

# MDL w/Quantum DXi Deduplication



## Executive Summary

Quantum DXi disk-based backup and replication storage systems use Quantum's policy based data deduplication technology to expand the amount of data customers can retain on fast-recovery RAID storage. Depending on the data, Quantum DXi can increase the storage capacity from 10 to 50 times.

Bus-Tech Mainframe Data Library (MDL) is a family of mainframe virtual tape controllers which allow customers to easily implement disk-based backup and replication within the IBM and compatible mainframe (z-Series) environment.

Together MDL and Quantum DXi offer customers the opportunity to immediately implement data de-duplication on their IBM mainframe. The results of implementing such an approach is the ability to significantly reduce storage and electronic vaulting costs by storing more mainframe backup / archive data in less space than ever before without having to re-engineer mainframe backup and data archive software.

## Quantum DXi Series

Quantum DXi systems provide a disk backup solution for open-systems. DXi is designed to receive backup data over a network from open-systems applications and store that data on a fast access redundant array of independent disks (RAID).

Quantum data deduplication technology is included within all DXi systems so that data storage requirements can be minimized by deduping the data before it is written to protected storage (RAID). Deduplication can be performed in one of two fashions. When inline deduplication is used data is automatically deduped as it is being received; allowing it to be processed once and written to storage.



# MDL w/Quantum DXi Deduplication

Alternatively, out-of-band deduplication allows the DXi to store the data temporarily to disk just as it has been received. Then an asynchronous deduplication process reduces the data before finally writing to protected storage.

DXi systems support two different front-end network connections. First, if DXi is connected to a fibre channel storage area network (SAN), the system is configured as a virtual tape library (VTL). This type of connection is most appropriate for use with open-systems backup applications designed to write tape backups to a SAN-attached automatic tape library (ATL). Second, and most relevant to Bus-Tech's Mainframe Data Library (MDL), DXi can be attached to a gigabit Ethernet network. When attached in this fashion DXi presents itself to the network as an industry standard Network File System (NFS) server. NFS Servers allow NFS client systems on the IP network to write and read data in standard file format to the storage attached to the NFS Server.

Whether DXi is operating as a SAN attached VTL or a LAN attached NFS Server makes no difference with regard to the data deduplication services. Data from either connection type will be deduplicated before it is stored on the RAID.

## Bus-Tech Mainframe Data Library

Mainframe Data Library (MDL) is a family of virtual tape controllers for the IBM and compatible mainframes; universally known as z-Series. MDL controllers attach to the mainframe using one or more mainframe FICON or ESCON input / output channels. MDL emulates standard IBM mainframe tape drives to the z-Series system including IBM 3480, 3490, and/or 3590 device types. A single controller can emulate a number of devices. For example, an MDL controller with 2 FICON interfaces connecting to the mainframe can emulate from 1 to 256 devices; with a typical configuration being between 16 and 32 devices.

MDL controllers attach to open-systems disk storage systems. More specifically, MDL supports connectivity to either fibre channel SAN based disk subsystems or IP-based Ethernet network storage. When attached to IP-based storage MDL controllers perform as industry standard Network File System (NFS) clients.



# MDL w/Quantum DXi Deduplication

As the IBM mainframe writes a tape volume (VOLSER) to an MDL emulated tape drive, MDL receives the data and then stores it on the back-end open systems disk system. Each mainframe VOLSER written to MDL becomes a single file on the open-systems filesystem.

## The MDL - DXi Solution

Configuring the DXi storage system as a network attached NFS server allows Mainframe Data Library (MDL) to directly attach and use DXi storage to house the MDL tape library.

As shown here, the DXi is normally configured to export one or more NFS filesystems. Those filesystems are then defined to be part of the MDL tape library. Once this is done, MDL can allocate tape volumes (VOLSERs) written by the mainframe to the DXi.

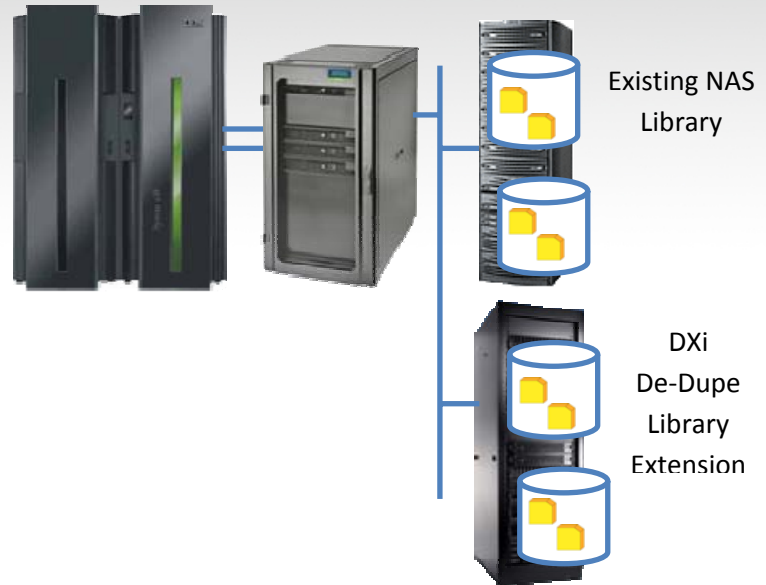
Using DXi as a back-end to MDL allows mainframe customers the opportunity to introduce Quantum's data deduplication technology into the IBM mainframe backup / archive solution.



Mainframes routinely run daily and weekly backups of critical business data. Most of these backups are images of a single mainframe DASD (disk) volume. Daily or weekly backups of DASD volumes that do not change much are ideal candidates for data deduplication. MDL and DXi can bring Quantum's industry leading data deduplication technology into the mainframe backup environment with little or no change to current mainframe-based backup applications.

# MDL w/Quantum DXi Deduplication

Additionally, because Quantum DXi is capable of presenting itself as an industry standard IP attached NFS Server, DXi can be added to existing MDL libraries without having to change or modify the existing MDL stored tape volumes in any way.



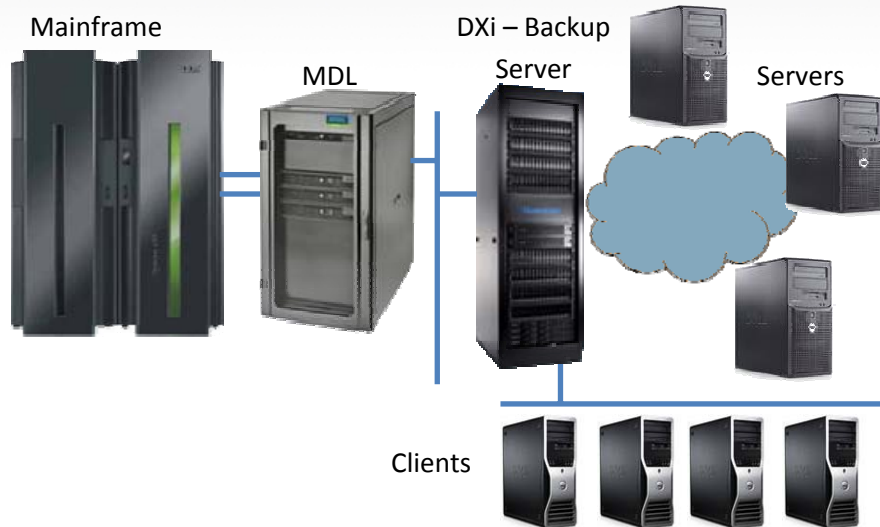
Once attached, the new DXi storage can be used in one of two different ways. First, the DXi storage can simply be used as new storage within the library. When MDL is looking to write a new mainframe VOLSER to the library, the DXi NFS space will be used as a potential target along with any other NFS storage in the library.

Secondly, MDL tape pools can be defined to allow the customer to direct specific tape volumes (VOLSERs) to DXi when data deduplication is desirable and direct VOLSERs to standard NAS storage when data dedupe is not desirable. For example, a work tape whose retention is not required past the end of the job or nightly batch run does not necessarily make a good candidate for deduplication. MDL tape pools can be used to direct such a tape to standard NAS storage. On the other hand, backup or archive VOLSERs whose data will be retained for some time can be directed to a tape pool residing on the DXi causing the data to be processed by deduplication before being stored.

This flexibility within the MDL-DXi solution allows the customer to add data deduplication to an existing MDL tape library and use his understanding of the data being written to tape to make the best utilization of both the existing NAS and the new data deduplication storage system.

# MDL w/Quantum DXi Deduplication

Finally, DXi is an open-systems disk backup solution. For small to medium sized enterprises with a single IT staff, MDL and DXi can be used to provide a common backup solution for all of the organizations servers.



Open-Systems servers / clients can attach directly to the Quantum DXi via either a SAN or IP network. Open-systems backup applications can then backup those systems directly to the DXi. Concurrently the MDL can attach the mainframe, allowing DXi to be the target for backup of all mainframe data. The combined, total backup solution minimizes the administration demands required of the IT staff while providing a single storage solution for the protection of all the enterprise's backup data.

## Summary

Mainframe Data Library (MDL) is a proven tape-on-disk solution for the IBM mainframe (z-Series). MDL allows customers to upgrade and replace their aging mainframe tape subsystems with a new disk-based backup solution.

Quantum DXi is a new breed open-systems disk backup solution that includes advanced data deduplication technology. DXi can be connected directly to an MDL controller and be used as the data store for MDL data.

# MDL w/Quantum DXi Deduplication

Together these two industry leading solutions provide the mainframe data center manager the ability to easily integrate advanced data deduplication technology into their mainframe backup / archive infrastructure without the need to undertake expensive mainframe application re-engineering.

DXi storage can be used as the sole storage behind MDL, or it can be combined with other open-systems storage; allowing data center managers to apply data deduplication in a planned and appropriate approach.

For small to medium sized installations with a common IT staff, MDL and DXi can be used to satisfy the backup and archive requirements of distributed, open-systems, end-user desktops, and the mainframe data center with a single coherent solution that simplifies the data backup, increases the density of data on backup storage, and reduces the overall administration and cost of the installation's backup solution.