Citrix XenServer 5.6
Feature Pack 1

# Solutions Guide

# Notes and Cautions

✏️ **NOTE:** A NOTE indicates important information that helps you make better use of your computer.

⚠️ **CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.**

# Contents

# 1

# Overview

This document contains information that is specific to running Citrix XenServer on Dell servers and storage systems, including features, supported hardware, reference configurations, and best practices.

Dell and Citrix have partnered to bring pre-qualified and virtualization-ready platforms for dynamic and growing data centers. Citrix XenServer with its 64-bit open-source Xen hypervisor at the core, is a powerful virtualization solution that enables efficient resource consolidation, utilization, dynamic provisioning, and integrated systems management.

For general XenServer information including Virtual Management (VM), storage and network configuration, data backup and restore, and administrative steps, see the Citrix XenServer documentation at **mycitrix.com**.

## Citrix XenServer Features

**NOTE:** For a full list of new features in XenServer 5.6 Feature Pack 1, see the XenServer 5.6 Feature Pack 1 release notes at **mycitrix.com.**

- Factory installed from Dell—XenServer is factory installed on select PowerEdge servers and blade systems. This reduces the installation and deployment time required to get your XenServer-based infrastructure ready to run virtual machines (VMs).

- XenServer Local Console—XenServer includes a XenServer Local Console user interface to enable local administration of the host. XenServer Local Console enables you to configure and view host-specific properties such as management network configuration, local storage for VMs, and so on. XenCenter, the standard Microsoft Windows management console for XenServer, is also available.

- High Availability—XenServer supports several features to guarantee service uptime in the event of infrastructure failure. You can configure resource pools for automated high availability. For example, in case of individual host failures, you can move VMs running on the failed hosts to the next available system in the resource pool and restart them.

- Improved reliability—XenServer hosts can connect to remote internet small computer system interface (iSCSI) or Network File System (NFS) storage and take advantage of features such as Citrix XenMotion to minimize VM downtime and workload migration.

- Improved XenServer updates—To improve reliability of software upgrades, the XenServer image contains a primary and secondary copy of the XenServer file system. At any time when an update is applied, only the secondary copy is updated, leaving the primary copy in a known good state. The secondary copy now becomes the primary image. You can update the XenServer host by using the XenServer local console or XenCenter.

- Pre-certified and supported configurations—XenServer is certified and supported by Dell for select system and storage configurations.

- Granular Role-based Access Controls—Users can be assigned one of several roles, which allows them to execute different levels of administrative tasks from XenCenter and the command-line interface (CLI).

- Dynamic Memory Control—This feature allows the memory utilization of existing VMs to be compressed so that additional VMs can boot on the host. This can effectively increase the number of VMs per host. Once VMs on that host are shut down or migrated to other hosts, running VMs can reclaim unused physical host memory.

  **NOTE:** Installation of XenServer on flash storage is no longer supported by Citrix or Dell.

# VM Operating System Support

XenServer VMs are created from templates. A template is a file that contains the configuration settings to instantiate a specific VM. XenServer ships with a base set of templates, some that can boot an operating system installation media, and others that run an installation from a network repository.

For a list of supported operating systems and installation methods, see the XenServer installation guide at **mycitrix.com**.

# XenMotion Support Requirements

XenMotion is the capability of a VM to migrate between physical hosts within a XenServer resource pool with no interruption in service. A resource pool is an aggregate of one or more homogeneous XenServer hosts, and can support up to a maximum of sixteen hosts.

XenMotion is only possible among hosts that are part of a resource pool.

Homogeneous XenServer hosts have the following features:

- Each CPU is from the same vendor
- Each CPU is the same model (except for stepping)
- Each CPU has the same feature flags

For more information on resource pool requirements other than processor models, see the *XenServer 5.6 Feature Pack 1 Administrator's Guide* available at **mycitrix.com.**

**NOTE:** The XenServer Enterprise edition supports heterogeneous pools and you can have heterogeneous servers in the same pool. For more information, see **citrix.com**.

# 2

# Installing and Configuring Citrix XenServer

## Installing XenServer

✎ **NOTE:** If your XenServer host is preinstalled, you can skip the following installation steps and proceed to "Configuring the XenServer Host" on page 12.

**1** Burn the downloaded ISO image to a media.

   ✎ **NOTE:** To download the XenServer ISO image, go to **mycitrix.com**.

**2** Insert the XenServer installation media and boot to the media.

   The installer takes you through several steps and prompts you to select the keyboard type, source installation type, target installation device, supplemental packs, and so on.

   ✎ **NOTE:** A supplemental pack is an additional software that is installed on top of the XenServer image.

**3** If you are installing Linux VMs, you must install the Linux supplemental pack. Select **Yes** and proceed.

   The installer prompts you for the supplemental pack media after it installs the base XenServer image.

**4** Complete the installation by adding the network, locale, and user information.

**5** Confirm your selection.

   The installer partitions the target device and the installation begins. The time required to install XenServer varies depending on the hardware configuration of your server.

# Configuring the XenServer Host

**1** Connect the network cables to the appropriate NIC connectors.

   ![note icon] **NOTE:** If you need to separate the virtual machine (VM) or storage IP traffic from the management console traffic, ensure that your network cables are connected appropriately.

**2** Turn on the system. Citrix XenServer boots automatically.

   The XenServer local console menu is displayed after booting and provides a range of management and configuration options for the XenServer host.

**3** Navigate to **Network and Management Interface→ Configure Management Interface.** Verify that the network configuration is correct. It is recommended that you use a static IP address for your management interface.

   Your XenServer host is now configured.

**3**

# Citrix XenCenter

Citrix XenCenter is the client application for managing the Citrix XenServer host and its virtual machines (VMs). Table 3-1 outlines the system requirements for XenCenter:

**Table 3-1.   XenCenter System Requirements**

| | |
|---|---|
| Operating system | Windows 7, Windows XP, Windows Server 2003, Windows Server 2008, or Windows Vista SP1 and SP2 with .NET framework version 2.0 service pack 1 or later |
| CPU Speed | 750 MHz minimum, 1 GHz or faster recommended |
| RAM | 1 GB minimum, 2 GB or more recommended |
| Disk space | 100 MB minimum |
| NIC | 100 Mb or faster |

You can download the installer for XenCenter at:

- **mycitrix.com**

  *NOTE:* You need to register to download the XenCenter installer.

- **http://<xenserver IP address>**

## Installing XenCenter

*NOTE:* Before installing XenCenter, uninstall all previous versions of the software from your system.

1  Navigate to the directory where you downloaded the XenCenter installer and locate the file. Double-click the icon to launch the application installer.

2  Follow the instructions on the screen. When the installer prompts you for an installation directory, select one of the following options:

- Click **Browse** to change the default installation location.

- Click **Next** to accept the default path
  **C:\Program Files\Citrix\XenCenter**.

By default, XenCenter allows you to save user names and passwords. To disable XenCenter from saving the passwords and user names feature:

**a** Open the registry editor and navigate to the key
**HKEY_CURRENT_USER\Software\Citrix\XenCenter**.

**b** Add the **AllowCredentialSave** key with the string value **false**. This string value prevents XenCenter from saving user names and passwords, and disables the **Save and Restore Connection State** option in the **Tools→ Save and Restore** menu in XenCenter.

**3** On the management station, start the XenCenter application.

**4** In the XenCenter wizard, select **Add New Server**. Provide the host name/IP address and log in information for your XenServer and click **Connect**.

**NOTE:** To start or create new virtual guests, you must activate your free XenServer edition within 30 days from first boot. To request and activate your free license, see the *XenServer 5.6 Feature Pack 1 Installation Guide* at **mycitrix.com**. If you purchased the XenServer Enterprise Edition, you must redeem the activation code from the license card you received with your system.

You are now ready to start managing your virtualization environment using XenCenter.

# Removing XenCenter

Windows XP, Windows 2000, and Windows Server 2003:

**1** Click **Start→ Control Panel→ Add or Remove Programs**.

A list of programs installed on the system is displayed.

**2** Select **XenCenter**.

**3** Click **Remove**.

**4** When XenCenter is uninstalled from the system, a message is displayed. Click **OK** to close the message box.

Windows Vista and Windows 7:

1  Click **Start→ Control Panel→ Programs and Features**.
   A list of programs installed on the system is displayed.

2  Select **XenCenter**.

3  Select **Uninstall** from the toolbar above the list of programs.

4  When the XenCenter is uninstalled from the system, a message is
   displayed. Click **OK** to close the message box.

   > **NOTE:** For more information on using XenCenter to manage your
   > Dell XenServer host, see the online help. You can access online help by
   > selecting **Help Contents** from the **Help** menu. You can also press <F1>
   > to access context-sensitive help from any screen, dialog box, or wizard.

# 4

# Systems Management Using Dell OpenManage

Dell OpenManage Systems Management software suite comprises of system management applications for managing Dell PowerEdge systems.

## Dell OpenManage Components

### Dell OpenManage Server Administrator

Dell OpenManage Server Administrator provides single server management with a secure command line or web-based graphical management user interface.

There are several sub-components in Server Administrator which are described below.

- **Instrumentation Services**—Provides hardware instrumentation and configuration information.
- **Storage Management**—Provides monitoring and instrumentation of the storage connected to the Dell PowerEdge RAID Controller (PERC) and Serial-attached SCSI (SAS) families of controllers.
- **Dell Systems Management Server Administration (DSM SA)**— Provides remote or local access to Server Administrator from any system with a supported web browser and network connection.
- **DSM SA Shared Services**—Runs an inventory collector at startup to perform a software inventory of the system to be consumed by Server Administrator's Simple Network Management Protocol (SNMP) and Common Information Model (CIM) providers. This allows a remote software update using Dell IT Assistant.

### Dell Remote Access Controller

Dell Remote Access Controller (DRAC) is designed to allow anywhere, anytime *Lights Out* monitoring, troubleshooting, and system repairs and upgrades independent of the operating system status.

### Dell IT Assistant

Dell IT Assistant (ITA) provides an integrated view of Dell's comprehensive suite of server monitoring and reporting tools. It includes one-to-many management for Dell systems. ITA can also be used to perform BIOS and firmware updates.

Hardware monitoring of Dell systems is supported with XenServer. Power monitoring of Dell systems is supported on PowerEdge systems that have power monitoring capability. Performance monitoring of Dell systems is not supported with XenServer.

### Dell Systems Build and Update Utility

The Dell Systems Build and Update Utility provides functionality to update and deploy Dell systems. It contains basic functionality provided by OpenManage Server Update Utility and OpenManage Deployment Toolkit. The Dell Systems Build and Update Utility can be used to update the system firmware, configure system components such as DRAC and iDRAC, and configure RAID groups through a graphical interactive wizard.

### Server Update Utility

The Server Update Utility helps simplify single server updates with the latest system software features including inventories, reports, recommendations, and checks for prerequisite conditions.

Only the command line option is supported with XenServer.

### Dell Update Package

As the central component of the OpenManage server management family, Dell Update Package framework helps you to update system software on your PowerEdge systems in a scalable, non-intrusive manner. Dell Update Package features include:

- Self-extracting files that allow you to update system software including BIOS, firmware, drivers, OpenManage Server Administrator, and so on.
- Pre-installation checks for prerequisites such as system model, operating system version, and dependent software to help you avoid sequencing errors.
- Intuitive dialogs to help simplify installation.
- Scriptable and silent capabilities that can enable unattended installation.

### IPMI Baseboard Management Controller

IPMI Baseboard Management Controller (BMC) provides a standard interface for monitoring and managing Dell systems.

### Server Administrator Web Server

Server Administrator Web Server provides a way to manage a server remotely using a web interface. Install the Server Administrator Web Server only if you want to remotely monitor the managed system. You need not have physical access to the managed system.

# Installing OpenManage

The OpenManage software for XenServer is available as a supplemental pack.

> **NOTE:** For more information about the OpenManage supplemental pack, see *Dell OpenManage Server Administrator Installation Guide* at **support.dell.com/manuals**.

To download the OpenManage supplemental pack iso file:

1  Go to **support.dell.com**.
2  Select your line of business.
3  Select **Drivers and Downloads**.
4  Enter the **Service Tag** of the system or **Choose a model** and confirm your selection.
5  Select **XenServer** from the Operating System drop-down menu and then look in the **Systems Management** section.

To install the OpenManage supplemental pack:

1  Burn the supplemental pack iso file to a media or download the iso file to your server.

   If you are downloading the iso file, mount it on a temporary directory and run the command:

   ```
   $ mount -o loop <openmanange-supplemental-pack-
   filename>.iso /mnt
   ```

   If you burned the iso file to a media, insert it in the optical drive and run the command:

   ```
   $ mount /dev/cdrom /mnt
   ```

**2** Install OpenManage and run the command:

```
$ cd /mnt
$ ./install
```

**3** When the installation is complete, unmount the iso file or media and run the command:

```
$ cd ..
$ umount /mnt
```

# Using Dell OpenManage in XenServer

To start, stop, restart, or check the status of OpenManage services, log in to the XenServer local console and run the following commands, as needed:

```
# srvadmin-services.sh start
```

```
# srvadmin-services.sh stop
```

```
# srvadmin-services.sh restart
```

```
# srvadmin-services.sh status
```

To disable OpenManage services so that services do not start at boot, log in to the XenServer local console shell and run the following command:

```
# srvadmin-services.sh disable
```

To enable the disabled OpenManage services, log in to the XenServer local console shell and run the following command:

```
# srvadmin-services.sh enable
```

To connect to the XenServer host and access the OpenManage Server Administrator web-based interface, type the following web address in a supported browser window from a client system:

```
https://<XenServer hostname/IP Address>:1311
```

**NOTE:** 1311 is the default port used by the OpenManage web server.

The XenServer host firewall is pre-configured to allow ports used by OpenManage Server Administrator, so no additional firewall configuration is required. If you change the default OpenManage Server Administrator port to a value other than 1311, make the associated change in **/etc/sysconfig/iptables**. Restart the **iptables** service on the XenServer host by running the following command on the XenServer local console shell:

```
$ service iptables restart
```

To check the version of OpenManage installed, run the following command on the XenServer local console shell:

```
$ omreport about
```

To view the system summary, run the following command on the XenServer local console shell:

```
$ omreport system summary
```

For more information on using OpenManage to manage Dell systems, see the Dell OpenManage Server Administrator documentation at **support.dell.com/manuals**.

# Using ITA in a Citrix XenServer Environment

ITA can be used for discovery, monitoring, and management of XenServer hosts. ITA uses Simple Network Management Protocol (SNMP) to manage Dell systems running Citrix XenServer.

To manage XenServer hosts using ITA:

**1** Specify SNMP community name—Log in to the XenServer local console shell and edit the following entries in the **/etc/snmp/snmpd.conf** file to set your SNMP community name:

```
rocommunity <community name>

trapcommunity <community name>
```

**2** Configure SNMP traps—Configure the SNMP daemon to send SNMP trap messages to the management console. Edit the **/etc/snmp/snmpd.conf** file and edit the following line at the end of the file:

```
trapsink <ITA_IP_Address> <community name>
```

**3** After you edit the **/etc/snmp/snmpd.conf** file, save the file and restart the **snmpd** service by running the following command on the XenServer local console shell:

```
# service snmpd restart
```

**4** Perform a discovery and inventory of the XenServer host in ITA by specifying the XenServer hostname or the management IP address.

The ITA discovers the XenServer hosts and lists them under **Servers**.

For more information on using ITA to discover, perform inventory, monitor, and manage Dell systems, see the Dell OpenManage IT Assistant documentation at **support.dell.com/manuals**.

# Change Management in XenServer

Dell Update Packages for supported PowerEdge systems are available for download at **support.dell.com**. ITA provides a centralized software update capability. You can load Dell Update Packages and System Update Sets (system bundles) into the ITA repository, either from the *Dell Server Updates* media or from the **support.dell.com**. You can also apply updates individually on each XenServer host.

Before you apply an update to the system, ensure that all the virtual machines (VMs) on the system are powered down or the host is in maintenance mode so that there are no active VMs on the XenServer host.

To download a Dell Update Package for the XenServer host:

**1** Go to **support.dell.com**.

**2** Select **Drivers and Downloads**.

**3** Select the line of business.

**4** Select the appropriate system model (example: PowerEdge R710) or enter the Service Tag of the system.

**5** Select **Red Hat Enterprise Linux 5** from the operating system drop-down menu.

**6** Click to expand **BIOS**, and then click **Dell - BIOS**.

**7** Download the Update Package for Red Hat Linux and the GnuPG signature file.

To upgrade the system or device firmware or BIOS using ITA, you must create a software update task. To create a software update task:

1  Download the corresponding BIN and .sign files from **support.dell.com**.

2  In the ITA console, add the Dell Update Package to the ITA repository in the **Manage→ Software Updates** tab.

3  Create a task for **Software Update** and provide the required host details.

NOTE: ITA uses the SSH port for installation of the Dell Update Packages. Ensure that SSH is enabled on the XenServer host. If disabled, you can enable SSH from **XenServer local console→ Remote Service Configuration→ Enable/Disable Remote Shell**.

You can also upload the update package to the XenServer host using a file transfer program and then run the package. Log in to the XenServer host as a root user and perform the following steps:

1  Upload the update package (*.BIN file) to **/var/tmp**.

2  Login to the XenServer local console shell.

3  Run the **BIN** file that you downloaded.

4  Follow the instructions provided by the update package.

5  Reboot the system if required by the update package.

For more information on using Dell Update Package with ITA, see the Dell OpenManage ITA documentation at **support.dell.com/manuals**.

# Removing OpenManage

It is strongly recommended that you do not remove the OpenManage supplemental packs or RPMs. Manually removing any RPM leaves the system in an inconsistent state and makes any potential debugging effort difficult or impossible.

A future release (when available) will support the removal of the OpenManage supplemental pack.

# Upgrading OpenManage

A future release (when available) of the OpenManage supplemental pack will allow you to upgrade to the existing installation.

# Upgrading XenServer With OpenManage Installed

If you upgrade the XenServer image to a new version, re-install the OpenManage supplemental pack as the new XenServer image is placed on a different partition than the original partition.

> **NOTE:** When you reinstall the OpenManage supplemental pack, all OpenManage configuration settings saved on your system are lost. A future release (when available) of the OpenManage supplemental pack will preserve the OpenManage configuration settings.

To upgrade the XenServer image, see "Installing OpenManage" on page 19.

# 5

# Configuring Storage

## PowerVault MD1000 and MD12x0 Storage Enclosures

The PowerVault MD1000 and MD12*x*0 storage enclosures support mixing both SAS and SATA drives within a single enclosure making it ideal for high-capacity applications. The versatility of the PowerVault MD1000 and MD12*x*0 arrays enable you to configure the specific combination of storage resources. PowerVault MD1000 and MD12*x*0 support the following features:

- The PowerVault MD1000 storage enclosure is capable of housing up to fifteen 3.5-inch, 3.0 Gb/s disk drives.

- The PowerVault MD12*x*0 storage enclosure is capable of housing up to twenty-four 2.5-inch SAS disk drives or up to twelve 3.5-inch, 6 GB/s SAS or SSD disk drives.

- Each port on the PERC 6/E or H800 enables up to three PowerVault MD1000 or MD12*x*0 storage enclosures respectively to be daisy-chained to a single host.

- You can split the storage enclosures disk drives between two systems. You must set the mode switch before you turn it on.

- Shared storage for XenServer resource pools is not supported in the PowerVault MD1000 or PowerVault MD12*x*0 storage enclosure.

### Creating a Storage Repository on PowerVault MD1000 or MD12x0 Storage Enclosures

The process to create an SR, on virtual disks, on the PowerVault MD1000 or PowerVault MD12*x*0 controller is the same as creating an SR on the local hard disk drive of the host. For more instructions on creating an SR on local storage, see the XenServer reference notes at **mycitrix.com**.

# PowerVault MD3000 and MD32x0 Storage Enclosures

The PowerVault MD3000 and MD32x0 storage enclosures are designed for high availability, offering redundant access to data storage. It features dual active or active RAID controller modules, redundant power supplies, and redundant fans. The PowerVault MD3000 and MD32x0 storage enclosures are designed for high-performance environments that include either of the following:

- Two-node fully redundant XenServer hosts
- Multi-host storage access for up to four servers

XenServer hosts connected to the same RAID controller module can share the storage volume on the PowerVault MD3000 and MD32x0 storage enclosures. You can migrate VMs across two hosts using Citrix XenMotion.

- The PowerVault MD3000 and MD32x0 storage enclosures are expandable by simply adding up to three additional PowerVault MD1000 or MD12x0 expansion enclosures.
- The entire array subsystem is managed from a single, user friendly software application known as the Modular Disk Storage Manager (MDSM). MDSM streamlines the management and maintenance of storage as it scales.
- In-band management from a XenServer host is not supported.
- To manage the PowerVault MD3000 and MD32x0 RAID enclosures using MDSM, install the MDSM software on a separate supported Microsoft Windows or Redhat Enterprise Linux management station.

## Creating a Storage Repository on PowerVault MD3000 and MD32x0 Storage Enclosures

1   Create and configure a virtual disk using the PowerVault MD3000 and MD32x0 MDSM software (installed on your management station). Ensure that the newly-created virtual disk is controlled by the RAID controller to which your XenServer hosts have access.

2   Map the newly-created virtual disk to the XenServer hosts. For more information on managing hosts and virtual disks on the PowerVault MD3000 and MD32x0 RAID enclosures, see the *Dell PowerVault Modular Disk Storage Manager User's Guide* or PowerVault MD32x0 *Owner's Manual* at **support.dell.com/manuals**.

**3** If you are configuring storage on the PowerVault MD3000 and MD32*x*0 RAID enclosures for a XenServer pool, add all hosts to the XenServer pool. Ensure that the newly-created virtual disk is visible to all mapped hosts. Log in to the XenServer local console shell on each XenServer host and run the following command:

```
# mppBusRescan
```

**4** On the XenServer host or pool master, identify the disk ID of the PowerVault MD3000 and MD32*x*0 storage volumes.

To get the SCSI device name for the storage volume run the following command:

```
# /opt/mpp/lsvdev
```

The output of this command is similar to the following:

```
[root@xs1~]# /opt/mpp/lsvdev

        Array Name      Lun     sd device

        -----------------------------------

        MD3000_Array1    0     -> /dev/sdc
```

Note the SCSI device name (/dev/sdX) and find the corresponding disk ID in the output of the following command:

```
# ls -ltr /dev/disk/by-id
```

The output of this command is similar to one below:

```
scsi-36001c23000c967da00000bae47ecaeeb ->
../../sdc
```

**5** To create an SR on the PowerVault MD3000 and MD32*x*0 virtual disks, run one of the following commands:

- If you are adding storage to a pool, run the following command:

  ```
  # xe sr-create content-type=user name-label=
  <label_of_SR> shared=true type=lvmohba device-
  config:device=/dev/disk/by-id/<disk_id>
  ```

- If you are adding storage to a stand-alone host, run the following command:

```
# xe sr-create content-type=user name-label=
<label_of_SR> type=lvmohba device-
config:device=/dev/disk/by-id/<disk_id>
```

📝 **NOTE:** <disk_id> is the ID noted in step 4.

# PowerVault MD3000i and MD32x0i Storage Enclosures

The PowerVault MD3000i and MD32x0i storage enclosures are a high performance iSCSI Storage Area Network (SAN) designed to deliver storage consolidation and data management capabilities in an easy to use, cost effective solution. PowerVault MD3000i and MD32x0i support the following features:

- The Dell PowerVault MD3000i and MD32x0i storage enclosures consists of a standard or high-availability configuration.
- The standard model has a single controller with two or four 1GbE ports. It can be deployed to support up to 16 hosts non-redundantly.
- The high-availability model has dual controllers with two 1GbE ports per controller for a total of eight 1GbE ports. The dual controller option can connect up to 16 fully-redundant hosts.
- The entire PowerVault MD3000i and MD32x0i storage enclosures are managed from a single, user-friendly software application known as MDSM. MDSM streamlines the management and maintenance of storage as it scales.
- In-band management of an PowerVault MD3000i and MD32x0i storage enclosures from a XenServer host are not supported. To manage PowerVault MD3000i and MD32x0i storage enclosures using MDSM, install the MDSM software on a separate supported Micorsoft Windows or Linux management station.

XenServer is pre-installed with the open-iSCSI initiator that can be used to connect to PowerVault MD3000i and MD32x0i storage enclosures. Alternatively, a software iSCSI initiator inside a virtual machine (VM) can be used to add a storage volume from PowerVault MD3000i and MD32x0i storage enclosures.

By default, the physical network interface on which the XenServer management interface is configured is chosen to route the IP storage traffic. However, a physical interface or a bond of multiple interfaces can be configured to segregate storage traffic from management traffic.

> **NOTE:** For specific steps on using MD3000i and MD32x0i with an iSCSI initiator running inside a virtual machine, see the MD3000i *Installation Guide* or the MD32x0i *Owners Manual* at **support.dell.com/manuals**.

### Creating a Storage Repository on PowerVault MD3000i and MD32x0i Storage Arrays

1 Change the iSCSI IQN of the XenServer host to a string of your choice by selecting the host in Citrix XenCenter, viewing its **General** tab, and clicking the **Edit** button.
   The **Edit General Settings** dialog box is displayed, where you can modify the iSCSI IQN string.

2 Using the MDSM interface, create virtual disks on the PowerVault MD3000 and MD32x0i storage enclosure using the steps described in *Dell PowerVault Modular Disk Storage Manager User's Guide* at **support.dell.com/manuals**. Ensure that the XenServer hosts have a physical path to the controller which owns the newly created virtual disk.

3 From the **Mappings** tab in the **Storage Array Profile** window, note the controller number which owns the newly-created volume. If you wish to provide the XenServer hosts access to more than one volume, ensure all the volumes are on the same PowerVault MD3000i and MD32x0i controller.

   To change the controller that owns a volume, in the MDSM interface:

   **a** Go to **Modify→ Change Virtual Disk Ownership/Preferred Path**.

   **b** Select the appropriate disk group and the virtual disk.

   **c** Select RAID Controller Module 0 or 1 as the virtual disk owner and click **Change**.

4 Run the Modular Disk Storage Manager and manually add the XenServer host(s) based on the new iSCSI IQN entered in step 1. After opening the MDSM and selecting the PowerVault MD3000i and MD32x0i storage array to be configured, select the **Configure** tab.

**5** From the **Configure** tab, select **Configure Host Access (Manual)**. Enter the host name for the server which has XenServer software installed. Select **Linux** as the host type.

**6** From the next screen, specify the iSCSI initiator by selecting the **New** button. On the **Enter New iSCSI Initiator** screen enter the XenServer iSCSI initiator name configured in step 1. The label is auto-populated with the server name. See Figure 5-1.

**Figure 5-1.   iSCSI Initiator Window**



**7** Host Group configuration starts from the **Configure Host Access (Manual) - Specify Host Group** screen. If provisioning storage as shared storage for a XenServer pool, a host group must be defined so the MD3000i and MD32*x*0i storage subsystem has a configured iSCSI path to each of the hosts.

**8** Select **Yes: This host will share access to the same virtual disks with other hosts** and determine which of the following two options applies to your host group:

   **a** If you want a new host group, select the radio button for that option and enter a name for your host group using standard host naming conventions.

**b** If you have already created one or more host groups, select the radio button enabling selection from a drop-down menu that lists the existing host groups. Use this option to configure the rest of the hosts in a group. After you select the host group, previously configured hosts for that host group are displayed.

> **NOTE:** These host groups are shown as Linux hosts even though they are configured as XenServer hosts.

9 Select **Next**. A confirmation screen in which the new server being configured is displayed and the other previously configured associated hosts are named. For the first server configured in a new host group, no associated hosts are listed under the **Associated host group**.

10 Select **Finish** to confirm the new host definition. This initiates the wizard configuration of the new host.

11 On completion, select **Yes** to proceed to the next host you wish to configure, or select **No** to end the configuration wizard.

12 Return to XenCenter and create a new SR by connecting to the desired XenServer host and clicking on its **Storage** tab.

13 Click **Add**, choose the iSCSI radio button for Virtual disk storage, and click **Next**.

14 Enter the name for the new SR in the **Name** field.

15 Enter the portal IP address of the PowerVault MD3000i and MD32*x*0i controller that owns the LUN created in step 2 in the target host field.

16 Enter 3260 in the port field.

17 Click on **Discover IQNs** and **Discover LUNs** to populate the **Target IQN** and **Target LUN** fields.

18 Select the appropriate LUN and click **Finish** to create a new SR.

# Dell EqualLogic PS Series

Dell EqualLogic PS Series iSCSI arrays simplify storage deployment by offering high performance, reliability, intelligent automation, and seamless virtualization of a single pool of storage.

The foundation of an EqualLogic storage array is a PS Series group which is an iSCSI SAN including one or more PS Series storage array members connected to an IP network and managed as a single system. Each array has fully redundant hardware and up to three active network connections for maximum bandwidth. Integrated virtualization firmware provides:

- Seamless scalability
- Automatic RAID configuration and spare disk configuration
- Automatic network, performance, and capacity load balancing

All PS Series models have dual active/passive controllers with three 1-GbE ports per controller for a total of six 1-GbE ports.

By default, the physical network interface on which the XenServer management interface is configured is chosen to route the IP storage traffic. However, a different physical interface or a bond of two network interfaces can be configured to segregate storage traffic from management traffic. For more details on specific configuration steps, see "High Availability Configuration and IP Storage Traffic Segregation" on page 33.

## Creating a Storage Repository on Dell EqualLogic PS Series Arrays

With XenServer, two types of SRs can be created on PS Series arrays:

- LVM Over iSCSI (lvmoiscsi) SRs utilize the Linux Volume Manager (LVM) to create a logical volume per virtual disk image (VDI). The entire volume on the PS Series array is used to hold VDIs.
- EqualLogic (equal) SRs utilize the XenServer storage adapter to manage VM storage on PS Series arrays. For each XenServer VDI, a corresponding volume on the PS Series array is created, allowing for advanced VM lifecycle operations, such as snapshots, fast clones, thin provisioning, and so on.

# 6

# Best Practices

## High Availability Configuration and IP Storage Traffic Segregation

- **High Availability**—Use Citrix XenCenter to create a network interface bond using two NIC ports. This provides high availability for storage traffic.

- **IP Storage Traffic Segregation**—To segregate IP storage traffic, create a new host interface. In XenCenter, click the host and select **Management Interfaces**. Create a new interface and configure the IP settings so that the storage management interface is on a separate subnet than the host management interface. To segregate IP storage traffic from host management traffic, the storage interface must be on a separate subnet than the host management interface.

**NOTE:** As a best practice, it is recommended to use a static IP address for the host management and storage interface.

## Adjusting SCSI Timeouts to Tolerate Storage Controller Failures

To account for time that an I/O may take to complete in a case where the Dell PowerVault MD3000 or the PowerVault MD3000i storage array goes through exception recovery on I/O operations, it is recommended to adjust the SCSI timeouts on XenServer hosts and VMs that are resident on the SRs on the PowerVault MD3000 or the PowerVault MD3000i storage arrays.

## Adjusting SCSI Timeouts for the PowerVault MD3000 RAID Enclosure

If the XenServer host is connected to the PowerVault MD3000 RAID enclosure, you can adjust the SCSI time-out of the Windows VMs residing on the SR resident on the PowerVault MD3000 RAID enclosure by changing the registry settings. Follow the steps below:

1 Navigate to **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\disk\TimeOutValue**.

2 Create the value if it is not present. Set this value to **200**.

> **NOTE:** Do not modify the SCSI timeout in the paravirtualized Linux VMs as the VM virtual disks are not presented as SCSI disks.

## Adjusting SCSI Timeouts for the PowerVault MD3000i Storage Arrays

If the XenServer host is connected to the PowerVault MD3000i storage arrays, on the XenServer host, you can change the SCSI timeout value for the SCSI device(s) on the PowerVault MD3000i storage arrays. Follow the steps below:

1 Create a new **udev** rule file with name **96-md3000i-sto.rules** at **/etc/udev/rules.d/** and add the following text:

```
KERNEL=="sd*[!0-9]", ACTION=="add", SYSFS{model}==
"MD3000i", SYSFS{vendor}=="DELL", RUN+="/bin/sh –c
'echo 200 > /sys$DEVPATH/device/timeout'"
```

2 Save the file. Attach the iSCSI volume to the XenServer host and create an SR.

3 Adjust the SCSI timeout on the Windows VMs residing on the SR resident on the PowerVault MD3000i by changing the following registry setting: **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\disk\TimeOutValue.**

4 Create the value if it is not present. Set this value to **200**.

> **NOTE:** Do not modify the SCSI timeout in the paravirtualized Linux VMs as the VM virtual disks are not presented as SCSI disks.

Using an iSCSI initiator inside a VM is the same as using an iSCSI initiator in a physical system. For specific steps to install the relevant Dell multi-pathing drivers and supported iSCSI initiators, and to attach the PowerVault MD3000i volumes to a VM using the iSCSI initiator inside the VM, see the *MD3000i Systems Installation Guide* at **support.dell.com/manuals**. There are no extra steps required to modify the SCSI timeouts when Dell multi-pathing drivers control the LUN(s) on a PowerVault MD3000i array.

# Configuring XenServer Management Network for High Availability

For detailed instructions on configuring XenServer management network for high availability, see the *Creating NIC Bonds* section of the *XenServer 5.6 Feature Pack 1 Administrator's Guide* at **mycitrix.com**.

# A

# Appendix: Recovering XenServer After a Board Replacement

In the event of a system board change in your XenServer host, the system Service Tag must be reset to its original value for XenServer to function. Download the latest **asset.com utility** from **ftp.us.dell.com/utility**. In the command prompt, type `asset.com /s <service tag>`.

# B

# Appendix: NIC Enumeration in Citrix XenServer

NIC enumeration involves mapping of the physical network interface to the **ethX** device name in XenServer. The NIC enumeration is based on the device position in the system. The integrated LAN on Motherboard (LOM) ports are always enumerated first in order of their physical marked position (GB1, GB2, and so on). The add-in network cards are enumerated after the LOM ports in ascending order of the slot position and the PCI bus, device or function information.

For example, if there are two LOM ports in a system and one dual port network adapter in the PCI slot 4, the NIC enumeration is as follows:

- **eth0**: LOM Port 1 (Gb1)
- **eth1**: LOM Port 2 (Gb2)
- **eth2** and **eth3**: ports on adapter in slot 4 (arranged in ascending bus, device or function number)

You can find the NIC enumeration and corresponding position in the system by logging in to the XenServer local console shell and running the following command:

```
# biosdevname -d
```

The output of the command must be similar to the one below:

```
BIOS device: eth0

Kernel name: eth0

Permanant MAC: 00:1E:4F:1F:77:67

Assigned MAC : 00:1E:4F:1F:77:67

Driver: bnx2

Driver version: 1.6.7b

Firmware version: 3.5.12 UMP 1.1.8

Bus Info: 0000:03:00.0
```

```
PCI name       : 0000:03:00.0
PCI Slot       : embedded
SMBIOS Device Type: Ethernet
SMBIOS Instance: 1
SMBIOS Enabled: True


BIOS device: eth1
Kernel name: eth1
Permanant MAC: 00:1E:4F:1F:77:69
Assigned MAC : 00:1E:4F:1F:77:69
Driver: bnx2
Driver version: 1.6.7b
Firmware version: 3.5.12 UMP 1.1.8
Bus Info: 0000:07:00.0
PCI name       : 0000:07:00.0
PCI Slot       : embedded
SMBIOS Device Type: Ethernet
SMBIOS Instance: 2
SMBIOS Enabled: True


BIOS device: eth2
Kernel name: eth2
Permanant MAC: 00:15:17:24:A4:B0
Assigned MAC : 00:15:17:24:A4:B0
Driver: e1000
Driver version: 7.6.9.2-NAPI
```

```
Firmware version: 5.6-2
Bus Info: 0000:0b:00.0
PCI name      : 0000:0b:00.0
PCI Slot      : 4
BIOS device: eth3
Kernel name: eth3
Permanant MAC: 00:15:17:24:A4:B1
Assigned MAC : 00:15:17:24:A4:B1
Driver: e1000
Driver version: 7.6.9.2-NAPI
Firmware version: 5.6-2
Bus Info: 0000:0b:00.1
PCI name      : 0000:0b:00.1
PCI Slot      : 4
```

The BIOS device name is the name suggested by the system BIOS. The BIOS device name is used by the XenServer kernel to enumerate the device name. As shown in the above output, the PCI slot and the System Management BIOS (SMBIOS) instance fields for **eth0** and **eth1** display that these devices are two LOM NIC ports on the system. Fields PCI slot filed for **eth2** and **eth3** display that these devices are two ports on a dual port network adapter present in the PCI slot number 4.

The **BIOS device name** field must match the **kernel name** field. In rare cases, after the XenServer boots for the first time, the BIOS device name may not match the kernel device name. To resolve this issue, log in to the XenServer local console shell and restart the **xapi** service by running the following command:

```
# service xapi restart
```

# C

# Appendix: Supported Hardware

For a complete list of Dell servers and storage arrays supported with XenServer, see Citrix's Hardware Compatibility List at **hcl.xensource.com**.

**Table C-1.    Storage Arrays—Host HBA Failover**

| Storage Type/Model | Host HBA Failover | Array Controller Failover | Shared Storage for Citrix XenServer Hosts |
|---|---|---|---|
| Direct Attached: Dell PowerVault MD1000 and MD1120 storage array | No | Not applicable | No |
| Direct Attached: PowerVault MD12x0 storage array | No | Not applicable | No |
| Direct Attached: PowerVault MD32x0 storage array | Yes | Yes | Yes |

**Table C-2.    Storage Arrays–NIC Bonding for Storage Traffic**

| Storage Type/Model | NIC Bonding for Storage Traffic | Array Controller Failover | Shared Storage for XenServer Hosts |
|---|---|---|---|
| iSCSI: PowerVault MD3000i and MD32x0i storage array | Yes | Yes | Yes |
| iSCSI: EqualLogic PS 4000/5000/6000 series storage array | Yes | Yes | Yes |

# D

# Appendix: Troubleshooting

## Unable to Power on a Microsoft Windows Virtual Machine (VM)

### Symptom

On powering on a Windows VM, the following error message is displayed:

```
HVM is required for this operation.
```

### Resolution

1   Enable CPU virtualization technology in the system BIOS. Log in to the XenServer local console shell and run the following command:

    ```
    # omconfig chassis biossetup attribute=cpuvt
    setting=enabled
    ```

2   Reboot the system.

## Unable to Boot to the Dell Utility Partition (DUP)

### Symptom

On pressing <F10> during POST or selecting **Boot to Utility Partition** in the boot menu, the system does not boot to the UP and the following message displays:

```
Missing Operating System
```

### Resolution

1   Enter **System Setup**.

2   Use the up- and down-arrow keys to highlight **Hard-Disk Drive Sequence**, and then press <Enter>.

3   Use the up- and down-arrow keys to highlight the appropriate internal storage controller device.

**4** Use the left- and right-arrow keys to make the selected device the first device in the list.

**5** Press <Esc> twice, save your changes, and then reboot the system.

**6** Press <F10> during POST to boot to the UP.

**E**

# Appendix: Migrating From Flash Storage to Hard Drive Storage

## Overview

Citrix and Dell have decided to retire the embedded OEM Dell editions of XenServer, as of XenServer 5.6 Feature Pack 1. For this release, only the hard-drive installed retail edition of XenServer is available. If you are running the Dell OEM edition of XenServer 5.5 or earlier, you can upgrade to XenServer 5.6 Feature Pack 1, preserving all of their virtual machines and configuration data.

## Pre-requisites

- Upgrade to XenServer 5.6 Feature Pack 1 is only possible from XenServer 5.5 (with or without update 1 or update 2). If you are running an earlier Dell edition, you must upgrade to XenServer 5.5 Dell edition before upgrading to XenServer 5.6 Feature Pack 1.

- Before upgrading or updating XenServer, it is recommended that you backup the virtual machines that are associated with the host or resource pool. For more information, see *XenServer 5.6 Feature Pack 1 Installation Guide* at **mycitrix.com**.

- If you are currently using a Dell edition of XenServer installed on a USB flash media, you must install hard drives into their systems. The retail version of XenServer does not support installation to a USB flash media, as it does not incorporate the various disk traffic reduction measures.

- If you are installing XenServer 5.6 Feature Pack 1 on a hard drive, there must be a minimum of 8 GB of free space on the drive. If there is insufficient free space, you must export one or more VMs that are stored on the local SR to other storage, before upgrading to XenServer 5.6 Feature Pack 1. If XenServer is installed on the hard drive, additional space is not required as the new version of XenServer replaces the existing version.

# Licensing

Citrix XenServer 5.6 Feature Pack 1 uses Citrix standard licensing, and thus requires only a single web key to activate all features (instead of the dual licensing scheme used in previous versions).

Dell OEM customers who purchased Essentials for XenServer Enterprise or Platinum editions, and have installed components from the Essentials range (e.g. StorageLink, Workload Balancing, Lab Manager, Stage Manager) will be familiar with redeeming licenses from **mycitrix.com** and the need for a Windows-based license server to be present in their environment. You should return to **mycitrix.com** and "re-host" their existing license key in order to obtain an updated key that can be used to license XenServer 5.6 Feature Pack 1. For instructions on how to re-host license keys, see article *CTX118324 How to Return/Re-host a License using My Citrix* at **http://support.citrix.com/article/ctx118324**.

If you have purchased Essentials for XenServer, but did not redeem their Essentials license key from My Citrix (using the web key provided by their OEM) you will need to locate the web key and use it at **mycitrix.com**. If you purchased Essentials for XenServer, but are no longer in possession of the web key, contact your OEM to be issued with a new key.

A licensing server is required to enable the Advanced, Enterprise, or Platinum features of XenServer. You can download the Citrix Licensing Server from **mycitrix.com**, and find documentation on its use at **http://support.citrix.com/proddocs/topic/licensing-1161/lic-licensing-1161.html**.

If you are using the free edition of XenServer, you are unaffected by the new licensing requirements. Upgrade to the free edition of XenServer 5.6 Feature Pack 1 can take place without deploying a license server.

**NOTE:** Citrix recommends that customers deploy a license server first, in order to avoid license-enabled features of XenServer 5.6 Feature Pack 1 becoming disabled when no license is found.

For further details on licensing, including how to assign a license to a newly upgraded XenServer host, see the *XenServer 5.6 Feature Pack 1 Installation Guide*.

# Upgrading to XenServer 5.6 Feature Pack 1

1. Download XenCenter 5.6 Feature Pack 1 and install it on a client machine. The new version of XenCenter is suitable for managing older versions of XenServer, and hence no functionality is lost.

2. Download the XenServer 5.6 Feature Pack 1 installation ISO, and burn it to a media.

3. Insert the media into the host that is to be upgraded.

4. From XenCenter, shut down or migrate all virtual machines away from the host. Once this is complete, reboot the XenServer host.

5. At the console of the host, enter the BIOS setup utility, and check that the local hard dive is included in the list of devices the host should attempt to boot from. If it is not listed, add it.

6. Boot from the XenServer 5.6 Feature Pack 1 installation media. Follow the on-screen instructions. When asked whether you wish to upgrade or re-install, select to upgrade.

7. Follow the on-screen instructions. The installer checks for the required 8 GB of free hard disk space, and adjusts the size of the local SR accordingly (assuming sufficient free space exists in it).

8. After the installation is complete, remove the installation media from the drive.

9. If you were previously running XenServer from USB flash media, remove the flash device.

10. Reboot the host.

# Troubleshooting

While upgrading you may experience the following issues:

- Installer fails with insufficient space error—If you are a Flash edition customer, ensure that at least 8 GB of free space is available on the local SR on the hard disk in the host. You can free up space by exporting VMs to other storage (or deleting VMs).

- Host does not boot into XenServer following upgrade—The hard drive is not present in the list of boot devices configured in the host's BIOS. Add the hard drive to the list and also ensure that the USB flash device is removed from the boot list, and physically unplugged from the host.

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