Data Migration: Moving from Dell PowerVault™ MD3000i/MD3000 to MD3200i/MD3220i and MD3600i/MD3620i Series Storage Arrays

A Dell Technical White Paper

PowerVault™ MD3200/MD3200i and MD3600i Storage Arrays

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Purpose of This Paper

This paper provides an overview of the processes and interoperability requirements for migrating data from an MD3000i/MD3000 storage subsystem directly to a new PowerVault MD3200i, MD3220i, MD3600i, or MD3620i storage array.

Planning the Migration

Data migration is accomplished by a temporary connection of both storage subsystems to the same host prior to retirement of the MD3000i/MD3000 storage from that server, presenting a viable alternative to remote backup/restore.

Following are the steps for migrating data from MD3000i/MD3000 storage directly to a new PowerVault MD3200i, MD3220i, MD3600i, or MD3620i storage:

1. Back up the data. Backup is recommended for data security and archival storage, and should be performed before attempting any data migration or reconfiguration solution.
2. Determine the amount of data to be migrated and the amount to be archived.
3. Schedule an offline period (recommended) for data migration (see “Successfully Tested Configurations” in this document for estimated data throughput).
4. Obtain migration software compatible with the operating system, applications, and data types.
5. Configure MD3200i/MD3220i and MD3600i/MD3620i storage per the instructions in this document.
6. Move data using disk to disk migration software.
7. Remove MD3000i/MD3000 from host system.
8. Complete MD3200i/MD3220i and MD3600i/MD3620i host installation (Linux/SUSe operating systems).
9. Map volumes per application requirements.

Interoperability Limitations

Concurrent attachment of Dell PowerVault MD3000i/MD3000 storage and Dell PowerVault MD3200i/MD3220i or MD3600i/MD3620i to the same server is not officially supported at the time of MD3200i series product introduction. This is not, however, an impediment to concurrent attachment of these products for purposes of data movement/data migration from one storage system to the other.

Data transfer and intermediate level error recovery has been tested by Dell Storage Engineering and found to be functional when both MD3000i/MD3000 series storage arrays and MD3200i/MD3220i or MD3600i/MD3620i storage arrays are concurrently attached to the same server. Prior to performing any data movement actions, it is recommended that the MD3000i be upgraded to the most recent firmware version (see http://support.dell.com).

Interoperability: Error Recovery Process

The MD3200i/MD3220i and MD3600i/MD3620i products contain advancements in error recovery algorithms that significantly reduce the time required for error recovery processes. Common host level drivers have been modified to reflect the revised timing. In the rare case of I/O timeout greater than 60 seconds, this reduces the delay time before system level error recovery can be invoked.

However, in the rare case of significant I/O timeout, where storage system RAID controller resynchronization of redundant controllers is needed to resolve a complex error situation, incorporation of these reduced timer values into common software support stacks may truncate the later stages of advanced error recovery in an MD3000i/MD3000 system. Normally this process occurs in the final advanced stages of error recovery and is part of the robust error recovery required to maintain redundant, highly available storage and avoid equipment outages that can result from transient events.

Interoperability: Linux Device Manager

The latest versions of Linux based systems utilize Device Mapper (DM) for multipath connection, replacing MPP. Support for MD3000i/MD3000 in this environment is under investigation. MD3200i/MD3220i and MD3600i/MD3620i have been developed with DM support. Temporary interoperability of these storage systems using MPP is possible for data migration.

Configuration for Data Migration

When migrating data to the MD3200i and MD3600i series storage arrays, the first step is to install support software that includes the disk management utility, PowerVault Modular Disk Storage Manager (MDSM), and host software drivers. Install this software using the MD3200i Resource DVD or the MD3600i Resource DVD. Download the ISO images of these DVDs from http://support.dell.com. Follow these steps to add support for the MD3200i and MD3600i series storage (see Figure 1 or Figure 2 on the following page):

1. Install new Management Station software to enable configuration of the MD3200i/MD3220i and MD3600i/MD3620i storage array.
2. Install Host software to install drivers for the MD3200i and MD3600i to enable LUN detection.
3. Configure the Host Operating System for the multipath environment (see “Operating System Support” in this document).
4. Attach the MD3200i or MD3600i storage array to the network.
5. Configure virtual disks on the storage array.
6. Discover and mount virtual disk volumes.

Figure 1. Effected System Components — iSCSI Installation

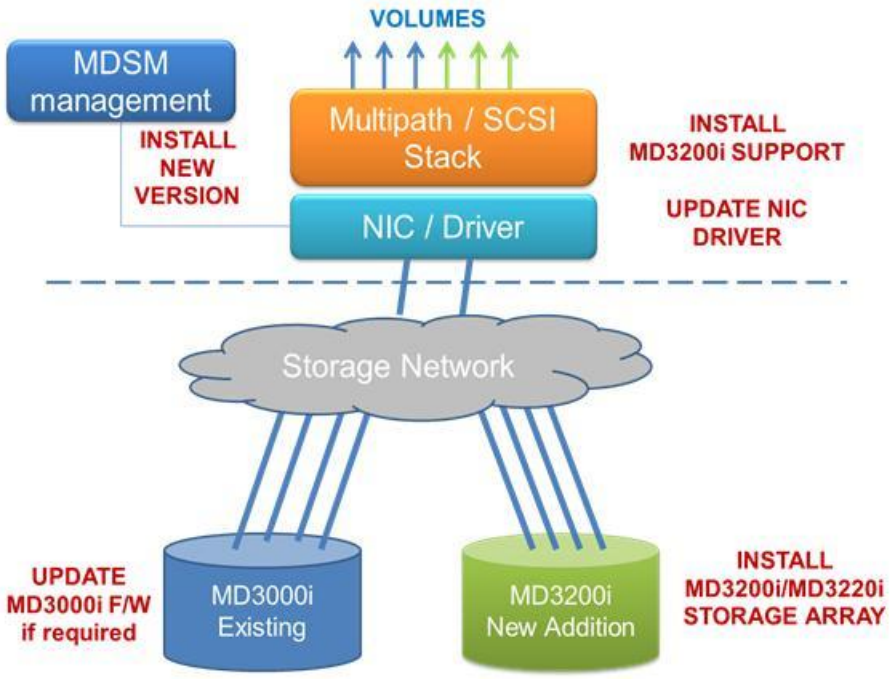
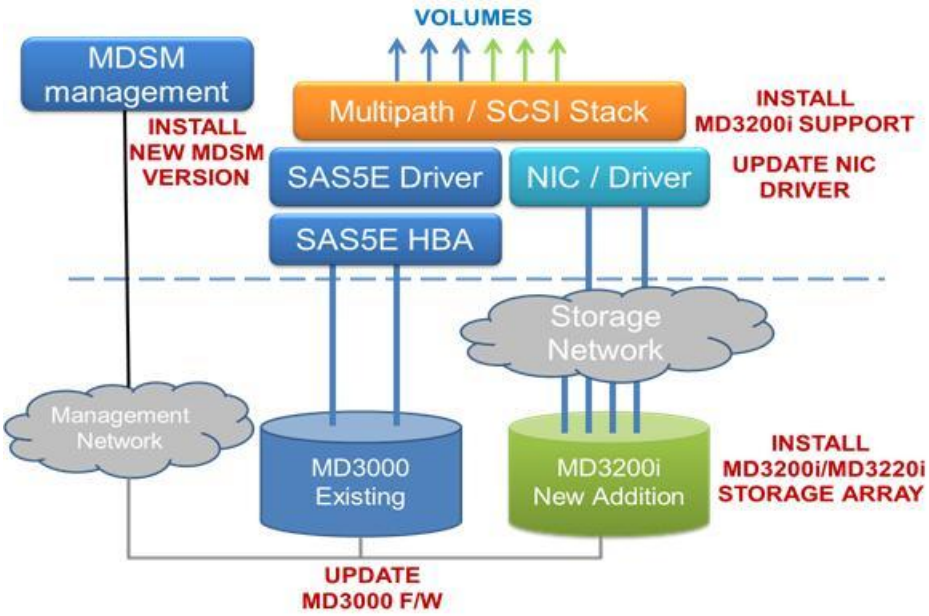


Figure 2. Effected System Components — SAS to iSCSI Data Movement



Management Station—Install MD3200i/MD3220i or MD3600i/MD3620i MDSM

Installation of the PowerVault Modular Disk Storage Manager is *required* for support of the MD3200i and MD3600i series storage arrays and any existing MD3000i series storage arrays. All product families are completely supported by the latest version of MDSM.

- If the management software is installed on a server with only MD3000 or MD3000i storage attached, take care to select the Management Station Install Set option when installing MDSM. Selecting the Full, Host Only, or Custom Install Sets option will install the shortened MD3200 and MD3600i host level timers, which do not support advanced error recovery timing required for the MD3000i series.
- If the management server is also the same server that will host the MD3200i or MD3600i, then perform a full installation of MDSM.

Host Support

Use the MDSM Full or Host Only install set options for hosts attaching to the new MD3200i and MD3600i series iSCSI storage. These options install the driver stack that properly detects and controls the MD3200i and MD3600i Series arrays and configured Virtual Disks. A server reboot is required to load the new driver stack.

Installation of the host support stack for MD3200i and MD3600i series replaces common timer settings and advanced error recovery parameters for a concurrently attached MD3000i.

Operating System Support

Microsoft® Windows® Multipath Support

Microsoft Windows 2003 R2 SP2, Windows 2008 SP2, and Windows 2008 R2 supported operating systems provide a native multipath support structure. The Device Specific Module (DSM) installed during the Host or Full MDSM installation adds required support for the MD3200i and MD3600i within this structure. No further change is required.

Linux Multipath Support

Linux based system multipath support is changing from RDAC (MPP) to DM (Device Mapper). This change is supported by the MD3200i and MD3600i series storage products with Dell drivers. Please reference the *Dell™ PowerVault™ MD3200i/MD3220i and MD3600i/MD3620i Storage Arrays Owner's Manual* for details on configuring DM.

Currently the MD3000i series is supported by MPP only. DM support and error recovery improvements for the MD3000i series are currently under development.

While there is a difference in multipath support, data transfer for data migration purposes is possible only *prior to installation of DM*. For data migration from a Linux based system with MD3000i attached using MPP, do *not install DM*. MD3200i and MD3600i virtual disks may be discovered to be mounted.

It is recommended that the user revert to a single storage series as soon as possible after data migration, since robust multipath support may not be in effect for a mixed storage application.

iSCSI Connection

iSCSI connection of either PowerVault MD3000i or MD3200i series iSCSI interface storage arrays uses 1Gbit/second server NICs (Network Interface Controllers) with no hardware differences required for upgrading from MD3000i to MD3200i series products. The MD3600i series supports 1Gbit/second and

10Gbit/second speeds and is set to 10Gbit/second by default. If the customer wishes to connect the MD3600i series to a 1Gbit switch or end point, the speed must be manually set to 1Gbit/second on the iSCSI host ports using MDSM; speed auto-negotiation is not supported on the MD3600i series. Dell recommends that the latest NIC firmware and drivers be downloaded from http://support.dell.com and installed.

- The MD3000i, MD3200i, and MD3600i coexist without restriction on a Storage Area Network (SAN) where host servers have unique attachment of either model of storage array. Install the applicable host support stack for each product.
- At this time, concurrent attachment of MD3000i and MD3200i or MD3000i and MD3600i to the same server is recommended only for data migration.
- The network infrastructure configured for 1 Gbit/second MD3000i also supports MD3200i without modification. The MD3600i, however, requires a manual speed change setting to 1Gbit/second.

iSCSI discovery, login, and volume mounting are the same for MD3000i, MD3200i, and MD3600i. The systems may be distinguished within the iSCSI initiator by their iSCSI qualified name (iqn) strings.

- MD3000i: iqn.1984-05.com.dell:powervault.<*target unique string*>
- MD3200i: iqn.1984-05.com.dell:powervault.**md3200i**.<*target unique string*>
- MD3600i: iqn.1984-05.com.dell:powervault.**md3600i**.<*target unique string*>

Successfully Tested Configurations for Data Transfer

Original Attachment	Added Storage	Management Station	Notes:
MD3000i	MD3220i	Remote	MD3200 Host support required
MD3000i	MD3220i	Local on MD3000i server	MD3200 Host support required
MD3000 / SAS5E	MD3220i	Either remote or local	MD3200 Host support required

Testing was performed using dedicated servers with high I/O loading and data verification. No test of data migration was performed simultaneously with typical active data sets or online customer applications. Testing used:

- IOmeter (block transfer)
- Dell proprietary data transfer and verification tools (file transfer)
- Microsoft RichCopy (file transfer)—Observed measurements MD3000i to MD3220i:
  - Set up using thread counts of: Directory Search: 1, Directory Copy: 32, File Copy: 32
  - Used up to 12 GByte of host memory (out of 16 GByte total)
  - Network Utilization: Up to 70%, all configured NICs
  - Average Data Throughput (mixed filesize loads) 39.9 to 40.9 Mbytes/second
- MD3000i currently running firmware level 07.35.31.30

Frequently Asked Questions (FAQ)

FAQ: Management Server Update

Q. What is the recommended configuration for a Management Server?

A. The Modular Disk Storage Manager function can reside on any server, but should be limited to one instance per set of arrays being managed. For larger facilities, a dedicated management server is recommended.

Q. Do I need to retain my MD3000i series MDSM installation when adding an MD3200i?

A. No. The MD3200i and MD3600i MDSM have enhanced the management structure to include both an Enterprise Management view and individual Array Management windows. The Array Management Window (AMW) supports the MD series Storage Array target, whether MD3000i series, MD3200i, or MD3600i series.

Q. Can I upgrade the MDSM Management software if it is installed on a server that also has MD3000i series Storage Arrays attached?

A. Yes. It is required that you also upgrade when including MD3200i or MD3600i Series Storage Arrays in your management domain.

Q. What is the process for upgrading the MDSM Management Software?

A. When using the installation DVD provided with the MD3200i or MD3600i, select the Management Software installation option and uncheck the option to run the configuration utility on reboot. The installation will process without requiring a server reboot.

FAQ: iSCSI Host Connection

Q. Can I use the default Microsoft Device Specific Module to connect my MD3200i or MD3600i?

A. No. The default Microsoft DSM (msiscdsm) will detect the MD3200i and MD3600i; however, it only surfaces the lowest numbered LUN to Disk Management for use. Data transfer without redundancy features is possible to this LUN only. The DSM provided with the MD3200i and MD3600i (md3dsm) provides the necessary device management to surface all the configured LUNs to the host.

Q. What new features are supported by the MD3200i and MD3600i installation that will affect simultaneous use of MD3000i and MD3200i or MD3000i and MD3600i?

A. The MD3200i/MD3600i software supports enhanced error recovery timing, which reduces the array subsystem time required during successful extended RAID software error recovery. These reduced time-outs are not currently supported by MD3000i code (and are anticipated for a future code release). The error recovery process for MD3000i may be truncated by the enhanced timing, resulting in subsystem failure for what may have been successful error recovery processes. Engineering tests do demonstrate the ability to survive a reset of one controller during data transfer without loss of data.

Q. Can both MD3000i and MD3200i or MD3000i and MD3600i be attached to the same host for data migration?

A. Yes, both iSCSI storage arrays can be attached to the same host for data migration. At this time, continued simultaneous attachment for normal use is not recommended, since timing changes implemented with the MD3200/MD3600 design may result in false failures on MD3000i.