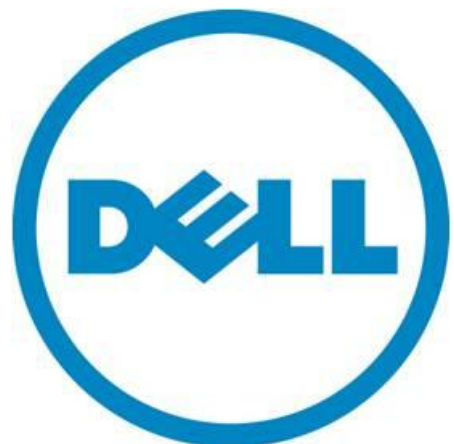# Data Migration: Moving from the Dell PowerVault™ MD3000i/MD3000 to MD3200i/MD3220i Series Storage Arrays

A Dell Technical White Paper

PowerVault™ MD3200 and MD3200i 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 storage array.

Planning the Migration

Data migration can be 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.

The steps for migrating data from MD3000i/MD3000 storage directly to a new PowerVault MD3200i are:

1. Backup the data
   Note: Backup is recommended for data security and archival storage, and a backup should be performed prior to attempting any data migration or reconfiguration solution.
2. Determine amount of data to be migrated, and amount to be archived
3. Schedule an offline period (recommended) for data migration (see Tested Configurations, below for estimated data throughput)
4. Obtain migration software compatible with your operating system, applications, and data types
5. Configure MD3200i/MD3220i storage per instructions below
6. Move data using disk to disk migration software
7. Remove MD3000i/MD3000 from host system
8. Complete MD3200i/MD3220i host installation (Linux/SUSe O/S'es)
9. Map volumes per application requirements

Interoperability Limitations

Concurrent attachment of Dell PowerVault MD3000i/MD3000 storage and Dell PowerVault MD3200i/MD3220i 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 storage arrays are concurrently attached to the same server. It is recommended the MD3000i be at the latest released version of firmware (see http://support.dell.com) prior to performing data movement actions.

Interoperability: Error Recovery Process

The MD3200i/MD3220i products contain advancements in error recovery algorithms which significantly reduce the time required during error recovery processes. Common host level drivers have been modified to reflect the revised timing, reducing system delay time before system level error recovery can be invoked in the rare case of significant I/O timeout greater than 60 seconds.

Incorporation of these reduced timer values into common software support stacks has, however, produced a situation where the later stages of advanced error recovery may be truncated in an

MD3000i/MD3000 system in the rare case of significant I/O timeout where storage system RAID controller resynchronization of redundant controllers becomes necessary to resolve a complex error situation. Normally this process would be 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 which can result from transient events.

Interoperability: Linux Device Manager

Latest versions of Linux based systems utilize Device Manager (DM) for multipath connection, replacing MPP.   Support for MD3000i/MD3000 in this environment is under investigation.   MD3200i/MD3220i has been developed with DM support.   Temporary interoperability of both storage systems using MPP is possible for data migration.

MD3200i/MD3220i Configuration for Data Migration

When migrating data to the MD3200i series storage arrays, the first step is to install support software which includes the disk management utility, PowerVault Modular Disk Storage Manager (MDSM), and host software drivers.   This software is installed using the *MD3200i Resource DVD*.   The iso image of this CD may be downloaded from http://support.dell.com.   Adding support for the MD3200i series storage requires the following steps (Ref: Figure 1 or Figure 2):

1. Install new Management Station software to enable configuration of the MD3200i
2. Install Host software to install drivers for the MD3200i and to enable LUN detection
3. Configure the Host Operating System for the multipath environment (see Operating System, below)
4. Attach the MD3200i storage array to the network
5. Configure virtual disks on the storage array
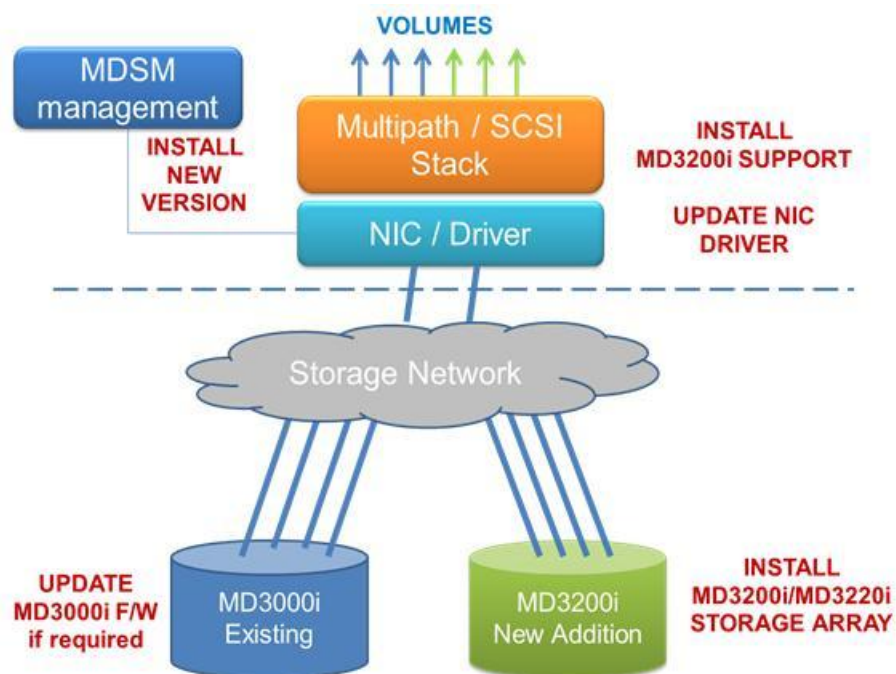6. Discover and mount virtual disk volumes

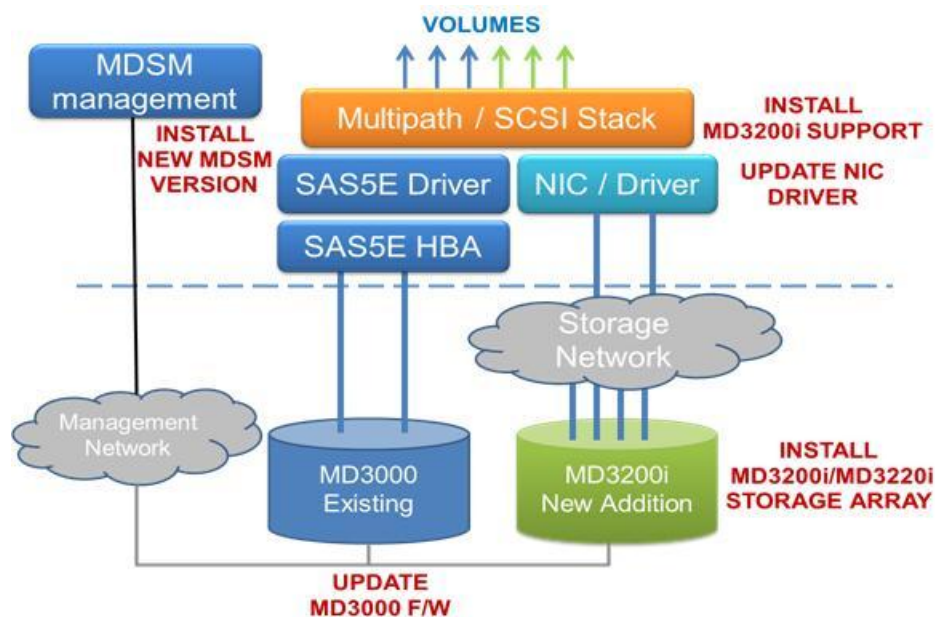**Figure 1.   Effected System Components – iSCSI Installation**

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

Management Station – Install MD3200i MDSM

Installation of the PowerVault Modular Disk Storage Manager (MDSM) is <u>required</u> for support of the MD3200i series storage arrays and any existing MD3000i series storage arrays.   Both series of products are completely supported by the latest version of MDSM supplied with the MD3200i series of products.

- Should the management software be installed on a server which also has only MD3000 or MD3000i storage attached, care must be taken to select the Management Station Install Set option when installing MDSM. Note: selection of Full, Host Only, or Custom Install Sets will install the shortened MD3200 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 which will host the MD3200i, then perform a Full installation of MDSM.

Host Support

MDSM Full or **Host Only** Install Set options must be used for hosts attaching the new MD3200i series iSCSI storage.   These options install the driver stack which properly detects and controls the MD3200i 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 series will replace 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 Managers (DSM) installed during the Host or Full MDSM installation will add required support for the MD3200i 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 series storage products with Dell drivers. Please reference the *Dell™ PowerVault™ MD3200 and MD3220 Storage Arrays Owner's Manual* for details on configuring DM.

Note: Currently the MD3000i series is supported by MPP only.

Note: 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 <u>prior to installation of DM</u>. For data migration from a Linux based system with MD3000i attached using MPP, do ***not install DM***. MD3200i 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 as 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 capable server NIC's (Network Interface Controller), with no hardware differences required for upgrading from MD3000i to MD3200i series products.   Dell recommends that the latest NIC firmware and drivers are downloaded from support.dell.com and installed.

- Both MD3000i and MD3200i will coexist without restriction on a Storage Area Network (SAN) where host servers have unique attachment of either model of storage array. The applicable host support stack should be installed for each product.
- Concurrent attachment of MD3000i and MD3200i to the same server is recommended only for data migration at this time.
- The network infrastructure configured for 1 Gbit/second MD3000i will also support MD3200i without modification.

Discovery, target logon, and volume mounting are the same for both MD3000i and MD3200i. The systems may be distinguished within the iSCSI initiator by their iqn strings.

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

Tested Configurations

Configurations which have been successfully tested in an engineering environment for data transfer are

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:
    o Setup using thread counts of: Directory Search: 1, Directory Copy: 32, File Copy: 32
    o Used up to 12 GByte of host memory (out of 16 GByte total)
    o Network Utilization: Up to 70%, all configured NICs
    o 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

- What is the recommended configuration for a Management Server?
  - The Modular Disk Storage Manager (MDSM) 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.

- Do I need to retain my MD3000i series MDSM installation when adding an MD3200i in my shop?
  - No. The MD3200i MDSM has 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 or MD3200i series.

- Can I upgrade the MDSM Management software if it is installed on a server which also has MD3000i series Storage Arrays attached?
  - Yes, and it is required that you upgrade when also including MD3200i series Storage Arrays in your management domain.

- What is the process for upgrading the MDSM Management Software?
  - When using the installation DVD provided with the MD3200i select the Management Software installation option, and uncheck the option to run the configuration utility on reboot. The installation process will complete without requiring a server reboot.

FAQ: iSCSI Host Connection

- Can I use the default Microsoft Default Device Specific Manager (DSM) to connect my MD3200i?
  - No. The default Microsoft DSM (msiscdsm) will detect the MD3200i; 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 (md3dsm) provides the necessary device management to surface all the configured LUNs to the host.

- What new features are supported by the MD3200i installation which will affect simultaneous use of MD3000i and MD3200i?
  - The MD3200i 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). There is an exposure that 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.

- Can both MD3000i and MD3200i be attached to the same host for data migration?
  - Yes, both iSCSI storage arrays can be attached to the same host for data migration. Continued simultaneous attachment for normal use is not recommended at this time due to the potential for false failures on MD3000i resulting from timing changes implemented with the MD3200 design.