

IBM TotalStorage Proven™ program

ATTO Technology, Inc.

iPBridge™ 1500E/D

iSCSI Storage Area Network using the ATTO iPBridge 1500E/D
Gigabit Ethernet to Ultra3 SCSI bridge connected to
Tape library backing up Direct Attached Storage



Testing Template:

This document will be used to describe, from a technical perspective, the elements that were included as part of the IBM TotalStorage Proven testing. It is intended to give an overall picture of the technical elements of the configuration, with a brief description of the results of the testing including any specific highlights of the interoperability results.

High-level architecture/description, include a list of products that meet the compatibility requirements ("Approved Product(s)") as well as a list of the IBM storage products with which the Approved Products meet the compatibility requirements ("Qualified IBM Storage Products"):

Test Overview

The ATTO iPBridge 1500E/D is an iSCSI to U160 SCSI bridging device that offers the ability to integrate an IBM TotalStorage Ultrium 3582 SCSI tape library into an IP Storage Area Network.

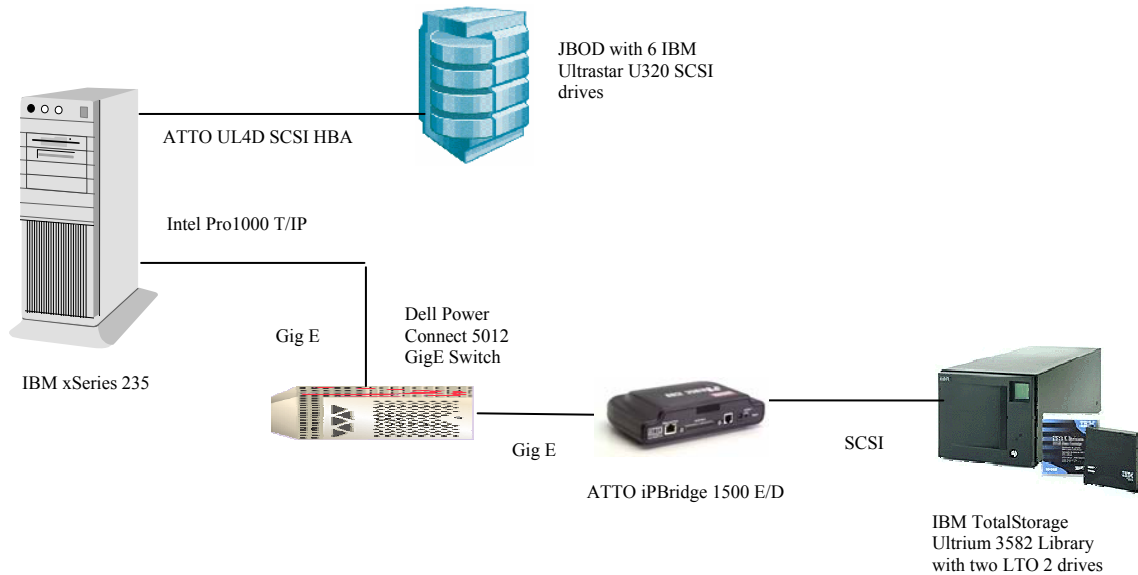
Test Scenario

In the test setup, the ATTO iPBridge 1500E/D was installed in front of the IBM 3582 Tape Library, effectively providing an iSCSI input into the library. An IBM xSeries 235 server running Windows 2000 and equipped with an Intel iSCSI host Adapter was used to backup, restore and manage the tape library. Veritas Backup Exec was used as the Backup Application.

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Test Configuration

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Testing Level Achieved

The “Comprehensive” testing level was achieved. A much higher level of integration and failure testing was performed in addition to the standard testing.

Test Description

The IBM xSeries 235 server had the Intel Pro/1000T IP Storage Adapters installed to provide an accelerated connection to the IP SAN. The host had access to the ATTO iPBridge 1500 E/D through a Dell Power Connect Gigabit Ethernet switch. An IBM LTO Ultrium SCSI Tape Library 3582 was connected to the SCSI side of the ATTO iPBridge 2500R/D. The IBM Server also had a direct-attached SCSI JBOD loaded with IBM/Hitachi U320 UltraStar disk drives. These drives were attached to the IBM Server using an ATTO UL4D SCSI host adapter. The drives were loaded with various files ranging from 1 byte to 1 Gigabyte in size. These files consisted of 52 different data patterns ranging from all zeroes to pure random.

The solution proved that an inexpensive Gigabit Ethernet network using the iSCSI protocol could be used to effectively and efficiently backup direct attached storage. Backups and restores were accomplished using Veritas Backup Exec 9.1 with the Tape Library Option installed.

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Description of Products Tested

Servers: IBM xSeries 235

Host Bus Adapter (HBA) vendor model: Intel Pro/1000T IP Storage Adapter
Firmware level: 4.6.87, Driver level: 3.0 special driver

Host Bus Adapter (HBA) vendor model: ATTO ExpressPCI UL4D, Ultra320 SCSI Adapter
Firmware level: 1.10, Driver level: 1.10

Storage Product:

IBM TotalStorage Ultrium Tape Library 3582 with 2 LTO 2 Ultrium drives
Capacity: 24 cartridges – 200 GB Native/400 GB compressed per cartridge
Microcode Level: Library: 237.001 / Drives: 4722
Comments: Tape Library used to back up to and restore from on the iSCSI SAN

Storage Product:

IBM/Hitachi Model Number: IC35L036UCDY10-0
Version: 12 Ultra320 SCSI Ultrastar 36 Gig drives
Microcode Level: S26M
Comments: SCSI JBOD Direct Attached to server used to back up and restore across the iSCSI SAN

Switch:

Dell Power Connect 5012
Version: 12 Port Gigabit Ethernet Switch
Microcode Level: 5.2.5

Software Details:

Software used: Veritas Backup Exec 9.1 revision 4691.1
Release level(s): Driver Install Patch 265501
Description: Backup Software
OS Version: Windows 2000 Server SP4

Test Results

The following testing was executed and passed:

- Installation Tests included:
 - Initial standard installation test – verify hosts can access devices.
 - Upgrades – Verify firmware upgrades can be made and devices still available.
 - Device Driver Installation
- Functionality Tests included:
 - Power on all devices, all target devices recognized by servers
 - Proper security enforced – CHAP, telnet/ftp/web server login/password

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- Basic functions of IBM LTO Ultrium Tape Library 3582 tested through the bridge
 - Erase Media
 - Format/Label media
 - Mount/Dismount media
 - Media Inventory
 - Cleaning of Tape Drives
 - Backups/Restores
 - Tape Spanning
- Stress Tests included:
 - Representative file size increments, ranging from 1 byte to 1 Gigabyte files.
 - Generated large amounts of data – 150 GB per server.
 - I/O Stress Run with data verification
 - Tape Library Multistreaming
 - Switch failure/exception tests
 - Long Running test (at least 72 Hours)
 - Host reboot tests
- Ensured Data Integrity/Data Protection tests:
 - Validated data integrity – verification of backup as well as data comparison tests
 - Backup/Restore features of IBM LTO Ultrium Tape Library 3582
 - Backup/Restore features of ATTO iPBridge 2500 R/D
- Exception Handling Behavior test included
 - Failure of connection links into ATTO iPBridge 2500 R/D
 - Injected errors into network (heavy network traffic, broadcast storms, invalid packets)
- Reliability/Availability/Serviceability test included:
 - Diagnostics – Failure logging, I/O logging
 - Fault Annunciation
 - Memory Leaks
 - Disaster Recovery
- Performance Test Results:
 - Performance through Veritas BackUp Exec Application (64 KByte transfer size)

	One Tape Drive
Backup	1935 MB/min
Restore	2017 MB/min

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Known Issues/Workarounds:

1. Denial of Service Attacks – One of the tests includes running a program that broadcasts large amount of garbage packets to every device on the network. Some switches appear to handle these broadcast storms better than other switches by filtering these broadcast storms out more effectively. On switches that do not effectively filter out these storms, tape operations will begin to fail and access to any device on the network will become impaired or even unattainable. Check with the switch vendor for latest firmware updates and feature updates.
2. It is recommended to have the Intel Pro/1000T IP Storage adapters set to ignore Bus Resets. Because of this, it is currently not possible to run with Microsoft's Clustering application.

Special Installation:

1. On initial installation of Backup Exec, do not install any tape drivers. Once the package is completely installed, the 'tapeinst.exe' program can be used to install the tape device driver. These steps are per Veritas instructions.
2. Carefully follow the installation instructions as specified for all components.

Support

For Technical Support Inquiries, please contact:

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