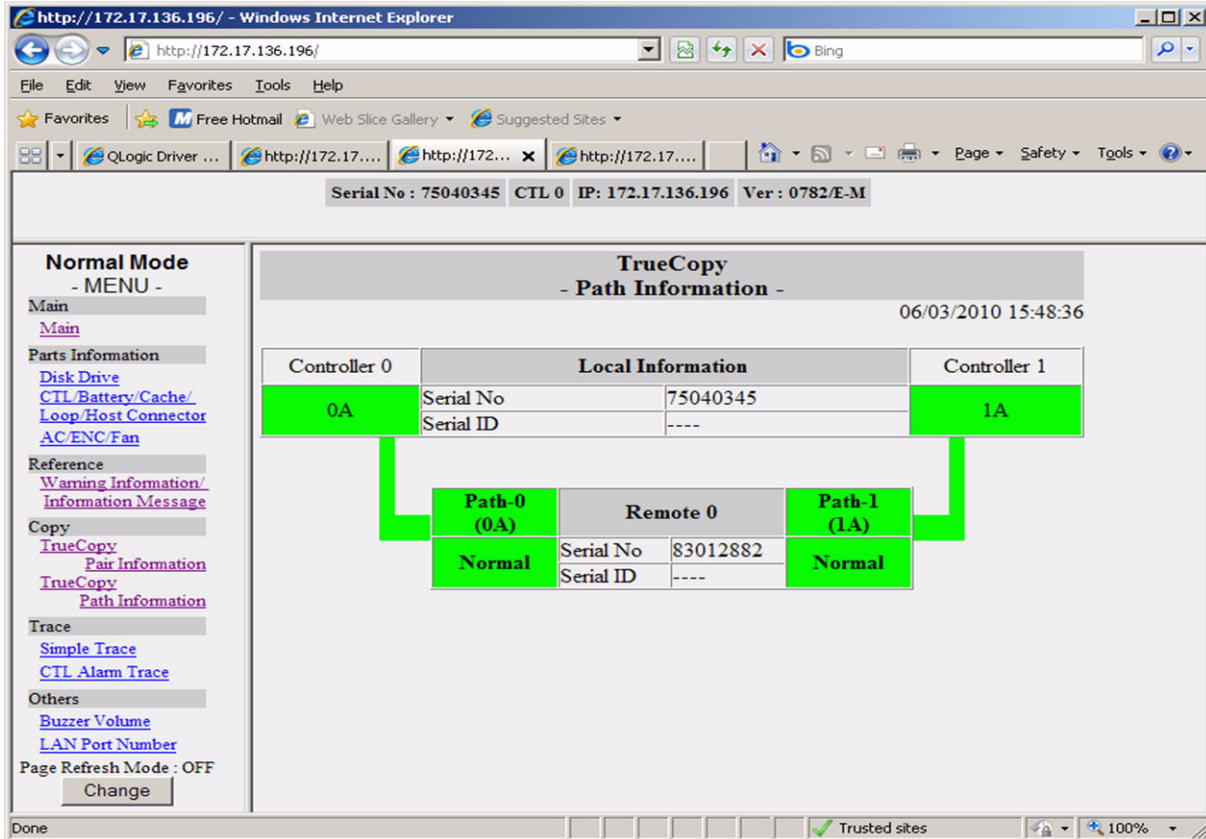


Figure 3-4. AMS500 TrueCopy Connection

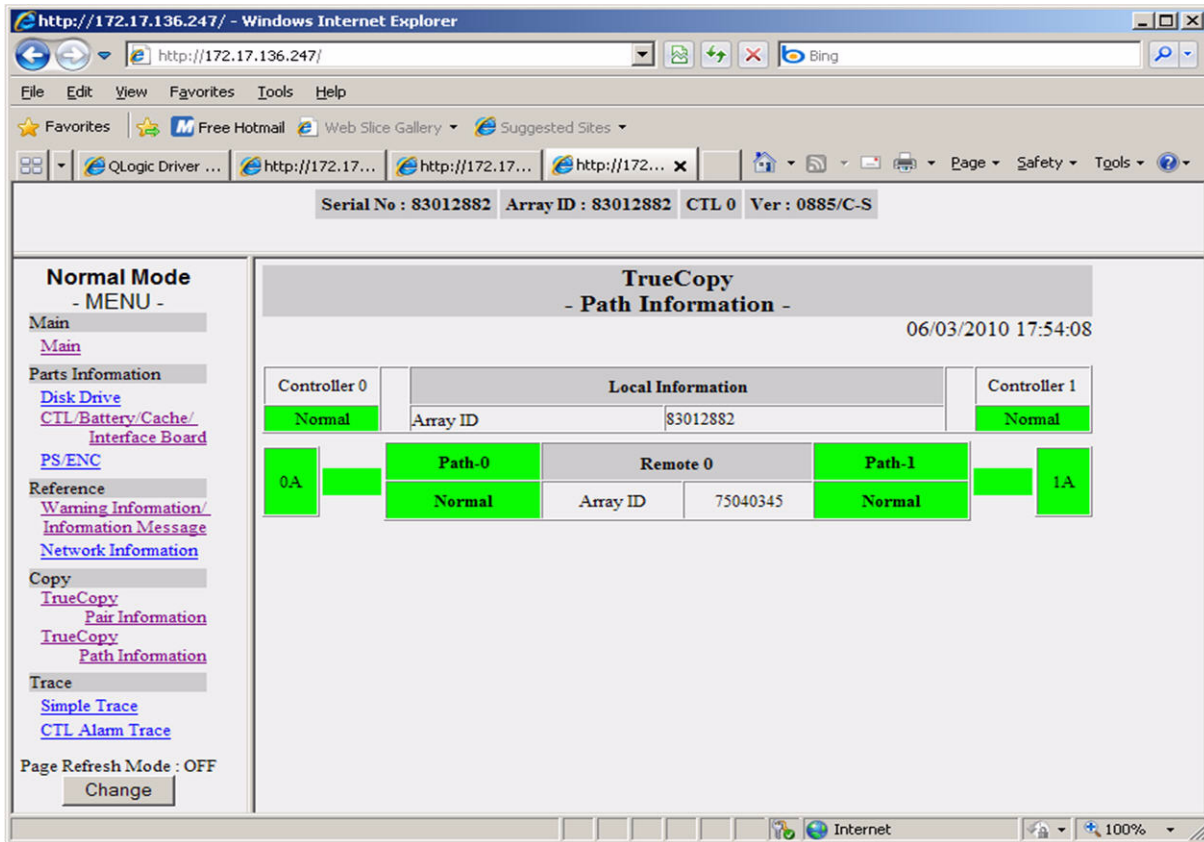


Figure 3-5. AMS2100 TrueCopy Connection

The combination of QLogic iSR6250 Intelligent Storage Router with Hitachi Data System’s AMS Storage and TrueCopy data replication provides solid data replication and disaster recovery and a strong product solution.

Document Revision History	
Revision A, October 5, 2010	
Changes	
Initial release of new applications note.	