

Mainframe Data Library with Open System Virtual Tape Libraries



Executive Summary

Open systems Virtual Tape Libraries (VTLs) have increasingly become the backup solution of choice for customers wishing to backup their Windows, Linux, and / or Unix servers over a

Storage Area Network (SAN). These disk based VTL products present themselves on a SAN as a fibre channel attached Automatic Tape Library (ATL); allowing servers to do backup to disk without having to re-write or replace popular tape backup software. Replacing tape-based backup solutions with open-systems VTLs allows system administrators to realize the benefits of using disk-based backup, such as data de-duplication and advanced disaster recovery capabilities.

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

By combining MDL with open-systems VTL customers can now use a common disk-based storage product to backup all of their data processing systems including open-systems servers and z-Series compatible mainframes.

Open Systems Virtual Tape Libraries

A Virtual Tape Library (VTL) is a class of product that is intended to provide a disk-based backup solution to servers on a fibre channel Storage Area Network (SAN). Commercial VTL products typically attach to a SAN using one or more fibre channel connections. The VTL appears to servers on the SAN as if it were a real fibre channel Automated Tape Library (ATL); with tape drives, storage slots and a robotic arm. This allows commercial backup software that was designed to work with ATLS to operate transparently with a VTL. But instead of writing data to physical tape cartridges, VTLs store tape cartridge images on open-systems disk storage; including Fibre Channel, Serial Attached SCSI (SAS), and/or Serial Advanced Technology Attachment (SATA).

Mainframe Data Library with Open System Virtual Tape Libraries

The advantage of writing backup data to a VTL versus physical tape is that VTLs are capable of providing value added service not generally or easily available to physical tape libraries. These value-added services may include improved performance providing higher throughput and quicker retrieval times, data de-duplication, and automated, remote data replication.

Bus-Tech Mainframe Data Library

Mainframe Data Library (MDL) is a family of tape-on-disk controllers for the IBM and compatible mainframes (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. Data written by the mainframe to MDL emulated devices is stored on open-systems storage behind the MDL controller. The IBM mainframe is completely unaware that the devices being emulated by the MDL are not real tape drives and that the data written to an MDL device is stored on a back-end disk rather than a physical tape cartridge.



The MDL to VTL Solution

Given that an MDL is essentially a virtual tape library (VTL) for the IBM mainframe, mapping MDL emulated mainframe tape devices to open-systems VTL emulated devices is a natural follow on.

Bus-Tech's MDL-x00V model controllers are designed specifically to make this connection. A single MDL-x00V controller can emulate a number of tape devices to the mainframe. An MDL-100V controller, for example, can support 1 or 2 FICON channels or 1 to 3 ESCON channels and emulate 1 to 32 mainframe tape drives across those channels.

MDL-x00V controllers provide 4 GBit fibre channel ports for connecting to one or more open-system VTLs. The MDL can connect in point-to-point fashion to ports on the VTL or can connect indirectly via a fibre channel switch.

Each mainframe tape device emulated by the MDL is mapped on a permanent, one-to-one basis to a single fibre channel tape device being emulated by the VTL. As data is written to a tape drive by the mainframe, the MDL translates the I/O request to an equivalent SCSI I/O request and passes the request on to the mapped VTL device for processing.

Mainframe Data Library with Open System Virtual Tape Libraries

As a result a tape volume (VOLSER) written by the mainframe is stored as a single tape cartridge on the VTL. When the mainframe later needs to read the tape volume back in, MDL uses the VTLs robotic arm to re-load the virtual cartridge and allow the VOLSER to be processed.

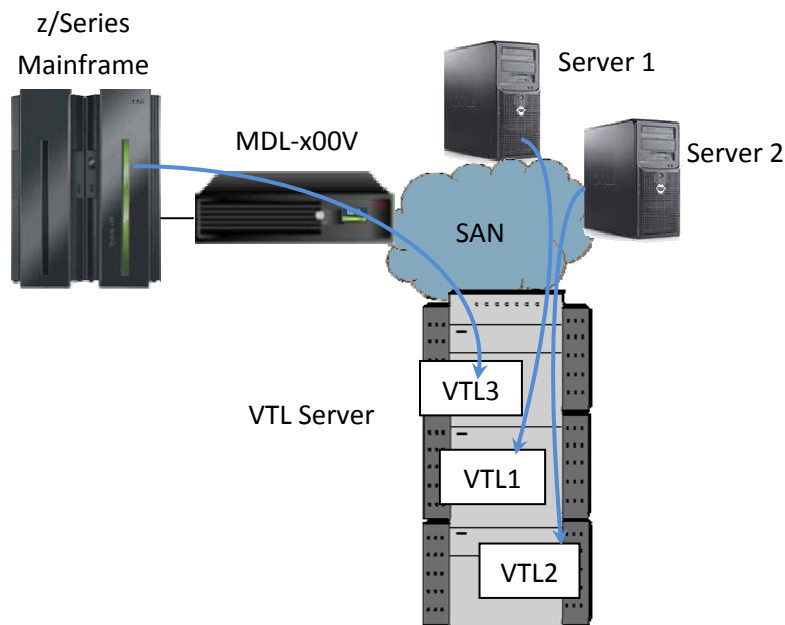
The Total Backup Solution

Using MDL to connect an open-systems VTL to the IBM mainframe in this fashion allows the IBM mainframe to take advantage of all the benefits a VTL offers to automated backup solutions. In other words, the mainframe can take advantage of whatever data de-duplication or replication services a specific VTL product may provide.

Additionally, the MDL to VTL connection can easily co-exist with other non-mainframe server connections to the same VTL; allowing a single VTL backup server to be the hub of all backup services within the data center.

Virtually all commercial VTL servers are capable of emulating multiple open-systems libraries (VTLs) at the same time. And, while MDL controllers require a dedicated library within the VTL server, it does not prevent other VTLs from being used at the same time by other servers on the SAN. Consider the picture below.

A single VTL Server is attached to a storage area network (SAN) along with two open-system servers (Server 1 and Server 2). A z/Series Mainframe is also attached to the



SAN using a Bus-Tech MDL-x00V series controller.

Mainframe Data Library with Open System Virtual Tape Libraries

The MDL requires a dedicated VTL for storage of VOLSERS (cartridges) written by the mainframe. The VTL server is emulating 3 automated libraries; VTL1, VTL2, and VTL3. Server 1 is using VTL1, Server 2 is using VTL2, and the mainframe is using VTL3. Each server is unaware of the other VTLs being emulated or the other servers (mainframe) using the VTL Server.

Services, such as data de-duplication and / or data backup / replication, provided by the VTL server can be used by each or all of the servers as appropriate. The IT staff can manage the backup environment using a single backup server (the VTL Server) with a common set of tools.