DL4XXX – Fibre Channel Implementation

Dell Technical Marketing
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Revisions

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Document Classification (for non-Titus systems) | DL4XXX - Fibre Channel Implementation | Document numbers, revision numbers, and other document identifiers can be placed in the footer.

Executive summary

Data backup and recovery solutions continue to challenge IT administrators. Traditional data backup and recovery technologies are limited in ability to protect both physical and virtual hybrid environments and struggle to cost effectively meet the demands of data growth.   To reduce RPO, RTO and SLA's demanded by today's business environments, IT administrators are looking to next-generation data protection technologies to reduce costs and management complexity while meeting user demands for performance and availability.

The Dell DL4000 is a 1U turnkey backup and recovery appliance powered by award-winning AppAssure backup and recovery software. The DL4000 protects both physical and virtual servers, nearly eliminates backup windows, recovers applications within minutes, and guarantees recoverability.

In addition to backup and recovery, the DL4000 offers disaster recovery and enterprise capabilities such as remote replication, encryption, compression, deduplication and support for up to 4 standby virtual machines to be used for near instantaneous server recovery. The DL4000 appliance is built and designed to be deployed within minutes and is easy to manage.

Introduction

This whitepaper provides guidance for implementing a DL4000 in fibre channel storage environments. The DL4000 high-capacity edition offers a fibre channel HBA storage option allowing for creation of repositories using fibre channel storage arrays.   Once integrated, the DL4000 protects servers, applications and its data over the LAN in a highly efficient manner utilizing the AppAssure backup and recovery engine.

The DL4000 can be configured in many fibre channel switch and storage array environments that include Compellent and MD3600f storage arrays and Brocade switches that are supported by Dell.   In this white paper, a pair of Brocade 6505 switches and a Dell PowerVault MD3600f storage array is used as an example. The steps and examples for fibre channel integration apply to the DL4X00 family of appliances as well.
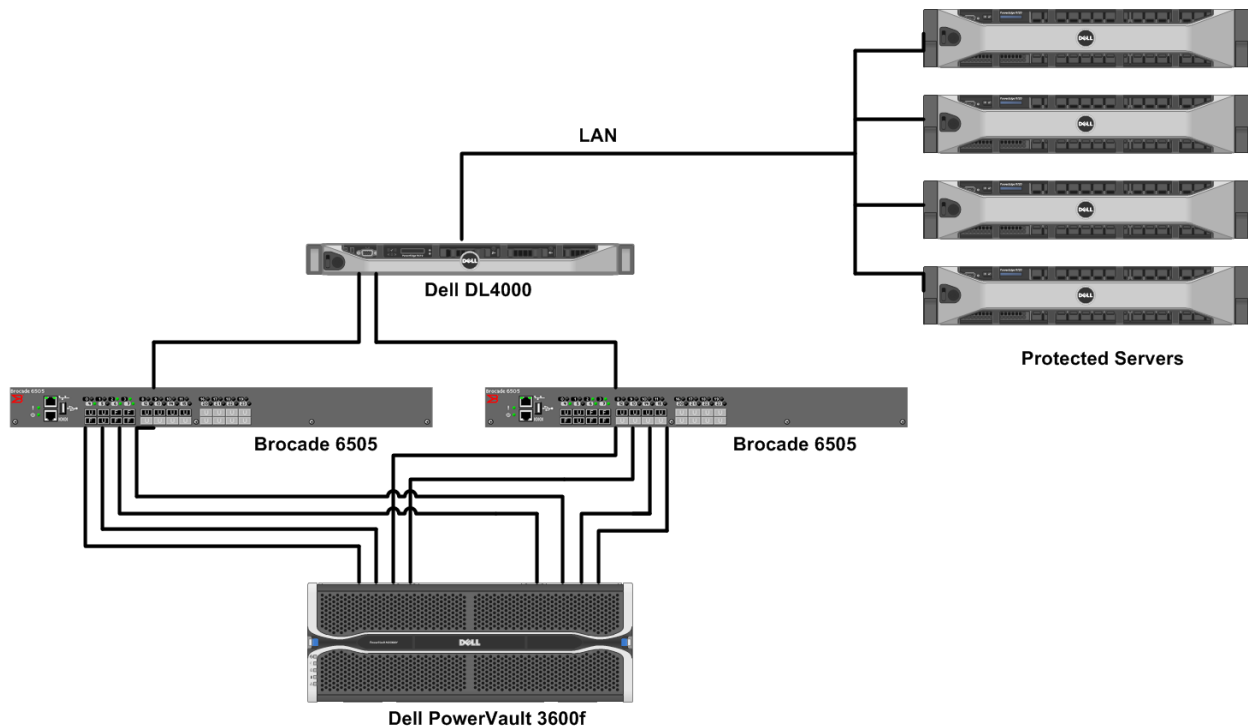
Prerequisites & Assumptions

- The DL4000 is setup and configured within the existing network environment.
    Note: Automatically provision DL4000 using the AppAssure Appliance Configuration Wizard followed by manually configuring the DL4000 fibre channel repositories.

- The MD3600f SAN storage array is setup, configured and operational.
- Remote Installation Services performs the 7th integration process step below. Dell Pro Services performs steps 1-6.

Technical Resources

The following table shows additional documentation available for reference.

Hardware Component	Software / Document or Resource Title	Location
DL4000	DL4000 Manuals and Documentation	Product Support
AppAssure	Knowledge Article 118407	Support.software.dell.com
	Knowledge Article 119910	Support.software.dell.com
QLogic 2562 HBA	QConvergeConsole	driverdownlaods.qlogic.com
Emulex LPE 12002 HBA	OneCommand Manager	Emulex.com/products
Brocade 6505	EZSwitchSetup Administrator's Guide	Product Support
MD3600f	*Dell PowerVault MD3600f and MD3620F Storage Arrays Deployment Guide*	Product Support
	Configuring Fibre Channel With Dell MD3600f/3620f/MD3660f Series Storage Arrays	Product Support

Process for DL4000 & Fibre Channel Integration

The procedure to integrate and use fibre channel storage as a DL4000 backup repository follow these 7 general steps as outlined by this whitepaper:

1. Connect the DL4000 fibre channel HBA to a SAN switch.
2. Install the QLogic or Emulex HBA management software on the DL4000
3. Install the storage array multi path software on the DL4000
4. Fibre Channel Zoning:
   a. Inventory the DL4000 and storage array WWNs (World Wide Names).
   b. Zone the fibre channel fabric to allow the DL4000 to access the storage array.
5. Create a fibre channel LUN to be assigned and used as a DL4000 repository.
6. Mount the fibre channel storage LUN to the DL4000,
7. Configure the DL4000 fibre channel storage as a backup repository.

1. Connect the DL4000 fibre channel HBA to a SAN switch

Refer to the "*Configuring Fibre Channel with Dell MD3600f/3620f/MD3660f Series Storage Arrays Guide*" found on dell.com/support. Consult with your SAN administrator for guidance connecting any fibre channel device into your fabric.

2. Install the QLogic or Emulex HBA management software on the DL4000

Download QLogic QConvergeConsole or Emulex OneCommand Manager HBA management software and install on the DL4000.

3. Install the Fibre Channel Storage Array Multi-Path Software on the DL4000

The MD3600f provides a DSM for the DL4000 MPIO driver. This DSM gives the DL4000 storage array specific information needed to optimize connectivity such as IO-path load balancing and failover.

To load the MD3600f DSM on the DL4000:
1. Insert the PowerVault MD series resource media and install the MDSM software.
2. Select to install the Host Core software on the DL4000.
      NOTE: Installation of the DL4000 DSM (multi-path driver) will enable Microsoft MPIO as necessary.

3. Optionally selecting the "Management Station" will install the MDSM management software on the DL4000 providing management, configuration and monitoring of the storage array.
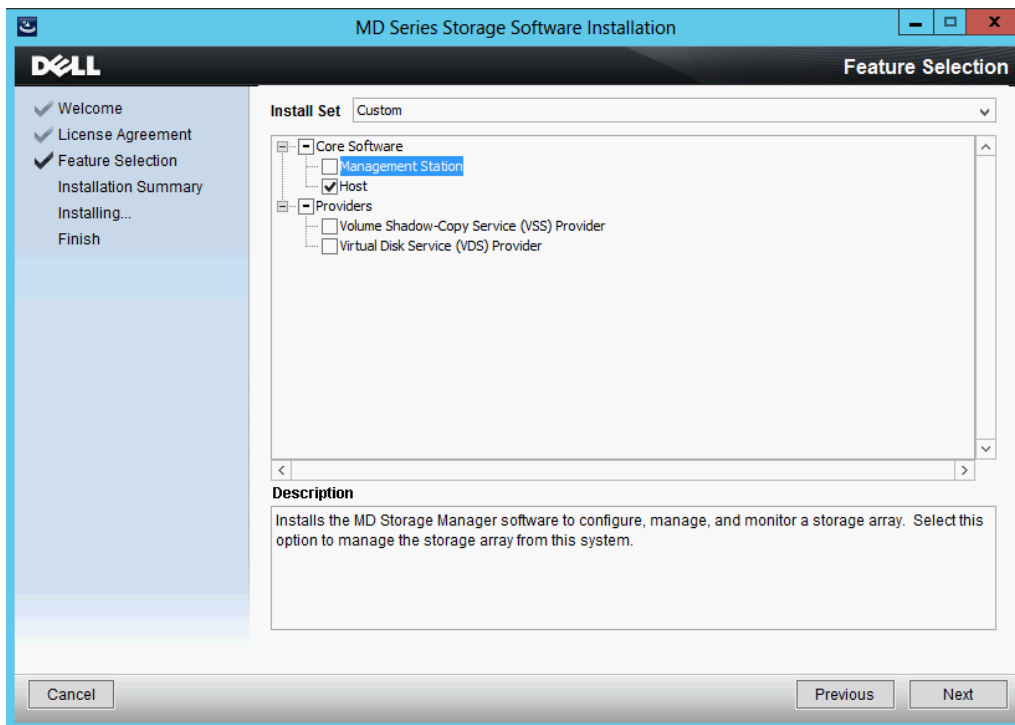
For additional details to these steps, refer to the "*Dell PowerVault MD3600f and MD3620F Storage Arrays Deployment Guild*" on dell.com/support

4. Fibre Channel Zoning

4a. Inventory the DL4000 and Storage Array WWNs
To prepare for zoning, create an inventory of port WWNs. Identify and document the WWN's of the DL4000 HBA ports.   In this example, a DL4000 hosts a QLogic 2562 Dual Port 8GB Optical Fibre Channel Low Profile HBA

1. Within the DL4000, launch QConvergeConsole.

2. Within the console, select Port 1 and Port 2 and inventory their port WWNs.
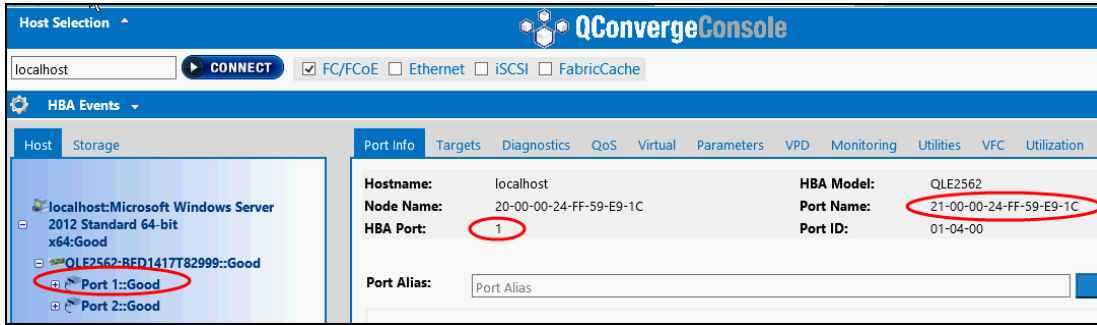
QLogic 2562 HBA	
Port 1	Port 2
21-00-00-24-FF-59-e9-1C	21-00-00-24-FF-59-E9-1D

Identify and document the WWN's of the MD3600f storage array.   The MD3600f has four fibre channel ports on both controller-1 and controller-2.

3. Within MSDM, select the **Summary** Tab, then select **View Storage array Profile**. Select the **Hardware** tab, then the **RAID Controller Modules** sub-tab.   Scroll down and catalog the port WWNs of each controller.
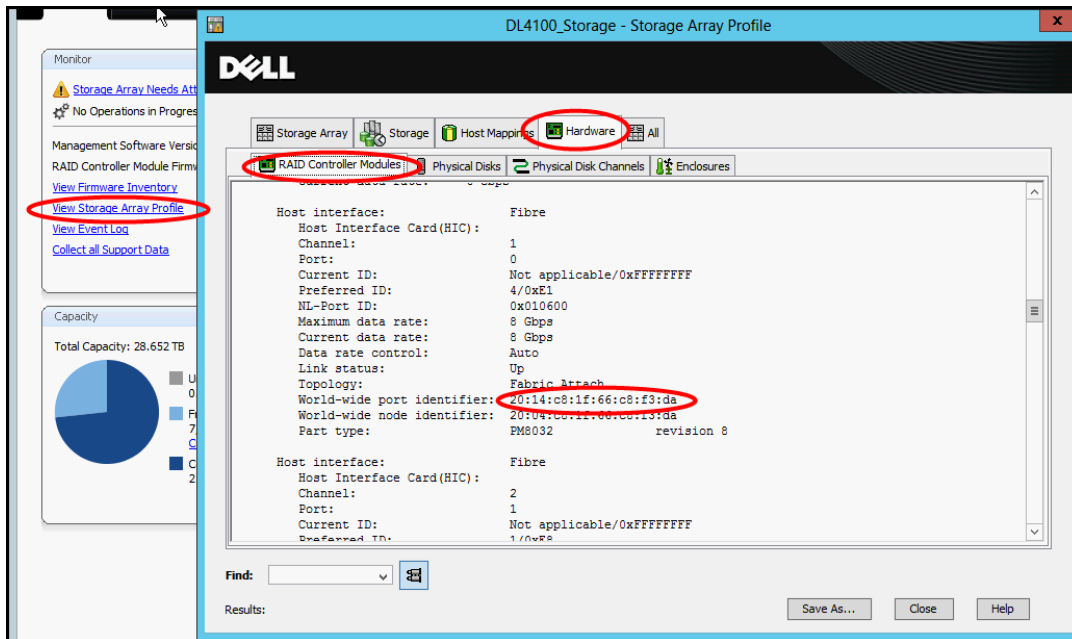
|	Controller-0	Controller-1
Port-0	20:14:c8:1f:66:c8:f3:da	20:15:c8:1f:66:c8:f3:da
Port-1	20:24:c8:1f:66:c8:f3:da	20:25:c8:1f:66:c8:f3:da
Port-2	20:34:c8:1f:66:c8:f3:da	20:35:c8:1f:66:c8:f3:da
Port-3	20:44:c8:1f:66:c8:f3:da	20:45:c8:1f:66:c8:f3:da

4b. Zone the fibre channel fabric to allow the DL4000 to access the storage array

Zoning logically partitions a fibre channel SAN fabric such that devices can access each other. There are many methods and approaches to zoning, thus consult your SAN administrator for zoning practices used in your environment. The following steps describe single initiator and target zoning using a Brocade 6505 fibre channel switch. A zone created in this example use port WWN's to allow the DL4000 to access only the MD3600f. Eight port based single initiator zones are created. Four zones are created on fibre channel switch-1 and four zones are created on switch-2.

1. Launch the Brocade switch-1 management GUI.

2. Identify the DL4000 initiator WWN and the four MD3600f target WWNs connected to the switch. The following four zones will be created in Brocade switch-1:

| Initiator (DL4000 QLogic WWN)	Target (MD3600f controller WWN)
	20:24:c8:1f:66:c8:f3;da
21:00:00:24:ff:59:e9:1c	20:25:c8:1f:66:c8:f3.da
	20:34:c8:1f:66:c8:f3;da
	20:35:c8:1f:66:c8:f3.da

3. Create the four zones in switch-1.

   i. Select **New Zone** and enter a zone name. DL_DR_Zone1 was used in this example.

   ii. Highlight the QLogic initiator and press the arrow button to add it as a new zone member.

   iii. Highlight one of the MD36000f target ports and press the arrow button to add it as a new zone member.
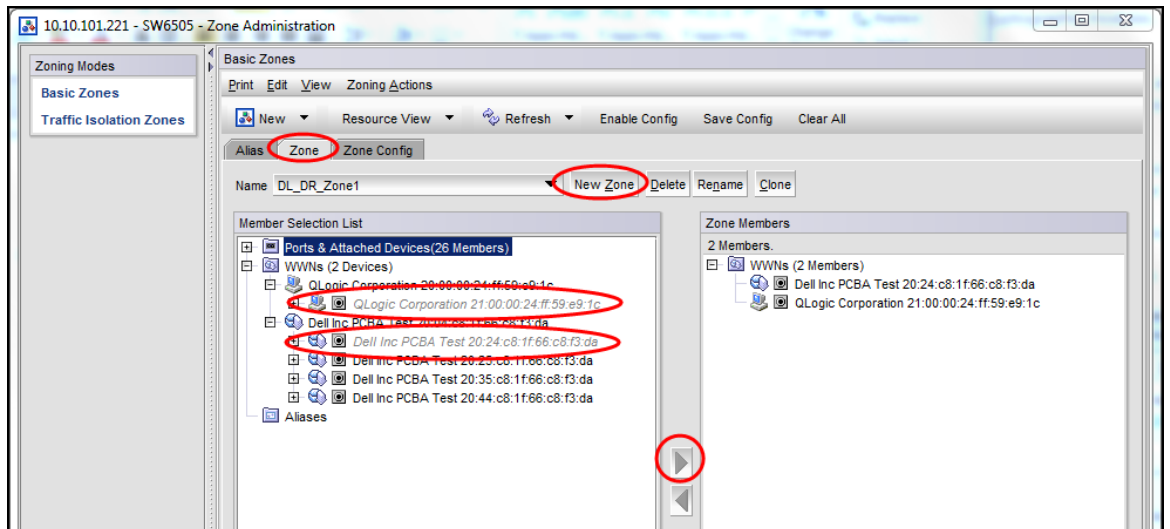
   iv. A new zone has been created. Repeat steps 1- 3 to create the remaining 3 zones for switch-1.

4. Add the 4 newly created zones into a Brocade zone configuration and enable it.

   i.   Select the **Zone Config** tab.

   ii. Select **New Zone Config** and enter a zone configuration name.   'DL_MD3000config' was used in this example.

   iii. Highlight the four zones created in step-3, then press the arrow key to add them in the Zone Config Members list.

   iv. Save the new zone configuration by selecting **Save Config**.

   v.   Enable the zone configuration by selecting **Enable Config**.
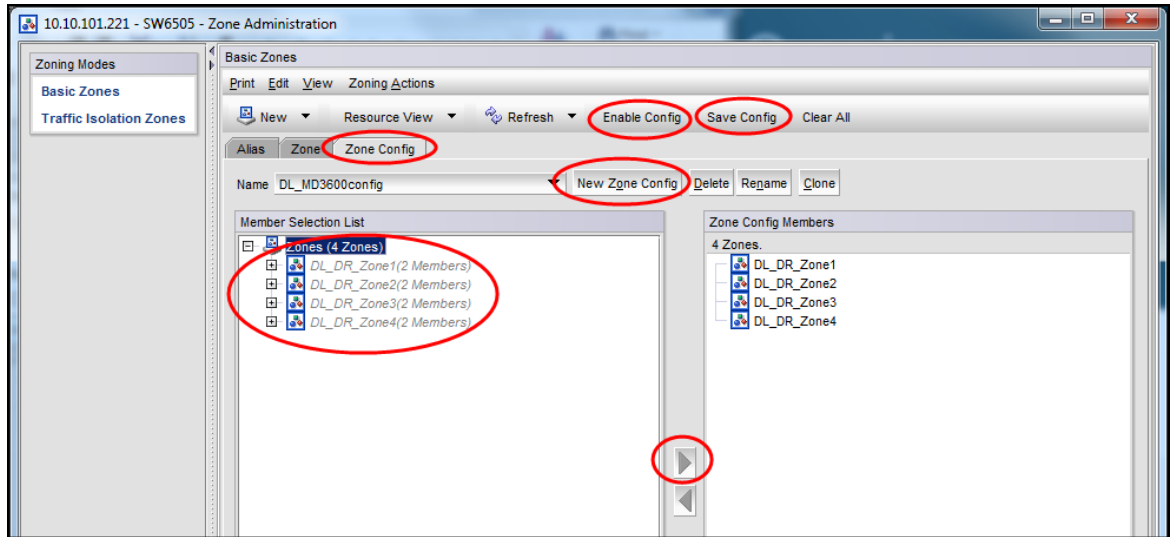
5. Repeat steps 1 - 4 outlined in Section-4b to create and enable the four zones on the alternate fibre channel switch.

5. Create a Fibre Channel LUN to be assigned and used as a DL4000 repository
   *NOTES*:
   - The DL4000 high-capacity edition capacity points are 20, 40, 60 and 80TB. Create your fibre channel storage capacities according to your licensed capacity point.
   - Configure the SAN storage using appropriate number of disk, speed and raid and to support the recommended sustained throughput for your environment. The storage sizing recommendations are identified in the following AppAssure sizing matrix:

| Number of Agents (physical and virtual)	CPU(1)	RAM-Server 2012 (2)	RAM-Server 2008 R2(3)	Network Cards	Repository Size(4)	Disk	Total Repository Size(5)	Application Assurance Triggers(6)	Change Rate Restrictions
Very Small 1-5 Agents	One dual-quad core processor	8GB	Add 2GB RAM per TB of repository space to Server 2012 Memory	1 Gigabit NIC	1.2 x total amount of data in all protected servers for Year 1. Each year add .5TB to accommodate growth	NAS, DAS, or SAN	0 - 2.5TB	1 SQL server/ 1 Exchange Any number of regular servers Max 10% SQL/EXCH Data Max 10% Virtual Standbys	Total change rate across all agents < 10% daily and <20 GB/hr. Maximum size of a single incremental from any agent not to exceed 10 GB
Small 1 - 10 Agents	One quad-core processor, minimum E5-1400	8-16 GB	Add 2GB RAM per TB of repository space to Server 2012 Memory	2 x 1 Gigabit NIC in teamed mode.	1.2 x total amount of data in all protected servers for Year 1. Each year add .5TB to accommodate growth	NAS, DAS, or SAN	2.5 - 6TB	2 SQL servers 1 Exchange Any number of regular servers Max 10% SQL/EXCH Data Max 10% Virtual Standbys	Total change rate across all agents < 10% daily and <20 GB/hr. Maximum size of a single incremental from any agent not to exceed 10 GB
Medium 11 - 20 Agents	One six-core processor. Intel E5-2400 or better.	16–32 GB	Add 2GB RAM per TB of repository space to Server 2012 Memory	2 x 1 Gigabit NIC in teamed mode.	1.2 x total amount of data in all protected servers for Year 1. Each year add .5TB to accommodate growth	DAS or SAN Sustained bandwidth of 200 MB/sec is strongly recommended.	6 - 12 TB	4 SQL servers 2 Exchange Any number of regular servers Max 10% SQL/EXCH Data Max 10% Virtual Standbys	Total change rate across all agents < 10% daily and <75 GB/hr. Maximum size of a single incremental from any agent not to exceed 50 GB
Large 21 - 50 Agents	Minimum one six or eight core processor, Intel E5-2600 or better. Recommended 2 x six/eight-core processors	32-64GB	Add 2GB RAM per TB of repository space to Server 2012 Memory	4 x 1 Gigabit NIC in teamed mode, minimum. 10 Gigabit NIC recommended.	1.2 x total amount of data in all protected servers for Year 1. Each year add .5TB to accommodate growth	DAS or SAN EqualLogic storage or equivalent is strongly recommended. Sustained bandwidth of 300 MB/sec or higher	12 - 30 TB	8 SQL servers 4 Exchange Any number of regular servers Max 10% SQL/EXCH Data Max 10% Virtual Standbys	Total change rate across all agents < 10% daily and <225 GB/hr. Maximum size of a single incremental from any agent not to exceed 75 GB
Enterprise 51 - 100 Agents	Two six or eight-core processors, 2 x E5-2600 or better.	64-128GB	Add 2GB RAM per TB of repository space to Server 2012 Memory	4 x 1 Gigabit NIC in teamed mode, minimum. 10 Gigabit NIC recommended.	1.2 x total amount of data in all protected servers for Year 1. Each year add .5TB to accommodate growth	DAS or SAN Compellent or EqualLogic storage or equivalent is strongly recommended Sustained bandwidth of 400 MB/sec or faster	> 30 TB	16 SQL servers 10 Exchange Any number of regular servers Max 10% SQL/EXCH Data Max 10% Virtual Standbys	Total change rate across all agents < 10% daily and <400 GB/hr. Maximum size of a single incremental from any agent not to exceed 75 GB

Additional storage sizing details are outlined in [Knowledge Article 118407 - Sizing AppAssure 5 Deployments](#).

1. Open up the MDSM storage management tool to configure the SAN storage.
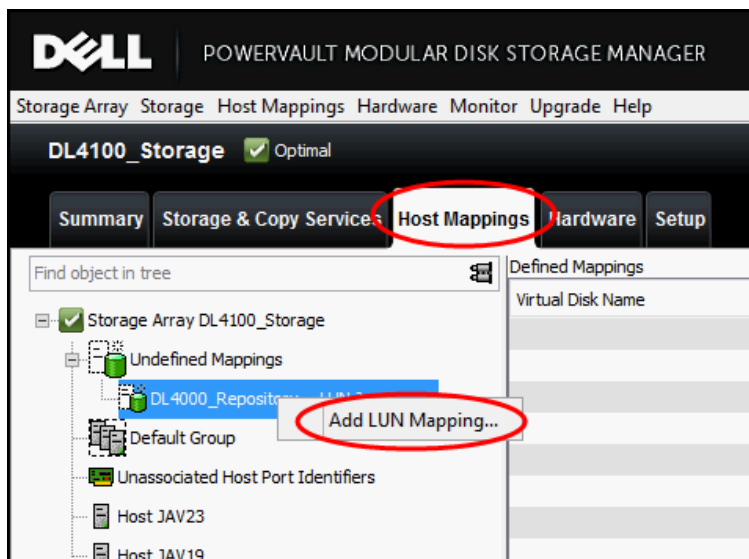2. Select 'Create Storage' to create a LUN or configure Disk Pools or Disk Groups.
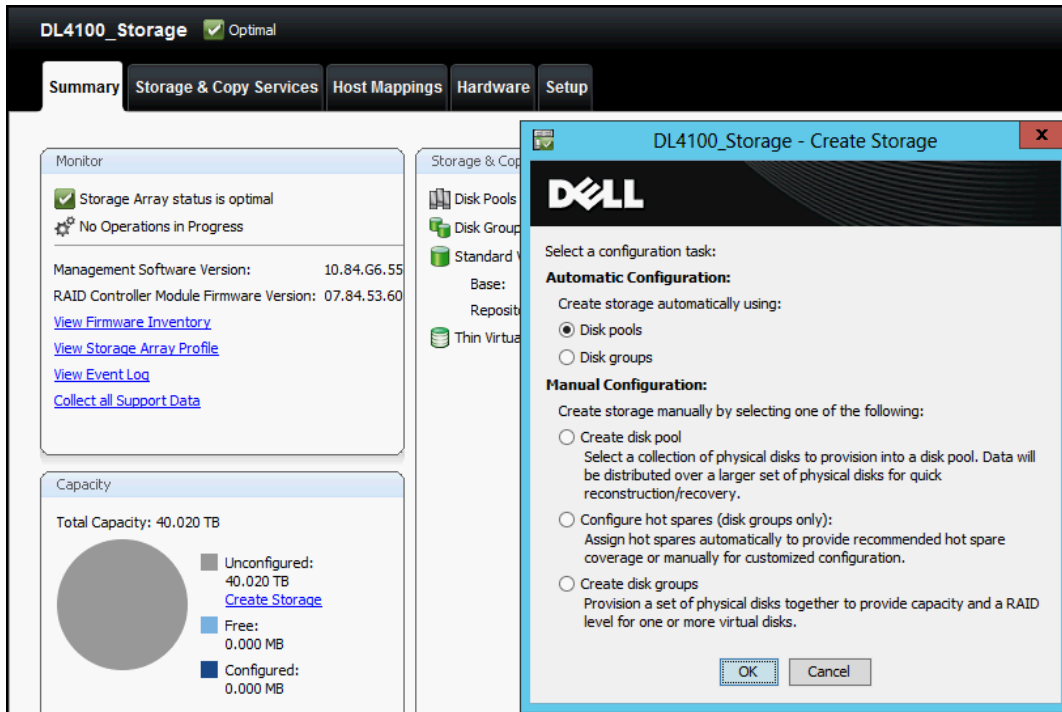
i.   Select **Yes** for the recommended configuration.

ii. Select **No** within the Virtual Disk Automatic Configuration window.

iii. Create a virtual disk. Select the **Storage & Copy Services** tab -> right click **Free Capacity** ->
   **Create Virtual Disk**.
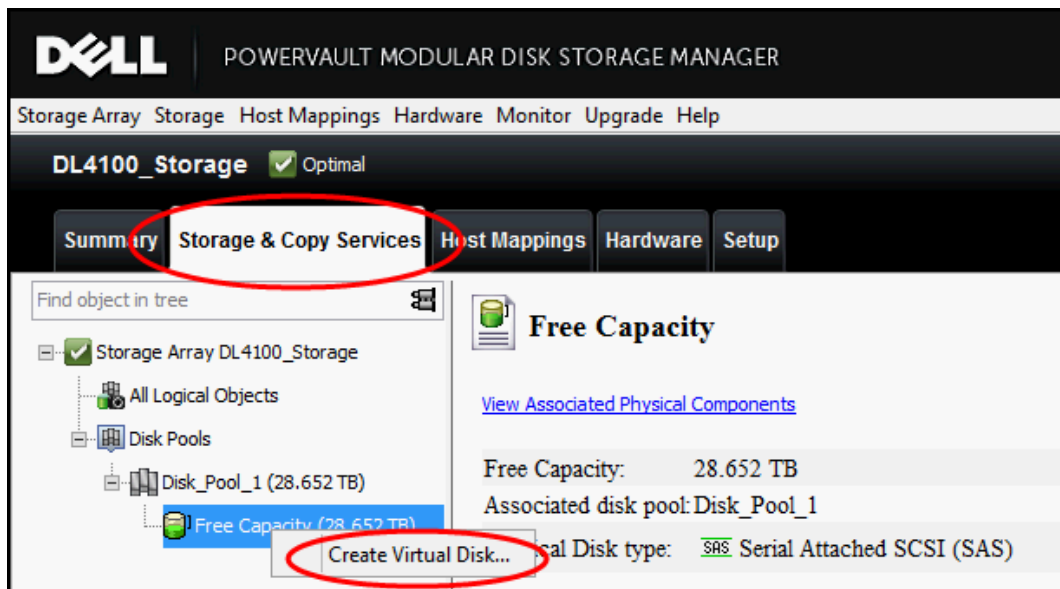
3. Define the capacity for the DL4000 repository and name the LUN. Do not create a thin virtual disk.
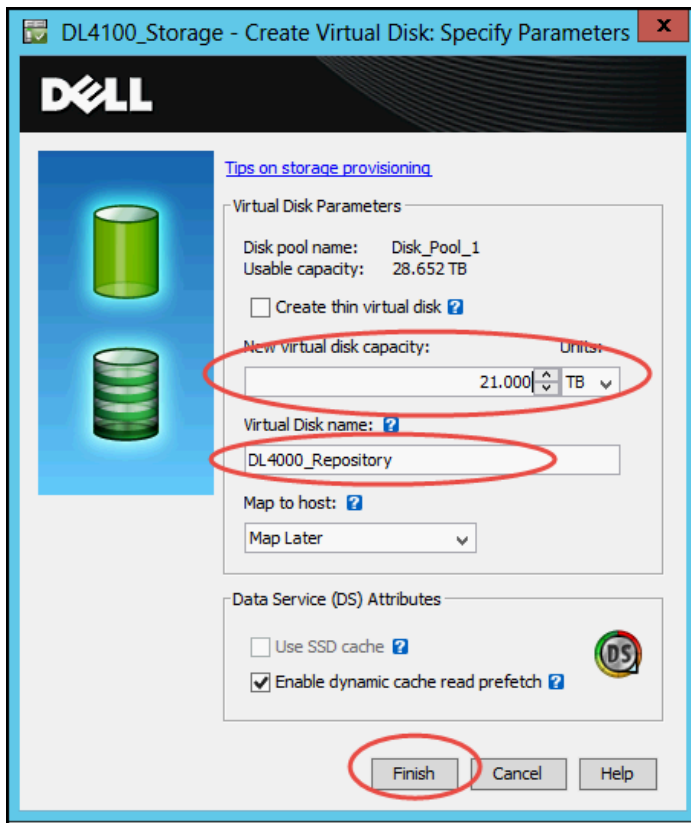
4. Assign the newly created LUN to the DL4000:
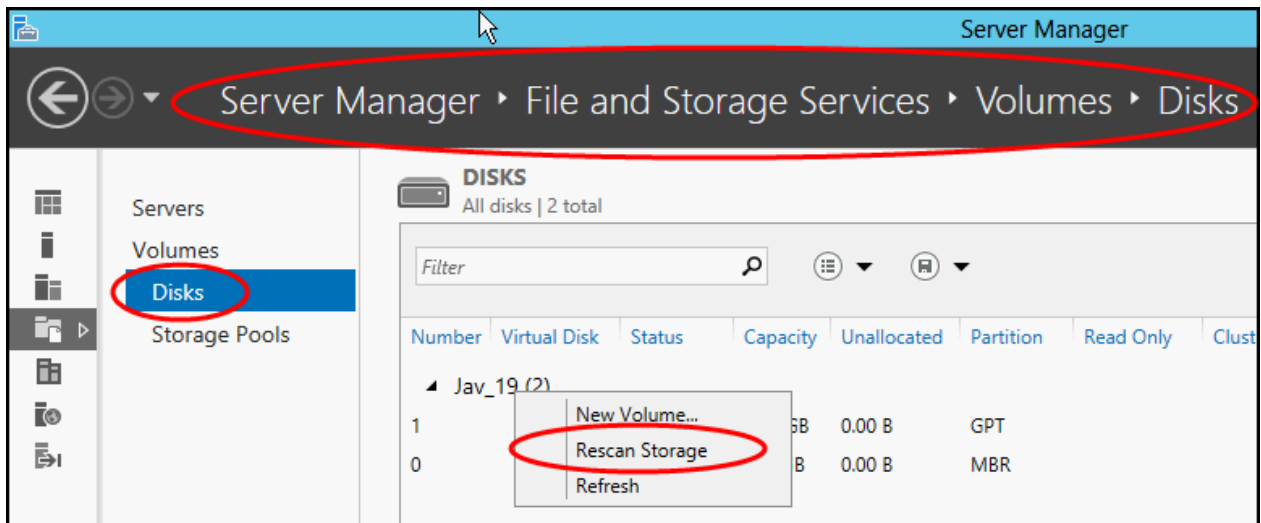   i. Select the **Host Mappings** tab -> Right click the newly created LUN -> then select **Add LUN Mapping**.

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ii. Now, map the newly created LUN to the DL4000. In this example, the DL4000 is named Host JAV19.   The newly created LUN is named DL4000_Repository.   Choose a Logical unit number greater than 0.
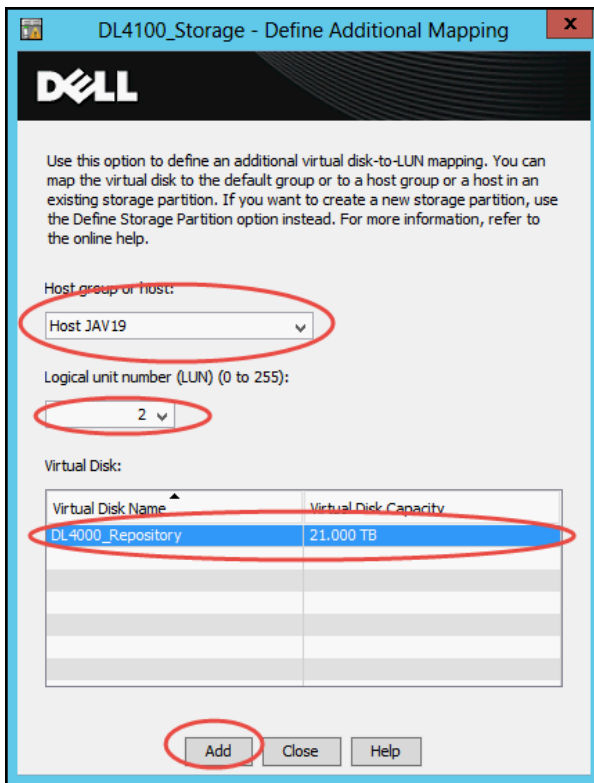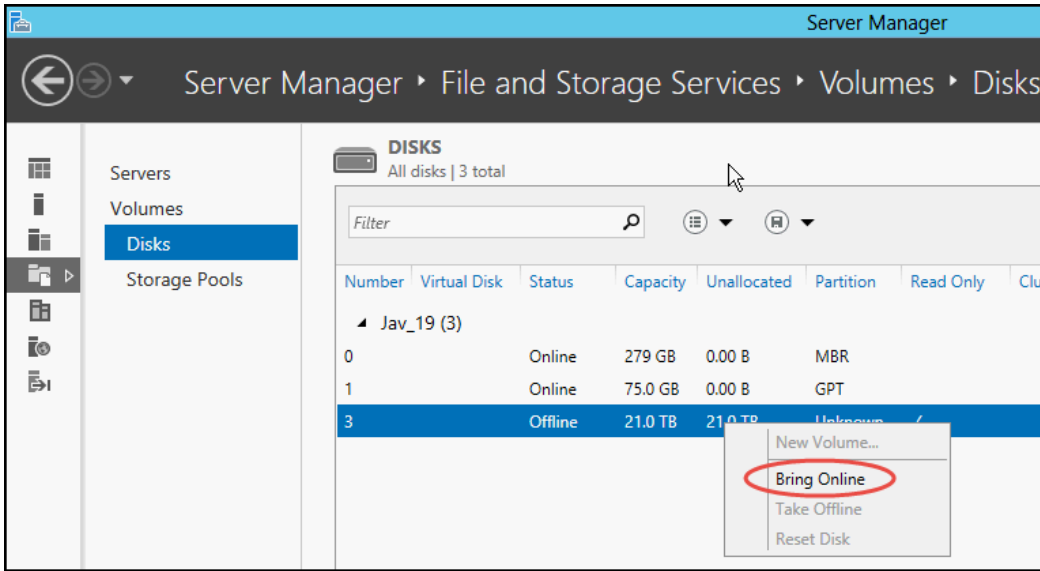

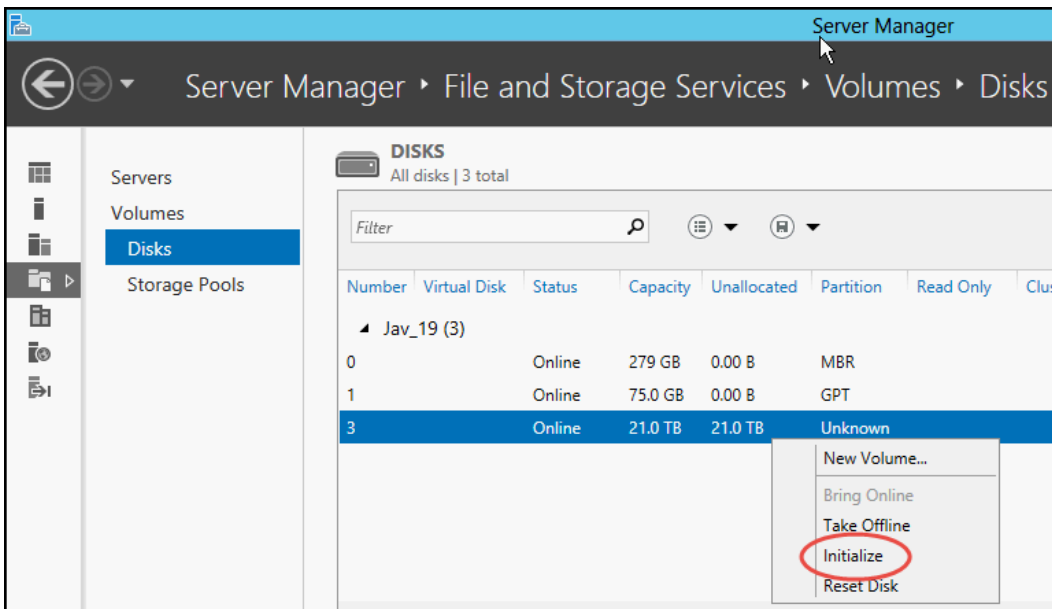6. **Mount the newly assigned fibre channel storage LUN to the DL4000**
    1. At the DL4000 desktop, launch Server Manager -> **File and Storage Services** -> **Disks**. Right click the DL4000 and choose **Rescan Storage.**

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2. Right-click the newly added LUN and then choose **Bring Online**.

3. Initialize the LUN as a GPT disk.

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4. Right-click **New Volume** to launch the New Volume Wizard, and then define a drive letter for newly assigned LUN while using the default wizard settings.
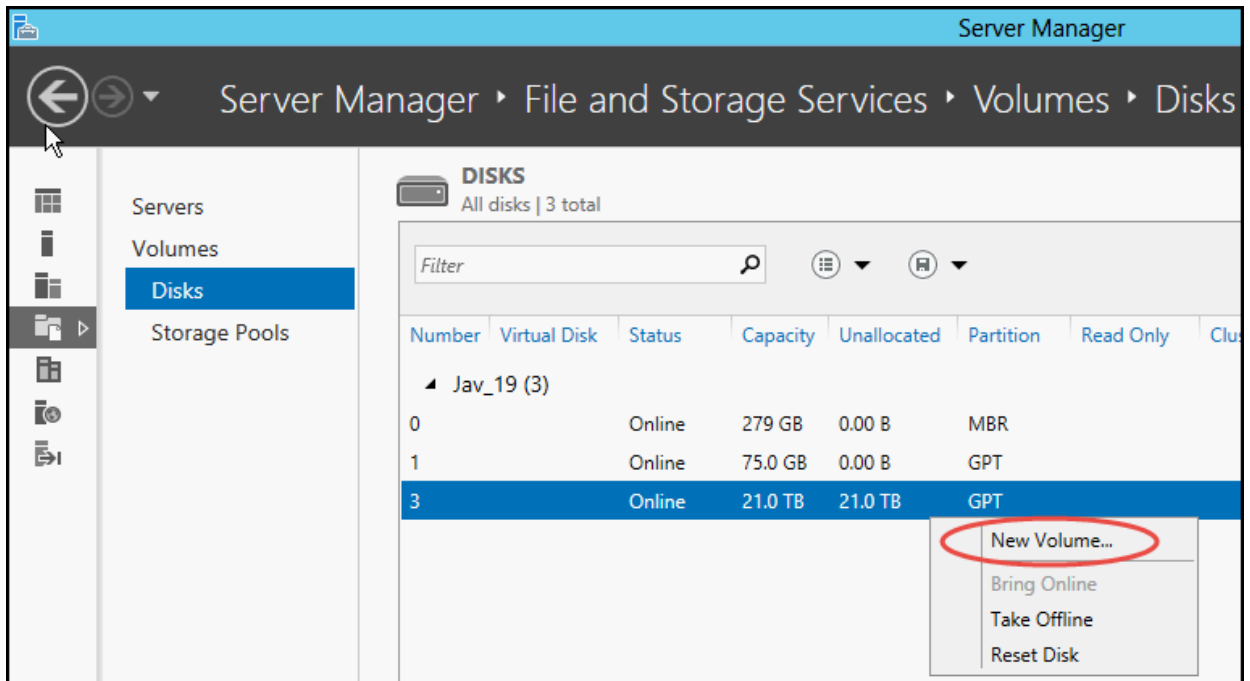

5. When the New Simple Volume Wizard has been completed, the **Volumes** display should look similar to the following diagram. The mounted fibre channel volume is ready to be configured for a DL4000 repository.
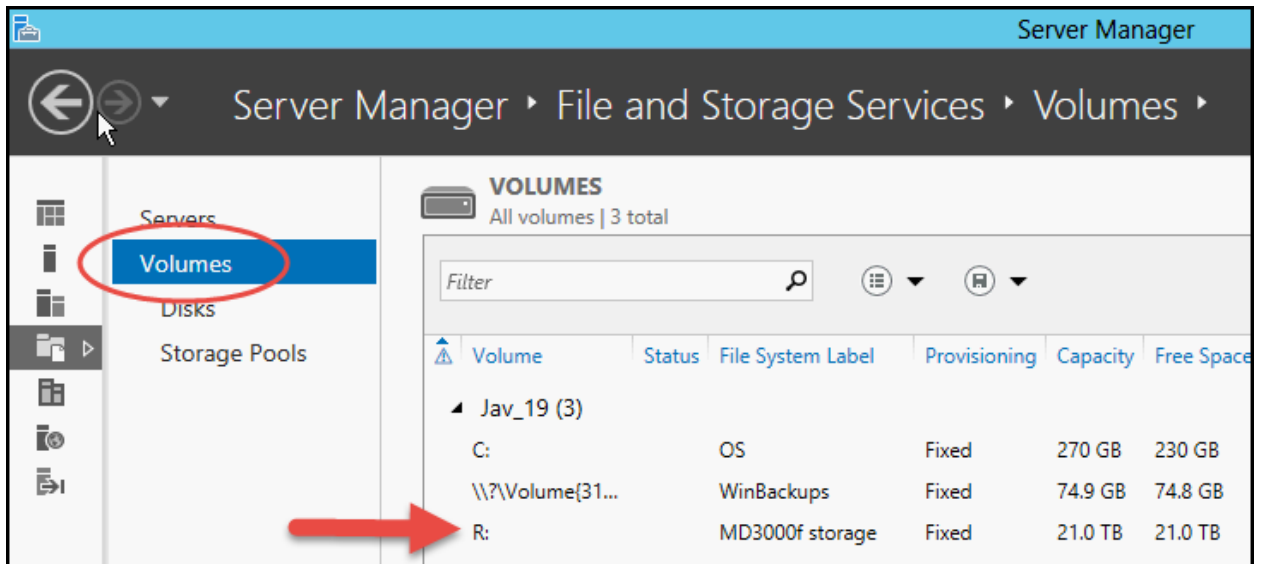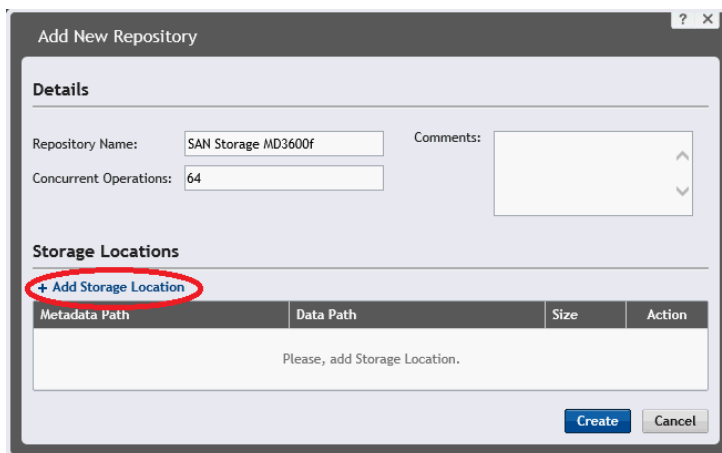
7. Configure the DL4000 fibre channel storage as a backup repository

The following steps configure the fibre channel storage to be used by the DL4000 as a repository. For additional DL4000 repository creation details, please refer to KB119910.

1. Launch the DL4000 Core Console. Select **Configuration** -> **Repositories** -> **+ Add new** to begin the process of creating a new repository.
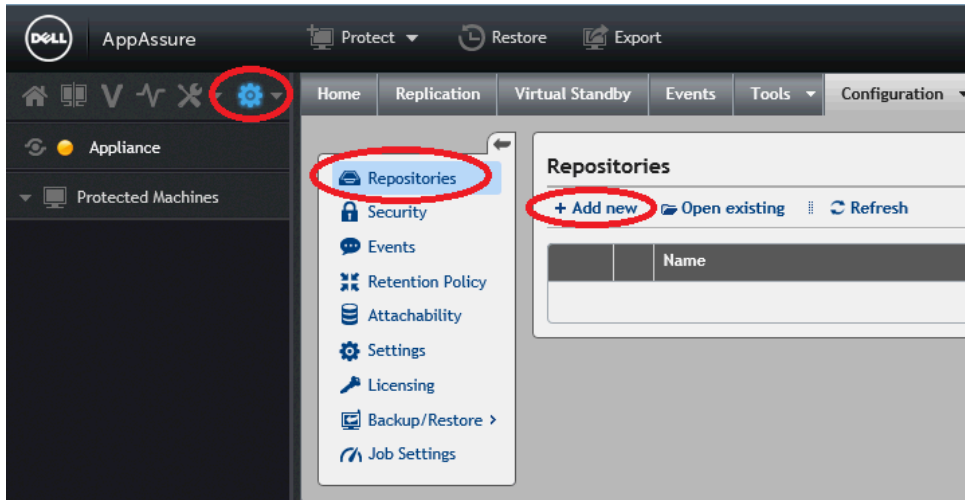

2. Select **+ Add Storage Location** to introduce the SAN storage for DL4000 repository configuration.

3. Select '**Add file on local disk**'.   In this example, the DL4000 \Data and \Metadata folders are configured to use the fibre channel storage identified by drive letter R: Select how much of the SAN LUN will be consumed by the repository (20, 40, 60 or 80TB capacities).   Save the configuration.
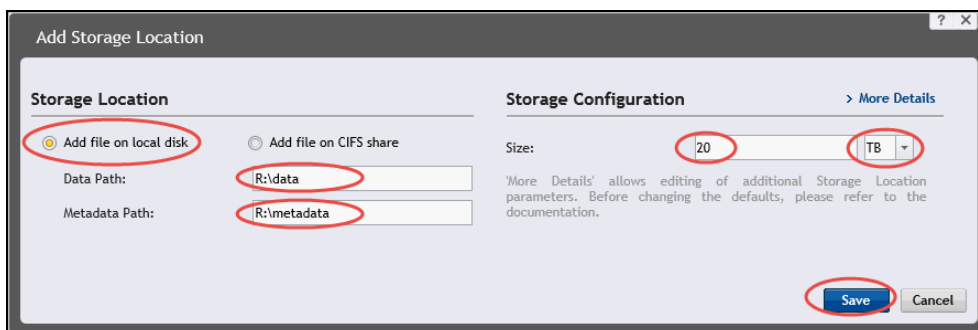
4. Select **Create** to add the new repository.
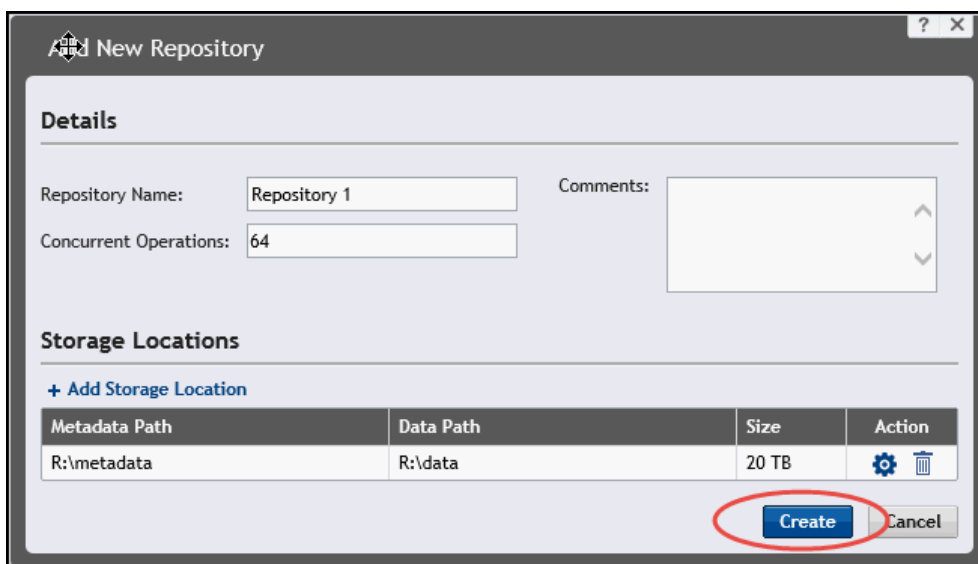
5. To confirm the repository has been created, select the **Repository** option within the **Configuration** tab, and then select **Refresh**. When the newly added fibre channel storage repository is displayed in the DL4000 repository list, the process of adding fibre channel storage to the DL4000 is finished.