



IBM XIV Management Console for VMware vCenter

Version 2.0.0

User Guide

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Note: Before using this document and the products it supports, read the information in “Legal notices” on page 58.

This publication applies to Version 2.0.0 of the IBM XIV Management Console for VMware vCenter and to all subsequent releases and modifications until otherwise indicated in a newer publication.

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About this guide

This guide describes how to install, configure, and use the IBM® XIV® Management Console for VMware® vCenter™.

Who should use this guide

This guide is intended for system administrators who are familiar with the VMware vCenter and vSphere™ environments, as well as with the IBM XIV Storage System.

Conventions used in this guide

Note: These notices provide important tips, guidance, or advice.

Important: These notices provide information or advice that might help you avoid inconvenient or difficult situations.

Attention: These notices indicate possible damage to programs, devices, or data. An attention notice appears before the instruction or situation in which damage can occur.

Publications and related information

For additional information related to the IBM XIV Management Console for VMware vCenter, refer to:

- IBM XIV Management Console for VMware vCenter, Version 2.0.0 – Release Notes, available on the IBM XIV Storage System Information Center:
http://publib.boulder.ibm.com/infocenter/ibmxiv/r2/index.jsp?topic=/com.ibm.help.xiv.doc/xiv_pubsrelatedinfoic.html
- IBM XIV Storage System – Product Overview, available on the IBM XIV Storage System Information Center (see the link above).
- VMware vCenter Server Performance and Best Practices:
http://www.vmware.com/files/pdf/techpaper/vsp_41_perf_VC_Best_Practices.pdf
- Performance Best Practices for VMware vSphere 4.1:
http://www.vmware.com/pdf/Perf_Best_Practices_vSphere4.1.pdf
- VMware Technical Resources website:
<http://www.vmware.com/technical-resources>
- For the latest updates from VMware regarding vCenter and ESX environments, refer to the VMware knowledgebase website:

<http://kb.vmware.com>

- For the latest updates from Microsoft regarding Windows Server, refer to the Microsoft Windows Server TechCenter:

<http://technet.microsoft.com/en-us/library/bb625087.aspx>

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Chapter 1. Introduction

The IBM XIV Management Console for VMware vCenter is a software plug-in that integrates into the VMware vCenter server platform and enables VMware administrators to connect to and fully utilize IBM XIV storage systems. After a connection is established, administrators can create volumes (LUNs) in selected predefined storage pools. These XIV-based volumes are mapped (as logical drives) to ESX hosts or clusters, and can be populated by user-defined VMware datastores that can be used by virtual machines.

Main features and benefits

The IBM XIV Management Console for VMware vCenter runs as a Windows Server service on the vCenter server. Any **vSphere client** that connects to the vCenter server detects the service on the server, and automatically enables the IBM XIV management features on the vSphere client.

After the plug-in is installed and configured, the IBM XIV Management Console features and enables:

- Full integration with the VMware vSphere graphical user interface (GUI), in the form of an IBM Storage resource management tool and a dedicated IBM Storage management tab.
- Full control over XIV-based storage volumes, including volume creation, resizing, renaming, migration to a different storage pool, mapping, unmapping, and deletion.
- Easy and integrated allocation of volumes to VMware datastores, used by virtual machines that run on ESX hosts or clusters.

Functional diagram

The following diagram (*Figure 1*) illustrates how the IBM XIV system is accessed and controlled through a VMware environment, and shows the primary relationships and interaction between the VMware components and the IBM XIV Storage System.

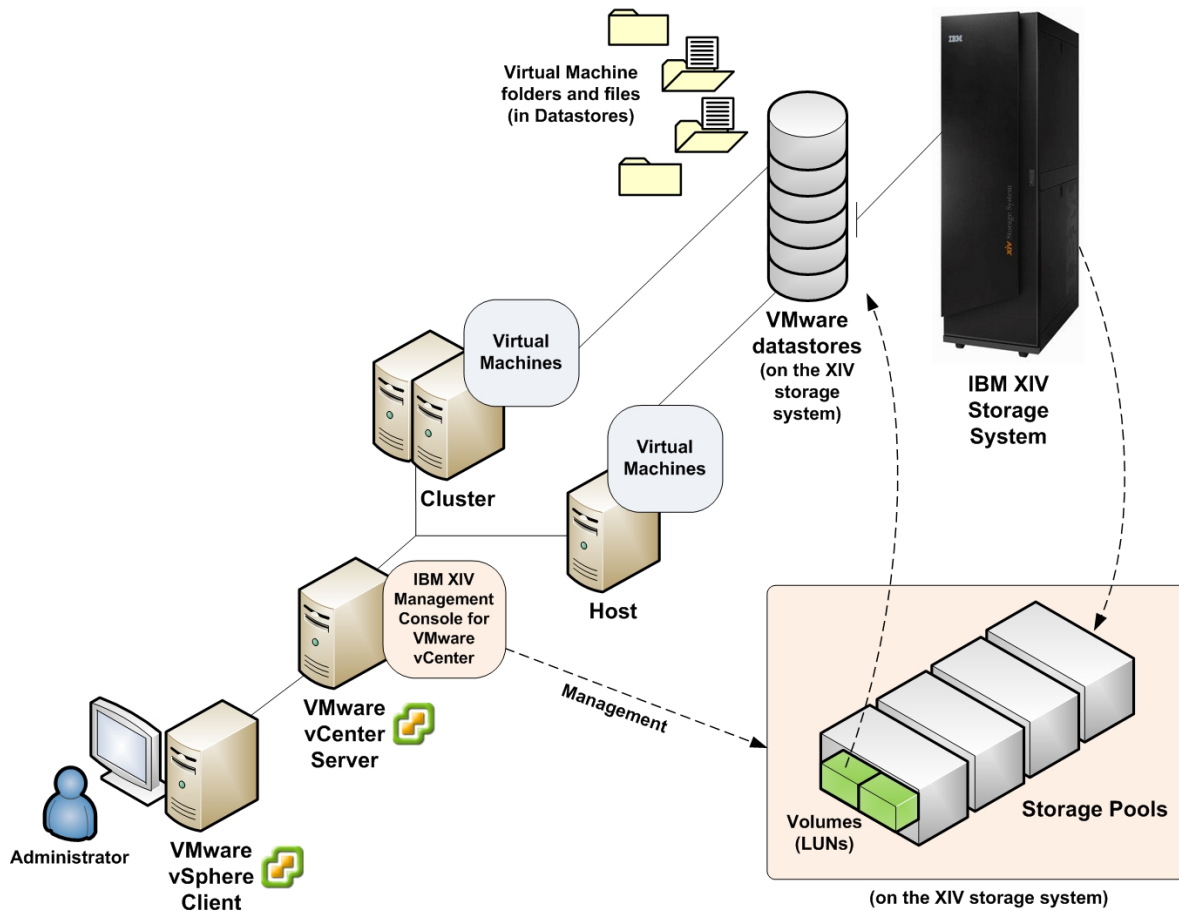


Figure 1. Primary relationships and interaction between components

Chapter 2. Installation

This chapter describes:

- Compatibility and requirements
- First-time installation vs. upgrade
- Running the installation wizard

Compatibility and requirements

The IBM XIV Management Console for VMware vCenter is compatible with different editions of the Microsoft Windows Server operating system and the IBM XIV Storage system. In addition, VMware software must be preinstalled on the host server, as well as on each client.

Refer to the following subsections for more specific details:

- Supported operating systems

- Supported storage systems
- Required server software
- Required client software

Supported operating systems

The IBM XIV Management Console for VMware vCenter is compatible with different versions of Microsoft® Windows Server®, as detailed in the following table.

Table 1. Supported operating systems and bit architectures

Operating system	Architecture
Microsoft Windows Server 2003 with Service Pack 2	32-bit (x86), 64-bit (x64)
Microsoft Windows Server 2008 with Service Pack 2	32-bit (x86), 64-bit (x64)
Microsoft Windows Server 2008 R2	64-bit (x64)
Microsoft Windows Server 2008 R2 with Service Pack 1	64-bit (x64)

Supported storage systems

The IBM XIV Management Console for VMware vCenter supports the IBM XIV Storage System of microcode versions **10.1.0** to **10.2.4x**.

Required server software

Prior to installing the IBM XIV Management Console, VMware vCenter 4.x (4.0, 4.1) must be installed on the host server (Windows Server).

Required client software

The client host (administration client) requires the following software:

- VMware vSphere 4.x (4.0, 4.1)
- Microsoft Internet Explorer 7.0 or later (currently, other browsers are not supported).

First-time installation vs. upgrade

When you run the installation file (see *Running the installation wizard*) on a system with an existing installation of the IBM XIV Management Console (version 1.0.0, 1.0.1, etc.), the **uninstallation** wizard is automatically invoked. In such a case, you must uninstall the existing version. The installation wizard of the new version starts only after the previous version has been uninstalled. During the uninstallation, the existing database is not removed and kept for use by the new software version.

Note: After you upgrade the IBM XIV Management Console for VMware vCenter, the upgrade takes effect only after you restart the VMware vSphere client software.

Running the installation wizard

Perform the following procedure to install the IBM XIV Management Console on the VMware vCenter server.

1. Run the installation file:
`IBM_XIV_VC_Management_Console_for_VMware_vCenter_2.0.0.exe`
2. If not previously installed on this Windows Server station, the IBM Storage Solutions External Runtime Components (previously named "XPvV") installation wizard starts automatically. In such a case, click **Next** to install the components in the default directory (cannot be changed).



Figure 2. IBM Storage Solutions External Runtime Components – installation wizard

After the IBM Storage Solutions External Runtime Components are installed, the installation wizard of IBM XIV Management Console for VMware vCenter starts.

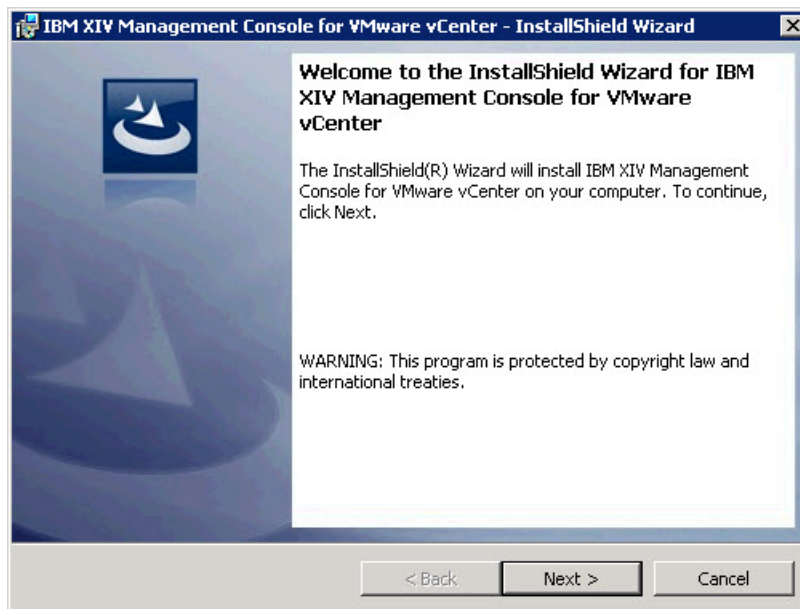


Figure 3. IBM XIV Management Console for VMware vCenter – installation wizard

3. Click **Next**. The License Agreement panel is displayed.
4. Read the IBM License Agreement and then select **I accept the terms in the license agreement**.
5. Click **Next**. The Destination Folder panel is displayed.
6. Use the default installation directory or click **Change** to install in a different directory.

Note: The default installation directory is:

C:\Program Files\IBM\IBM XIV Management Console for VMware vCenter

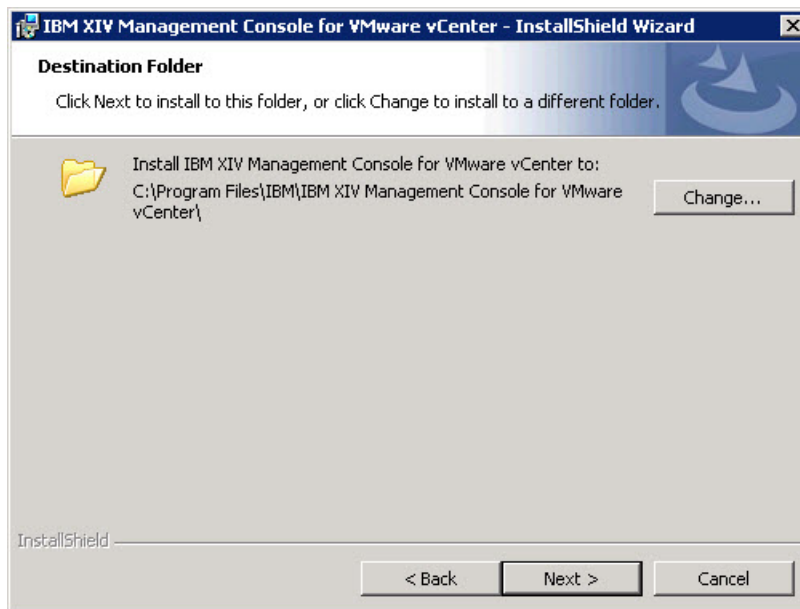


Figure 4. Destination Folder panel – default installation directory

7. Click **Next**. The Ready to Install the Program panel is displayed.
8. Click **Install** to start the installation. After the installation is complete, the Completed panel is displayed.
9. Select **Launch IBM XIV Management Console for VMware vCenter configuration wizard**, and then click **Finish**.

Note: Select the CLI configuration wizard option to start it automatically (see *Using the CLI configuration wizard*) after the installation.

Chapter 3. Configuration

Before you start using the IBM XIV Management Console for VMware vCenter, the following configuration and verification procedures are required:

- Using the CLI configuration wizard
- Changing Windows Server registry keys, which is required for:
 - Modifying general settings
 - Replacing the common SSL certificate with a private certificate
 - Setting the maximum possible LUN size
 - Setting the storage pool usage alert thresholds (color indications)
- Verifying the installation

Using the CLI configuration wizard

Use the CLI (command-line interface) configuration wizard to log in to the vCenter server and register extensions on the server. The CLI configuration wizard starts right after the installation (if the option to launch it was selected). If the configuration wizard does not start, you can start it from the IBM folder located in the All Programs menu of Windows.

The Welcome message is displayed when the configuration wizard starts.

```
■ Welcome to the IBM XIV Management Console for VMware vCenter setup wizard,
  version 2.0.0. Use this wizard to configure the IBM XIV Management Console
  for VMware vCenter.
  Press [Enter] to proceed.
```

Perform the following steps to configure the IBM XIV Management Console for VMware vCenter.

1. Press Enter. If this is the first time the IBM XIV Management Console is installed on this server (otherwise, skip to **step 4**) the following message is displayed:

```
■ The Wizard will now install the Management Console service and register the
  extension in the vCenter server.
  Do you want to continue? [default: yes]:
```

2. Press Y to proceed. The following message is displayed:

```
■ The IBM XIV Management Console requires a valid username for connecting to
  the vCenter server. This user should have permission to register the Plug-
  in the Plug-ins Manager.
  Please enter a username:
```

3. Enter the user name for accessing the VMware vCenter server. Then, enter your password.

```
■ Please enter the password for the user administrator:
```

Note: You must have permission to register extensions on the vCenter server. If the password that you enter is not correct, you are prompted to enter your user name and password again.

After you successfully log in to the vCenter server with your user name and password, the following message is displayed:

```
■ The IBM XIV Management Console for VMware vCenter web component requires a
  valid network port number.
  Please enter a port number for the web component [default: 8880 ]:
```

4. Enter the port number that should be used for HTTP requests from the vSphere client. The following message is displayed:

```
■ The IBM XIV Management Console for VMware vCenter is now configured.
  Press [ENTER] to proceed.
```

5. Press Enter. An extension is registered and verified on the vCenter server and the installation is complete.

Note: If any error occurs during the configuration, a record is added and shown in the log file (see *Viewing the event log* on page 51).

Changing Windows Server registry keys

You can modify different functionalities of the IBM XIV Management Console by changing registry keys of the Windows Server upon which the VMware vCenter software is installed.

Important: Perform registry changes with caution. All changes that apply to the IBM XIV Management Console must be performed on the **vCenter server** and not on the vSphere client. Before making any change, it is recommended to back up the Windows Server registry.

This section describes:

- Modifying general settings
- Replacing the common SSL certificate with a private certificate
- Setting the maximum possible LUN size
- Setting the storage pool usage alert thresholds (color indications)

Modifying general settings

Perform the following steps to access the relevant registry keys and change general settings of the IBM XIV Management Console for VMware vCenter.

1. From the Windows taskbar, select **Start** → **Run**. The Run dialog box is displayed.
2. Type `regedit` and then press Enter. The Registry Editor is displayed.
3. Go to the following registry tree path:

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\IBMConsoleForvCenter\Parameters

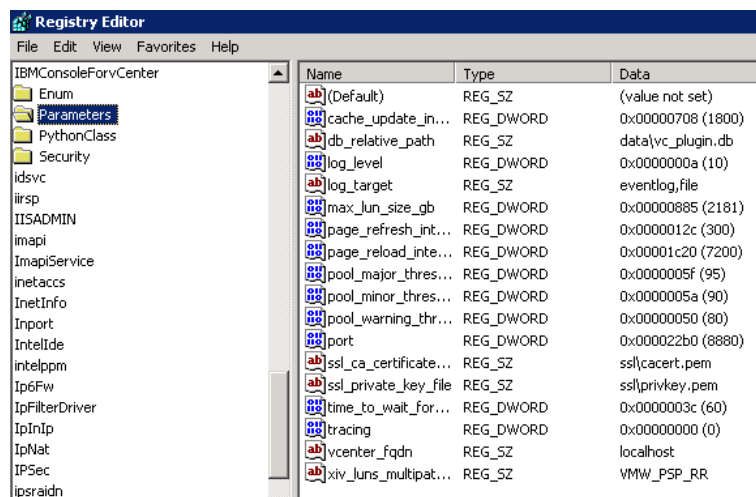


Figure 5. Windows Registry Editor

4. Use the following table to determine the parameters that you want to change. Alternatively, refer to the next subsections.

Table 2. Registry keys for general settings of the IBM XIV Management Console

Registry key	Description	Default value
cache_update_interval	The time interval in seconds for updating the cache with information from the vCenter server.	1800 (30 minutes)
db_relative_path	The relative path to the database file. Do not modify this key manually.	data\vc_plugin.db
log_level	The type of messages to be logged in the log file: <ul style="list-style-type: none"> • 10 – debug messages – use this value only if instructed to do so by IBM support. • 20 – info messages • 30 – warning messages • 40 – error messages For more information, see <i>Viewing the event log</i> and <i>Event messages</i> .	20 (info)
log_target	The target of the logging operation. By default, the log is written to a file and to the Event Viewer application log. Do not modify this key manually.	eventlog, file
page_refresh_interval	The refresh interval in seconds for updating the information displayed on the vSphere client. This parameter does not reload cache information.	300 (5 minutes)
port	Number of the port that the IBM XIV Management Console web service uses for HTTP requests from the vSphere clients. Do not modify this key manually. If you want to update the port number, run the configuration wizard again and restart the vSphere client.	8880

Registry key	Description	Default value
<code>time_to_wait_for_another_update</code>	Since any new cache update is not started until after the first update is completed, this value specifies the waiting time in seconds for the current cache update to complete before a timeout occurs.	60 (1 minute)
<code>tracing</code>	Turns the tracing on (1) or off (0). Do not modify this key unless you are instructed to do so by IBM Support.	0 (off)
<code>vcenter_fqdn</code>	The fully qualified DNS name of the VMware vCenter server. Do not modify this key manually.	localhost

Replacing the common SSL certificate with a private certificate

The IBM XIV Management Console uses a Secure Socket Layer (SSL) protocol for communication between the vSphere client and the vCenter server. The installation package includes a private key and an unsigned SSL certificate.

For non-interruptible management from the vSphere client, it is recommended to replace the provided key and certificate with your own private key and a signed certificate.

Perform the following procedure to replace the SSL private key and certificate.

- Copy a private key file and a certificate file to the SSL subdirectory of the installation directory.
- Go to the following registry tree path:
`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\IBMConsoleForvCenter\Parameters`
- Modify the following registry keys with the relative path to your own SSL files (the ones you copied to the SSL subdirectory):
 - `ssl_ca_certificate_file` – contains the relative path to the certificate file
 - `ssl_private_key_file` – contains the relative path to the private key file

Setting the maximum possible LUN size

The default maximum LUN size is set to 2181 Gigabytes (2 Terabytes). When you create a new volume, it cannot be larger than the maximum allowed size.

You can change the maximum LUN size (GB) by modifying the `max_lun_size_gb` registry key, located under:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\IBMConsoleForvCenter\Parameters
```

Setting the storage pool usage alert thresholds (color indications)

You can change the usage alert thresholds for storage pools by modifying the following registry keys:

- `pool_minor_threshold` – contains a size limit (GB) beyond which the storage pool bar color changes to **orange**, notifying you about **minor** over-the-limit use of storage space.
- `pool_warning_threshold` – contains a size limit (GB) beyond which the storage pool bar color changes to **yellow**, warning you about **considerable** over-the-limit use of storage space.
- `pool_major_threshold` – contains a size limit (GB) beyond which the storage pool bar color changes to **red**, alerting you about **critical** over-the-limit use of storage space.

The following figure shows how the different colors are displayed for storage pools.

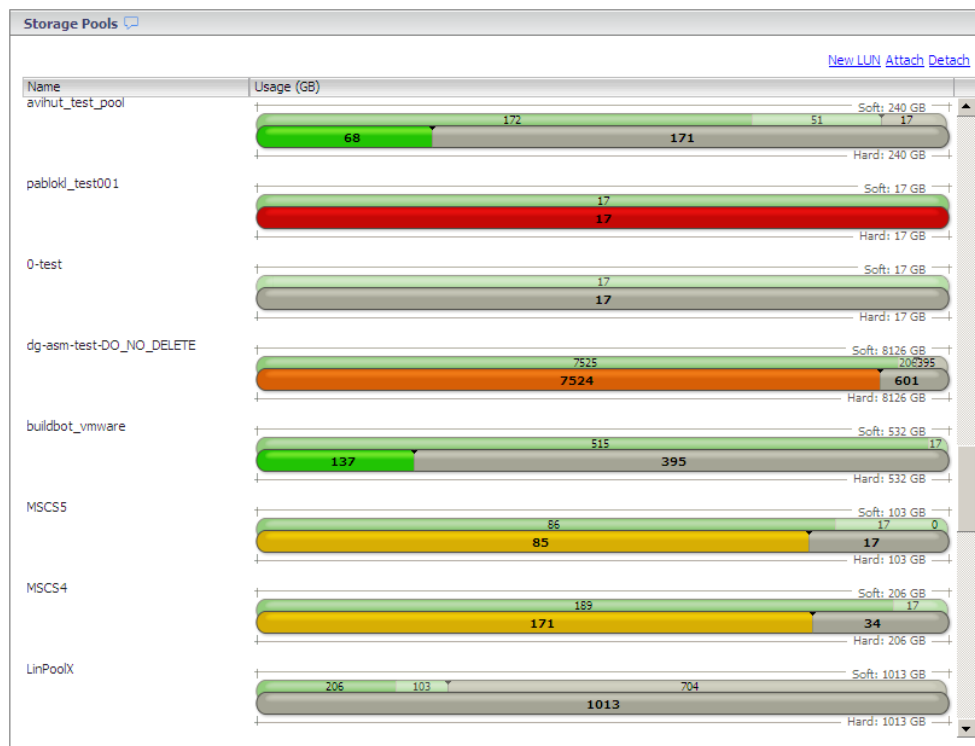


Figure 6. Different colors displayed for storage pools

These registry keys are located under the same registry path that is used for the other parameters:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\IBMConsoleForvCenter\Parameters`

Verifying the installation

After you install and configure the IBM XIV Management Console for VMware vCenter with the CLI configuration wizard, restart the vSphere client. The IBM Storage button becomes available in the vSphere management tools.

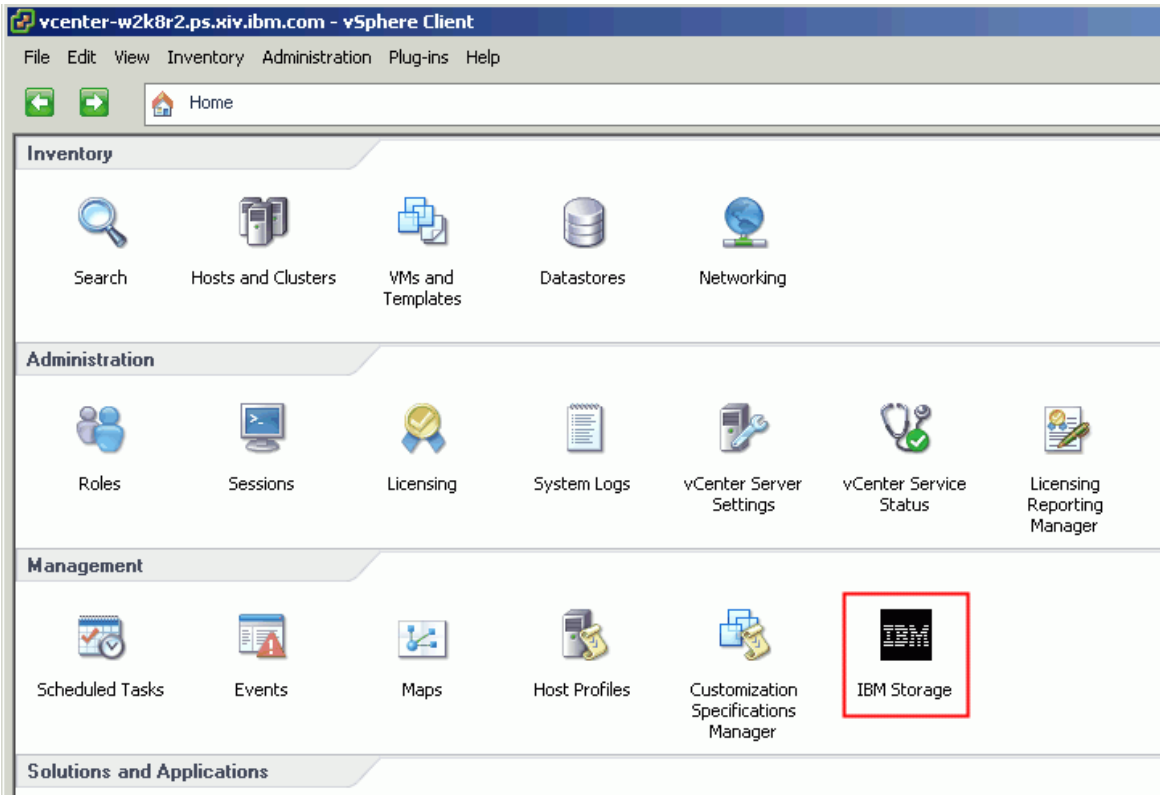


Figure 7. IBM Storage icon on the vSphere Client management tools

In addition, the IBM Storage plug-in should appear in the Installed Plug-ins list of the vCenter Plug-in Manager.

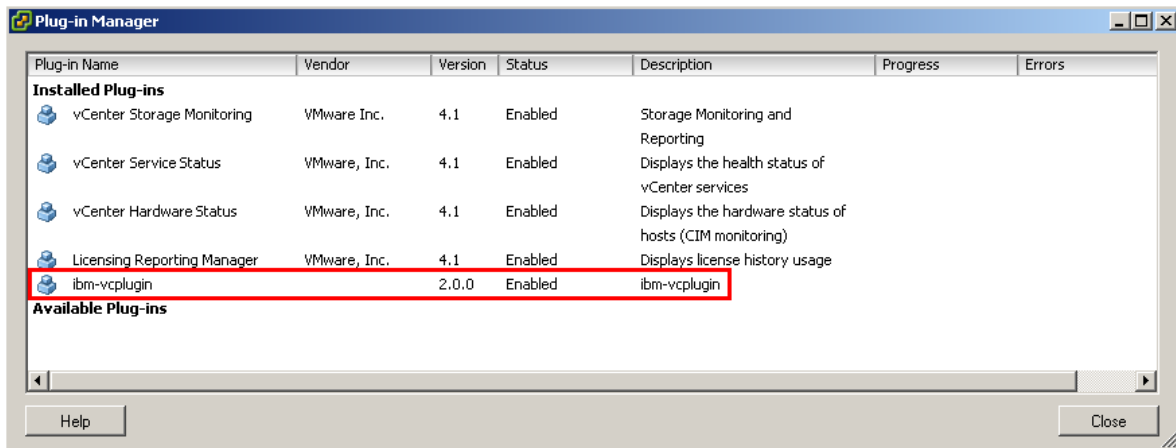


Figure 8. IBM Storage plug-in listed in the Plug-in Manager

When the IBM XIV Management Console is properly installed, the **IBM Storage** tab is added to the vSphere management GUI. You can access the tab from the Datacenter, Cluster, Host, Datastore, and Virtual Machine inventory views. From the IBM Storage tab you can view and fully manage XIV volumes, as explained in the next chapters.

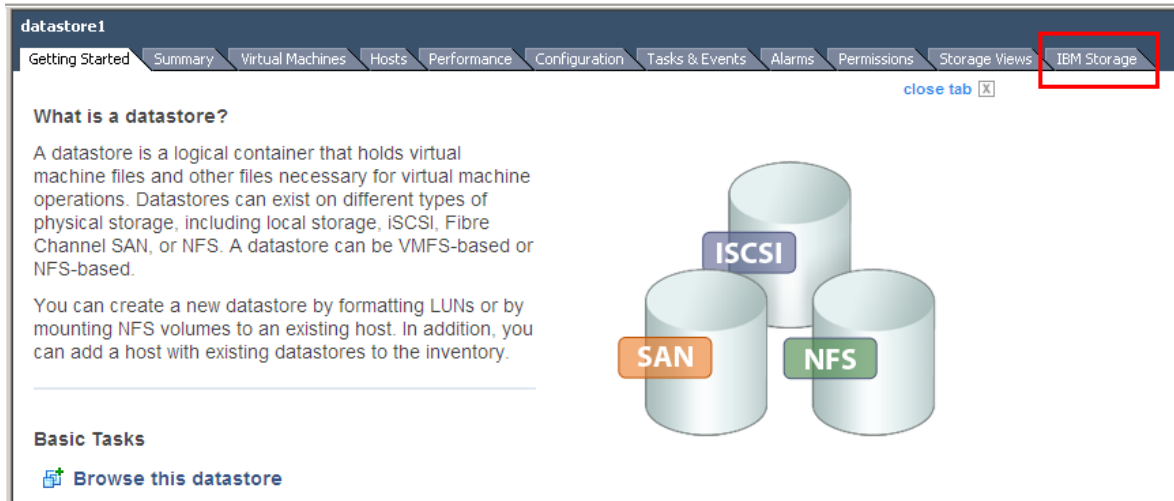


Figure 9. IBM Storage tab added to the vSphere GUI

Chapter 4. Connecting to (adding) XIV storage systems

Before you can create volumes for datastores, you must first connect to (add) at least one XIV storage system, by using appropriate credentials.

This chapter describes:

- Adding an XIV storage system
- Modifying an XIV storage system
- Removing an XIV storage system

Adding an XIV storage system

Perform the following procedure to add an XIV storage system on which you could later create and manage storage volumes (LUNs).

1. Click the IBM Storage icon located on the vSphere Client management tools (see *Figure 7*). The Storage Systems and Storage Pools management panels are displayed.
2. On the Storage Systems panel, click **Add**. Alternatively, right-click the storage systems table heading and click **Add** on the pop-up menu.

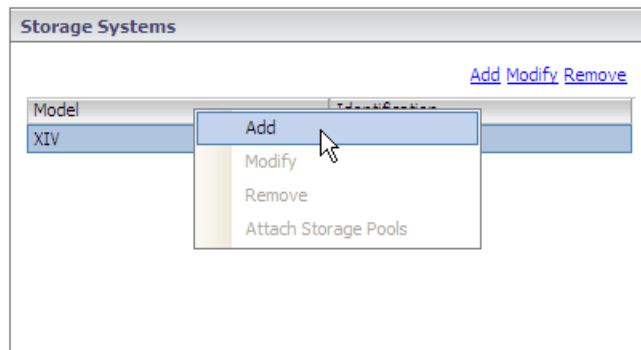


Figure 10. Clicking Add on the pop-up menu

The Add System dialog box is displayed.

3. Enter the following details:
 - **IP/Hostname** – IP address or host name of the XIV storage system to which you want to connect.
 - **Username** – user name for accessing the specified XIV storage system.
 - **Password** – password for accessing the specified XIV storage system.
4. Click **Add** (dialog box button). The Add an IBM Storage System dialog box is displayed.
5. Optional (available for Admin-type users only): you can attach predefined storage pools that are available on the XIV storage system that you add. Click and highlight the name of a storage pool that you want to add, or use the CTRL or SHIFT keyboard keys to select multiple storage pools. Then, click **Add Selection**. Alternatively, you can skip the storage pools attachment by clicking **Skip**.

Note: For more information about attaching or detaching storage pools, see Chapter 5.

Modifying an XIV storage system

Whenever needed, you can modify the IP address or host name of any storage system that was added, as well as the user credentials for connecting to that storage system.

Perform the following procedure to modify the details of an added storage system.

1. Click the IBM Storage icon located on the vSphere Client management tools (see *Figure 7*). The Storage Systems and Storage Pools management panels are displayed.
2. Select (highlight) the name of the storage system that you want to modify, and then click **Modify**. Alternatively, right-click the name of the storage system and click **Modify** on the pop-up menu.

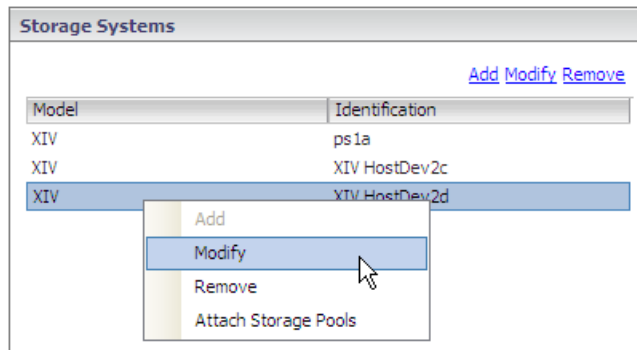


Figure 11. Clicking Modify on the pop-up menu

3. In the Modify Storage System Properties dialog box, edit the storage system details (described in *Adding an XIV storage system*), and then click **OK**. The modified system details appear in the Details pane.

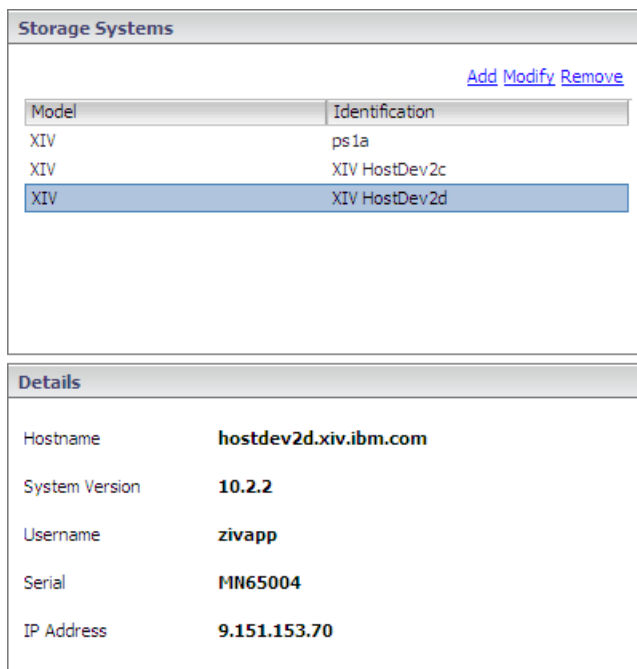


Figure 12. Storage system details

Removing an XIV storage system

When a storage system is no longer needed, you can remove it from the list of added storage systems.

Attention:

If you remove a storage system that contains working volumes and datastores, the information of these volumes and datastores will no longer be displayed in the IBM Storage tab. However, these volumes and datastores **remain active and functional**.

Perform the following procedure to remove a storage system.

1. Click the IBM Storage icon located on the vSphere Client management tools (see *Figure 7*). The Storage Systems and Storage Pools management panels are displayed.
2. Select (highlight) the name of the storage system that you want to modify, and then click **Remove**. Alternatively, right-click the name of the storage system and click **Remove** on the pop-up menu.

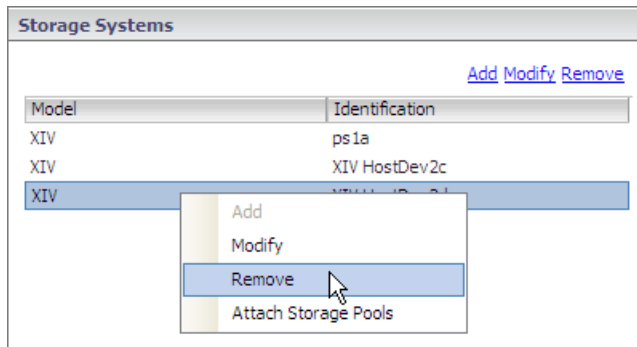


Figure 13. Clicking Remove on the pop-up menu

3. In the removal confirmation box, click **Yes**.

Note: You can add again any storage system you have removed.

Chapter 5. Attaching and detaching XIV-based storage pools

This chapter describes:

- Viewing the details of currently attached storage pools
- Attaching storage pools
- Detaching storage pool

Important:

Storage pools can be attached only with **XIV storage admin** user credentials. Any other type of XIV user credentials (read-only, application admin) cannot perform storage pool attachment. If your credentials are not sufficient to perform pool attachment, contact your storage administrator for assistance.

Viewing the details of currently attached storage pools

Attached storage pools are predefined storage areas (predefined by the storage administrator) that were specifically chosen to be used for volumes and VMware datastores. For each added storage system, you can view the details of all storage pools that are currently attached to the vCenter server.

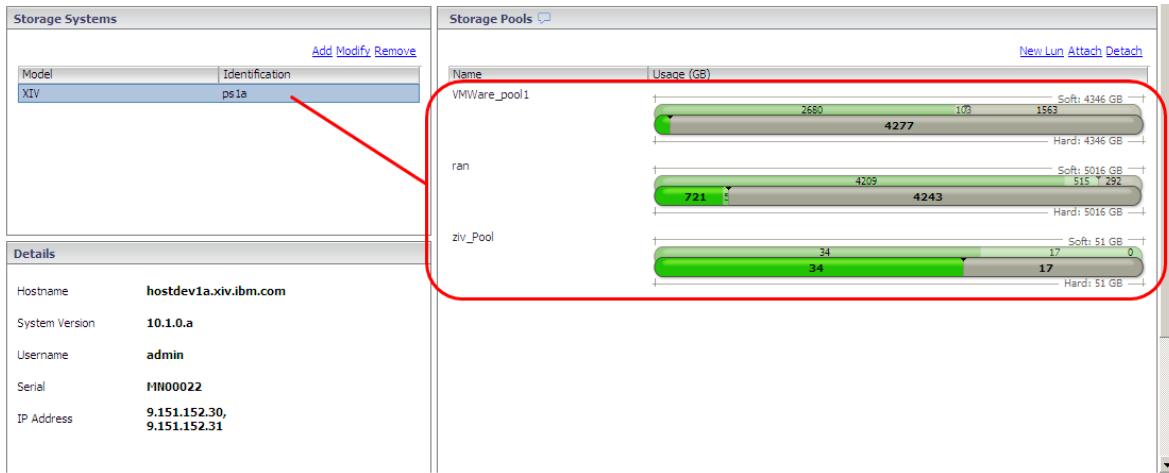


Figure 14. Viewing the storage pools that are currently attached

By placing the mouse pointer over different areas of each displayed storage pool, you can view different types of information.

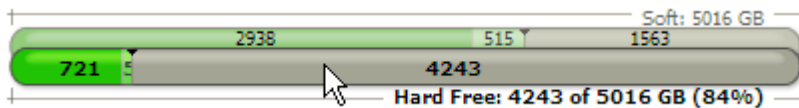


Figure 15. Amount (GB) and percentage of free hard disk space on the storage pool

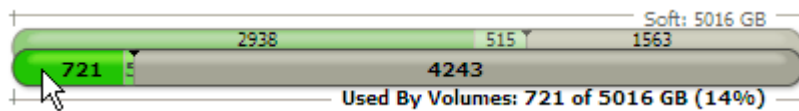


Figure 16. Amount (GB) and percentage of used hard disk space on the storage pool

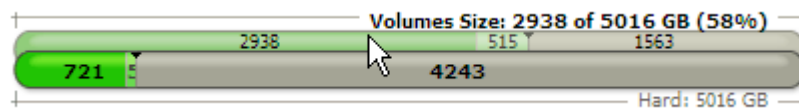


Figure 17. Amount (GB) and percentage of soft space used for volumes (LUNs)

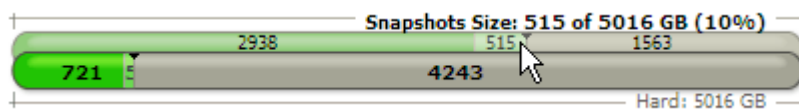


Figure 18. Amount (GB) and percentage of soft space reserved for snapshots

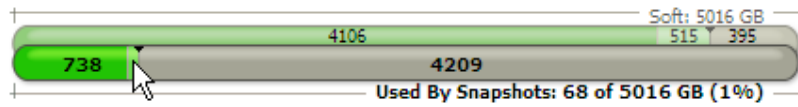


Figure 19. Amount (GB) and percentage of hard disk space currently in use by snapshots

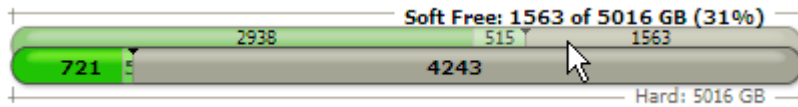


Figure 20. Amount (GB) and percentage of free soft space remaining for thin provisioning and snapshots

Note: Storage pools cannot be created via the vSphere management. To create storage pools, connect directly to storage system via its dedicated storage management GUI, or contact your storage system administrator.

Attaching storage pools

You must attach to the vCenter server any predefined storage pool (predefined by the storage administrator) that you want to use for volume (LUN) and datastore management operations.

Perform the following procedure to attach storage pools to the vCenter server.

1. In the Storage Systems management panel (see *Figure 12*), click the name of the storage system from which you want to select storage pools.
2. In the Storage Pools management panel, click **Attach** (see *Figure 21*). Alternatively, right click the name of the storage system and then click **Attach Storage Pools** (see *Figure 22*).



Figure 21. Attach button

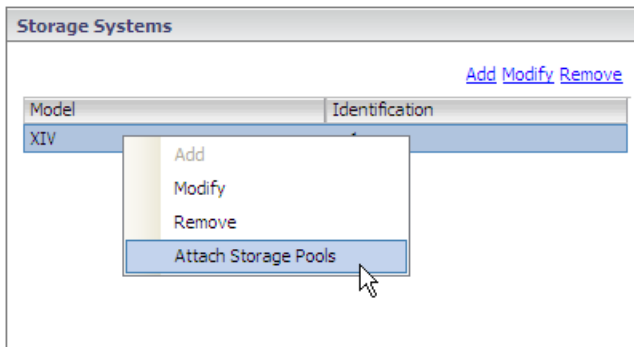


Figure 22. Clicking Attach Storage Pools on the pop-up menu

3. In the Attach Storage Pools dialog box, click and highlight the name of a storage pool that you want to add, or use the CTRL or SHIFT keyboard keys to select multiple storage pools. Then, click **Next**.
4. Enter your user name and password for accessing the storage system (credentials may be of any user with XIV storage admin permissions), and then click **Finish**.

Detaching storage pools

You can detach from the vCenter server any storage pool that you no longer need.

Attention:

If you detach a storage pool that contains working volumes and datastores, the information of these volumes and datastores will still be displayed in the IBM Storage tab, but you will not be able to perform LUN management operations on these pools.

Perform the following procedure to detach storage pools.

1. In the Storage Pools management panel, click and highlight the name of the storage pool that you want to detach, or use the CTRL or SHIFT keyboard keys to select multiple storage pools to detach.

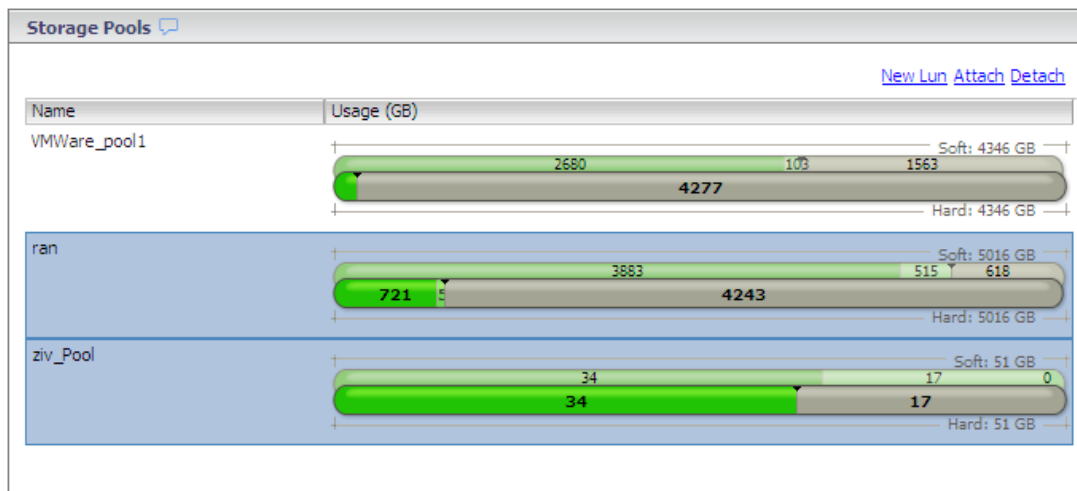


Figure 23. Selecting multiple storage pools to detach

2. Click **Detach** (see Figure 24). Alternatively, right-click the selected storage pools and select **Detach Storage Pool** from the pop-up menu (see Figure 25).



Figure 24. Detach button

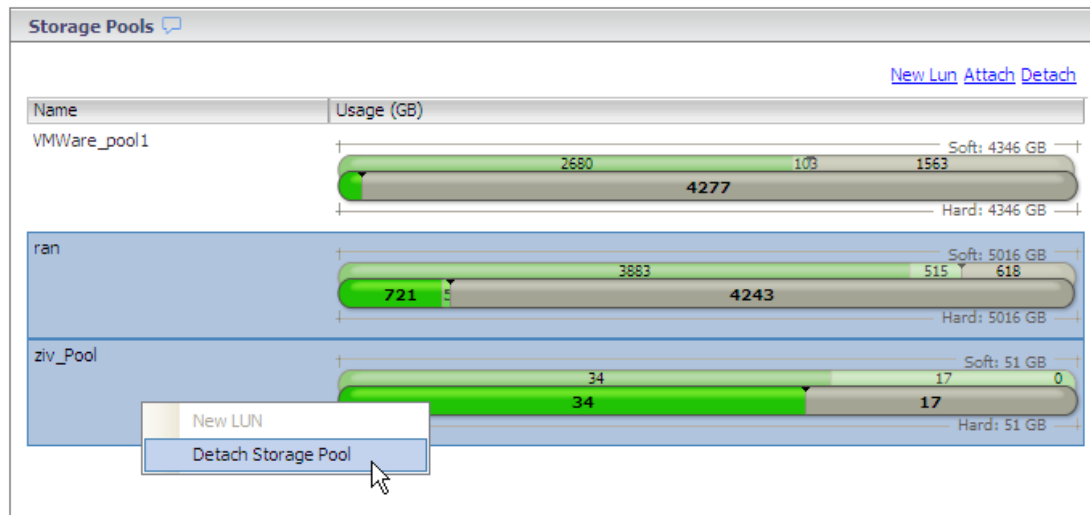


Figure 25. Clicking Detach Storage Pool on the pop-up menu

3. In the detachment confirmation box, click **Yes**.

Chapter 6. Creating, viewing, and managing volumes (LUNs) in storage pools

After the IBM storage systems are added and the storage pools are attached to the vCenter server, you can start the volume creation and management operations.

This chapter describes:

- Performing a target connectivity check
- Creating an XIV-based volume
- Viewing volume (LUN) details
- Managing XIV-based volumes

Performing a target connectivity check

Before you create a new volume, verify that the iSCSI or FC target connectivity between the ESX hosts and the newly defined XIV storage system is properly set.

Perform this one-time procedure for each ESX host (you do not need to perform this more than once per host), before creating the first volume on the XIV storage system.

1. Contact the storage administrator to obtain the list of WWPNs or iSCSI IQNs of the newly connected XIV storage system.
2. From the vSphere **Home** page, go to **Inventory** → **Hosts and Clusters**.

3. On the left-pane Datacenter tree, click on a single host, and then click the **Configuration** tab.
4. Click **Storage Adapters**. The details of the adapters in use are displayed.

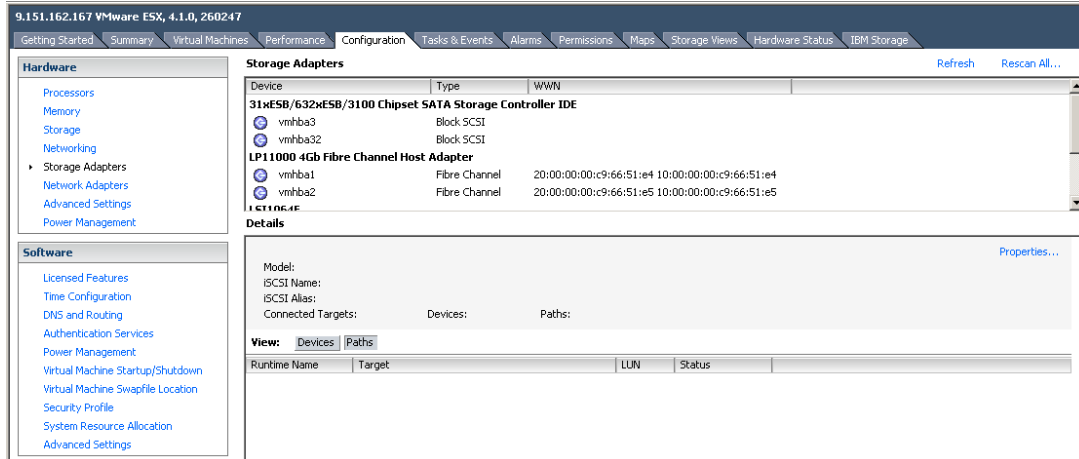


Figure 26. Displaying the storage adapters of a host

5. Perform the following checks:
 - For Fibre Channel (FC) connected storage, click each FC host bus adapter (HBA) and then click **Paths**. Then, verify that at least one of the storage system WWPNs appear in the table.
 - For iSCSI connected storage, click on the iSCSI software adapter ports. Then, click **Properties** and verify that the storage system IQNs appear in the **Static Discovery** tab.

Creating an XIV-based volume (LUN)

Create storage volumes (logical drives identified as LUNs) on which you want to create datastores or raw mapped volumes. In the creation process, you can map the created volumes to ESX hosts or datacenters, so that the virtual machines on these hosts or datacenters would be able to access and utilize datastores (for a general visualization, see *Figure 1* on page 5).

Note: You can create volumes only on storage pools that have been attached to the vCenter server. For more information, see *Viewing the details of currently attached storage pools*.

Important: You must perform SCSI target connectivity verification prior to creating a new volume. Without this verification, volumes that you create may be non-detectable. For more information, refer to *Performing a target connectivity check*.

Perform the following procedure to create a new storage volume.

1. In the Storage Pools management panel, click and highlight the storage pool on which you want to create the volume, and then click **New LUN** (*Figure 27*). Alternatively, right-click the storage pool and select **New LUN** from the pop-up menu (*Figure 28*).

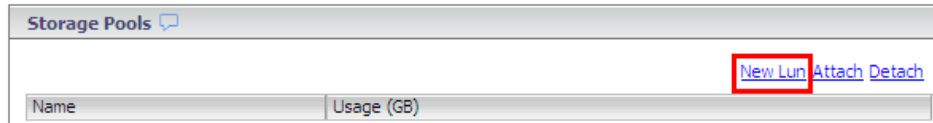


Figure 27. New LUN button

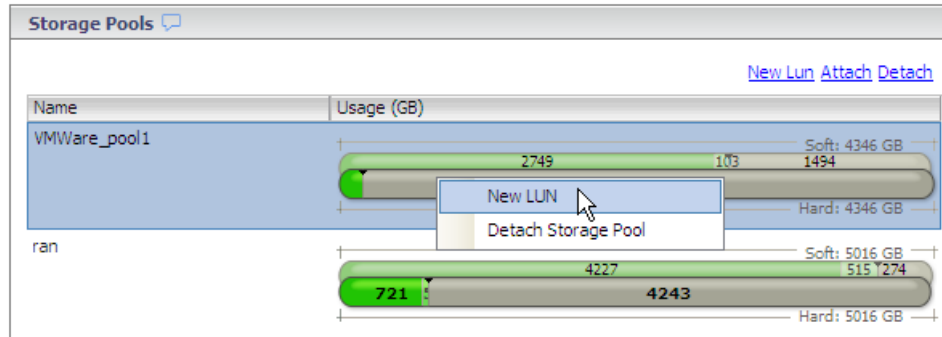


Figure 28. Clicking New LUN on the pop-up menu

Note: The New LUN option is not available when:

- There is no free space in the storage pool.
- More than one storage pool is selected.
- You have read-only permissions (on either the vSphere or XIV storage system).

The Create New LUN Wizard is displayed.

2. In **Volume Size**, enter the size (in Gigabytes) for the new volume. Alternatively, place the mouse pointer on the graphic image of the storage pool, and then click and slide the space marker rightward to set the new volume size (marked in yellow). The numerical value in Volume Size is automatically updated accordingly.

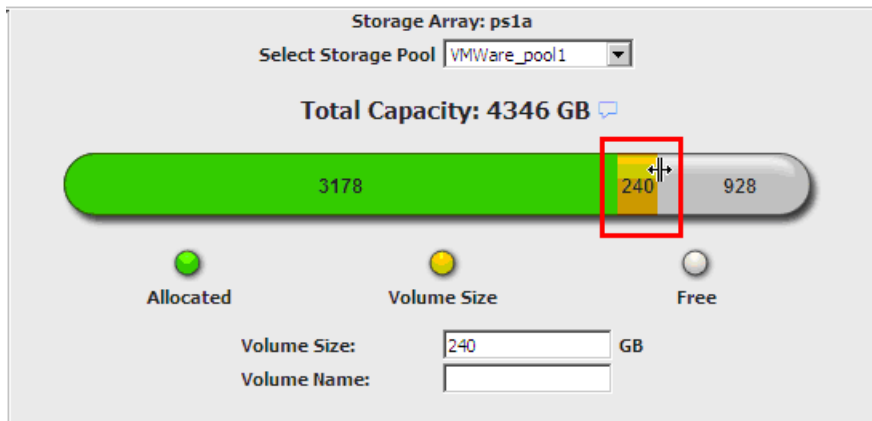


Figure 29. Setting the volume size with the graphic space marker

Note: XIV-based volume sizes are automatically rounded to the next multiple of 17.1 GB.

3. In **Volume Name**, enter the name that you want to assign to the new volume, and then click **Next**.

Create New LUN wizard

Properties
Specify the properties for the LUN

Specify Properties
LUN Mapping
Confirmation

Storage Array: ps1a
Select Storage Pool: VMWare_pool1

Total Capacity: 4346 GB

2783 206 1357

Allocated Volume Size Free

Volume Size: 206 GB
Volume Name: Vol_2f

Next > Cancel

Figure 30. Entering the new volume name

4. Select the host(s) or datacenter(s) to which you want to map the new volume. The selected host(s) or datacenter(s) will be able to utilize the new volume for datastores or raw mapped LUNs. Then, click **Next**.

Create New LUN wizard

Select the Host
On which Host do you want to add the storage?

Specify Properties
LUN Mapping
Confirmation

vcplugin-testvc.ps.xiv.ibm.com
Testing Datacenter
Cluster A
9.151.162.170
9.151.162.167

< Back Next > Cancel

Figure 31. Selecting the hosts or clusters for LUN mapping

Note: You must map the newly created LUN to at least one ESX host or datacenter in order to enable vSphere management of this volume.

5. Review the summary details of the new volume that is about to be created, and then click **Finish** to create the volume. Alternatively, if you want to change any detail that was set in a previous step, click **Back**.

Viewing volume (LUN) details

As you navigate through the different vSphere inventory views, you can view the details of existing volumes on the IBM Storage tab. This includes:

- Viewing volumes that are used by datastores
- Viewing unused volumes
- Viewing volumes that are used by virtual machines
- Choosing which volumes to show
- Viewing information in the LUN Details pane

Viewing volumes that are used by datastores

When you want to check which storage volumes are used by specific datastores, and also view the specific and current details of these volumes, perform the following procedure.

1. Go to **Home** → **Inventory** → **Hosts and Clusters**.
2. On the left-pane tree of datacenters, click an icon of a datacenter, a cluster, or a host. The table on the right pane displays the details of the datastores that are used by the element you selected on the tree (datacenter, cluster, or host).
3. On the displayed datastores list (under **View: Datastores**), click the name of a datastore to display the storage volumes that it uses. The volumes used by the selected datastore are listed on the volumes list underneath the Datastores list.

The screenshot shows the 'Testing Datacenter' view in the IBM XIV Management Console. The left sidebar shows a tree view with 'Testing Datacenter' selected. The main pane displays a table of datastores and a detailed view for the selected 'cluster_datastore_1'.

Datastore	Status	Capacity (GB)	Free (GB)	Type
datastore1	Accessible	135	117	Vmfs
datastore1 (1)	Accessible	135	79	Vmfs
cluster_datastore_1	Accessible	431	354	Vmfs
cluster_datastore2	Accessible	15	15	Vmfs

Identifier	Array	Model	Capacity (GB)	Use	Serial	LUN
eui.0017380000160b33	ps1a	2810XIV	16	Extent	MN000160B33	2
eui.0017380000160b34	ps1a	2810XIV	368	Extent	MN000160B34	3
eui.0017380000160b39	ps1a	2810XIV	592	Extent	MN000160B39	5
eui.0017380000160b3c	ps1a	2810XIV	16	Mapped Raw LUN	MN000160B3C	6
eui.0017380000160b3d	ps1a	2810XIV	16	Mapped Raw LUN	MN000160B3D	7

LUN Details

View: Summary | Snapshots | Mirroring

395 GB Capacity
0 GB Used
395 GB Free

Volume Name: Single_host_LUN_1
Pool Name: VMWare_pool1
Serial Number: 2868
Consistency Group:

Number of Snapshots: 0
Last Snapshot:
Mirroring: Not Defined

Figure 32. Displaying volume details when a datastore is selected

The screenshot shows the '9.151.162.167 VMware ESX, 4.1.0, 260247' view in the IBM XIV Management Console. The left sidebar shows a tree view with 'Cluster A' selected. The main pane displays a table of datastores and a detailed view for the selected 'cluster_datastore_1'.

Datastore	Status	Capacity (GB)	Free (GB)	Type
datastore1	Accessible	135	117	Vmfs
cluster_datastore_1	Accessible	431	354	Vmfs
cluster_datastore2	Accessible	15	15	Vmfs
one_vm	Accessible	463	463	Vmfs

Identifier	Array	Model	Capacity (GB)	Use	Serial	LUN
eui.0017380000160b33	ps1a	2810XIV	16	Extent	MN000160B33	2
eui.0017380000160b34	ps1a	2810XIV	368	Extent	MN000160B34	3
eui.0017380000160b39	ps1a	2810XIV	592	Extent	MN000160B39	5
eui.0017380000160b3c	ps1a	2810XIV	16	Mapped Raw LUN	MN000160B3C	6
eui.0017380000160b3d	ps1a	2810XIV	16	Mapped Raw LUN	MN000160B3D	7

LUN Details

View: Summary | Snapshots | Mirroring

395 GB Capacity
0 GB Used
395 GB Free

Volume Name: Single_host_LUN_1
Pool Name: VMWare_pool1
Serial Number: 2868
Consistency Group:

Number of Snapshots: 0
Last Snapshot:
Mirroring: Not Defined

Figure 33. Displaying volume details when a host is selected

The datastores list (above the volumes list) displays the following details per datastore:

- **Datastore** – Name of the datastore.
- **Status** – Current status of the datastore (valid per the last update time).
- **Capacity (GB)** – Total size of the datastore in **Gibibyte** (not Gigabyte) units.
- **Free (GB)** – Size of the free space remaining in the datastore, in **Gibibyte** units.

Important: The sizes of the total capacity and free space are displayed in Gibibyte (GiB) units and not in Gigabyte (GB) units because the datastore information is taken from the VMware hosts.

- **Type** – Type of file system used in the datastore.

The volumes list (underneath the datastores list) displays the following details per volume:

- **Identifier** – Unique alphanumeric string (with a dot) that identifies the volume on the vCenter server.
- **Array** – Identification name of the IBM storage system on which the volume is defined. The array name is given by the storage administrator.

Note: "Unknown" is a generic array name, automatically given to any non-IBM XIV storage system or to any IBM XIV system that is not currently added (see *Adding an XIV storage system*).

- **Model** – Model of the IBM storage system on which the volume is defined.
- **Capacity (GB)** – Total capacity of the volume, in **Gibibyte** (not Gigabyte) units.
- **Use** – Type of volume use: **Datastore Extent** or **Mapped Raw LUN**. For more information about these types, see *Choosing which volumes to show*.
- **Serial** – Unique serial number of the volume.
- **LUN** – Logical unit number of the volume.

Note: Although not technically correct, the term "LUN" is also used to refer to the volume itself, because a LUN is widely referred to as a volume in the storage administration community.

For more information about the LUN Details pane (under the volumes list), see *Viewing information in the LUN Details pane*.

Viewing unused volumes

Volumes that are not assigned to datastores as Datastore Extent or Mapped Raw LUN are listed on the Unused LUNs list, which you can view separately under **View: Unused LUNs**.

The screenshot shows the 'Testing Datacenter' interface with the 'Unused LUNs' view selected. The table below represents the data shown in the interface:

Identifier	Array	Model	Capacity (GB)	Use	Serial	LUN
eui.00173800fdeb0845	Unknown	2810XIV	1616	Unused	MN0FDEB0845	4
eui.00173800fdeb3ff6	Unknown	2810XIV	432	Unused	MN0FDEB3FF6	5
eui.00173800fdeb14e0	Unknown	2810XIV	240	Unused	MN0FDEB14E0	2
eui.0017380000160b9c	ps1a	2810XIV	16	Unused	MN000160B9C	1
eui.0017380000160bdf	ps1a	2810XIV	16	Unused	MN000160BDF	12
eui.00173800fdeb0429	Unknown	2810XIV	2032	Unused	MN0FDEB0429	6
eui.00173800fdeb2cad	Unknown	2810XIV	16	Unused	MN0FDEB2CAD	3
eui.0017380000160bb2	ps1a	2810XIV	16	Unused	MN000160BB2	8
eui.0017380000160bb3	ps1a	2810XIV	16	Unused	MN000160BB3	9
eui.0017380000160bb4	ps1a	2810XIV	16	Unused	MN000160BB4	10
eui.0017380000160bb5	ps1a	2810XIV	16	Unused	MN000160BB5	11
eui.0017380000160bf3	ps1a	2810XIV	304	Unused	MN000160BF3	4
eui.0017380000160bf4	ps1a	2810XIV	16	Unused	MN000160BF4	13
eui.0017380000160bf5	ps1a	2810XIV	64	Unused	MN000160BF5	14
eui.0017380000160bf6	ps1a	2810XIV	224	Unused	MN000160BF6	15
eui.0017380000160bf7	ps1a	2810XIV	16	Unused	MN000160BF7	16
eui.0017380000160bc5	ps1a	2810XIV	16	Unused	MN000160BC5	10

The 'LUN Details' pane for the selected LUN (eui.0017380000160bf3) shows:

- Volume Name: 65
- Pool Name: VMWare_pool1
- Serial Number: 3059
- Consistency Group:
- Number of Snapshots: 0
- Last Snapshot:
- Mirroring: Not Defined

Figure 34. List of unused volumes (LUNs)

For more information about the LUN Details pane (under the Volumes list), see *Viewing information in the LUN Details pane*.

Viewing volumes that are used by virtual machines

Volumes that are used by virtual machines are listed separately from those that are used by datastores (for more information, see *Viewing volumes that are used by datastores*). When you want to check which storage volumes are currently in use by to virtual machines, perform the following procedure.

1. Go to **Home** → **Inventory** → **VMs and Templates**.
2. On the left-pane tree of virtual machines, click an icon of a virtual machine. The table on the right pane displays the details of the virtual hard disks that are used by the virtual machine you selected on the tree.
3. Click the name of a hard disk to display the storage volumes that are currently defined on it and are used by the datastores of the selected virtual machine.

My Virtual Machine

Getting Started | Summary | Resource Allocation | Performance | Tasks & Events | Alarms | Console | Permissions | Maps | Storage Views | **IBM Storage**

Hard Disks Last update time: 28-Mar-11 5:09:23 AM [Update](#)

Label	Size (GB)	Filename	Datastore	Type
Hard disk 1	8	[cluster_datastore_1] New Virtual Machine/New Virtual Machine.vmdk	cluster_datastore_1	Virtual Disk

Show All LUNs ▾

Identifier	Array	Model	Capacity (GB)	Use	Serial	LUN
eui.0017380000160b33	ps1a	2810XIV	16	Extent	MN000160B33	2
eui.0017380000160b34	ps1a	2810XIV	368	Extent	MN000160B34	3
eui.0017380000160b39	ps1a	2810XIV	592	Extent	MN000160B39	5

LUN Details

View: Summary | Snapshots | Mirroring

395 GB Capacity
0 GB Used
395 GB Free

Volume Name: Single_host_LUN_1
Number of Snapshots: 0

Pool Name: VMWare_pool1
Last Snapshot:

Serial Number: 2868
Mirroring: Not Defined

Consistency Group:

Figure 35. Displaying volume details when a virtual machine is selected

For more information about the LUN Details pane (under the Volumes list), see *Viewing information in the LUN Details pane*.

Choosing which volumes to show

In the different inventory views, you can choose which storage volumes display for the entity (datacenter, cluster, host, or virtual machine) that you select on the left-pane tree. Three viewing options are available:

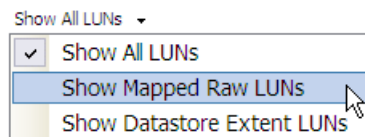


Figure 36. LUN viewing options

- **Show All LUNs** – Show all volumes (LUNs) that are related to the selected entity.
- **Show Mapped Raw LUNs** – Show only the Mapped Raw volumes (LUNs) that are related to the selected entity.

Reference: In raw device mapping, a special file in a VMFS volume acts as a proxy for another raw storage device. The mapping file contains metadata that is used to manage and redirect disk accesses to the physical device.

- **Show Datastore Extent LUNs** – Show only the Datastore Extent volumes (LUNs) that are related to the selected entity.

Reference: The VMware file system (VMFS) allows you to extend the size of datastores whenever needed, by creating datastore extents. Volumes that contain extended datastores are regarded as Datastore Extent LUNs.

Viewing information in the LUN Details pane

The LUN Details pane displays information of any recognized XIV-based volume that is selected in the volumes list (see *Figure 32*, *Figure 33*, and *Figure 34*).

Three different information views are available (click the view that you want to display): Summary, Snapshots, and Mirroring.

- Summary view (see *Figure 37* and *Figure 38*) – displays the following information:
 - **LUN pie chart** – A graphic representation of the total capacity, used space (red), and free space (orange) in selected volume. The pie chart is not displayed for snapshot volumes.
 - **Volume Name** – Name of the volume (given by the VMware administrator).
 - **Pool Name** – Name of the storage pool on which the volume was created.
 - **Serial Number** – Serial ID number of the volume.
 - **Consistency Group** – Indicates whether the volume belongs to a consistency group.
 - **Number of Snapshots** – Number of snapshots (if any) that exist for this volume.
 - **Last Snapshot** – Date and time at which the last snapshot was taken.
 - **Mirroring** – Indicates whether any mirroring is defined for this volume. Mirroring information is not available for snapshot volumes (see *Figure 38*) or if you do not have storage admin permissions.

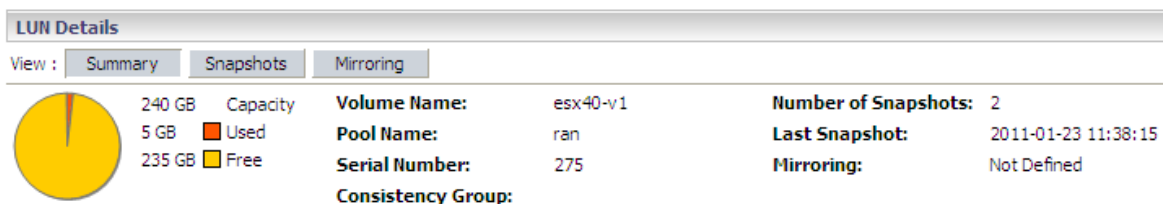


Figure 37. LUN Details – Summary view for a regular volume

LUN Details
 View : Summary Snapshots
 17 GB Capacity
Volume Name: cluster_test_3.snapshot_00003 **Number of Snapshots:** 2
Pool Name: VMWare_pool1 **Last Snapshot:** 2011-03-21 14:46:38
Serial Number: 2972
Consistency Group:

Figure 38. LUN Details – Summary view for a snapshot volume

- Snapshots view (see Figure 39) – displays the following information:
 - **Name** – Unique name of the snapshot file.
 - **Created** – Date and time at which the snapshot file was created.
 - **Modified** – Indicates whether the snapshot has been modified since its creation.
 - **Serial Number** – Serial ID number of the snapshot.
 - **Snapshot Group** – Indicates whether the snapshot belongs to a snapshot group. If yes, the name of the group is displayed.

Name	Created	Modified	Serial Number	Snapshot Group
cluster_test_3.snapshot_00004	2011-03-21 14:46:38	no	2973	
cluster_test_3.snapshot_00005	2011-03-21 14:46:38	no	2974	

Figure 39. LUN Details – Snapshots view

- Mirroring view (see Figure 40) – displays the following information:

Note: The Mirroring view is not available for snapshot volumes (see Figure 38).

- **Name** – Name of the mirroring operation.
- **Role** – Role of the mirroring operation.
- **Link State** – Current state of the mirroring link.
- **Status** – Current status of the mirroring operation.
- **Remote Volume** – Name of the mirrored remote volume.
- **Remote System** – Name of the remote storage system on which the mirrored volume resides.

Name	Role	Link State	Status	Remote Volume	Remote System
testing	M	↔	Synchronized	testing_mirror	mn26

Figure 40. LUN Details – Mirroring view

Managing XIV-based volumes (LUNs)

After you have created volumes, you can manage the volumes as needed. Accordingly, this section describes the following tasks:

- Extending a volume
- Increasing datastore capacity on an extended volume
- Renaming a volume
- Moving a volume to another storage pool
- Mapping an XIV-based volume to one or more ESX hosts
- Unmapping an XIV-based volume from one or more hosts
- Deleting an unused XIV-based volume

Note: You cannot manage volumes on "Unknown" storage arrays. "Unknown" is a generic array name, automatically given to any non-IBM XIV storage system or to any IBM XIV system that is not currently added (see *Adding an XIV storage system*).

Before you begin managing volumes:

- You must have XIV storage admin permissions on the relevant storage system.
 - Check whether the volumes you want to manage reside on attached storage pools.
 - Check whether the volumes you want to manage are used by a datastore as Extent or RDM.
- The **Map**, **Unmap**, and **Delete** options are not available for volumes that are used in such a way.

The above volume checks should not cause any downtime.

Extending a volume

If enough free space is available on the storage pools, you can extend the size of an existing volume. Perform the following procedure to extend the size of a volume.

1. In one of the Inventory views, right-click the row of the volume that you want to extend, and then click **Extend** on the pop-up menu.

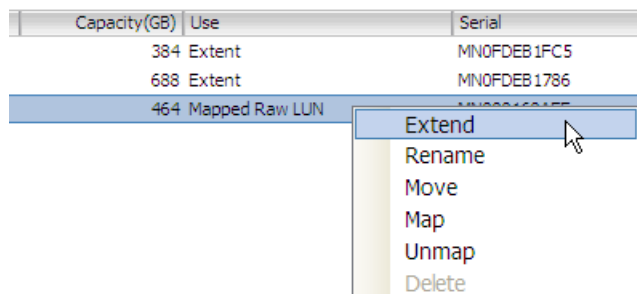


Figure 41. Clicking Extend on the pop-up menu

The Resize XIV Volume dialog box is displayed.

2. In **Volume Size**, enter the new size (in Gigabytes) for the volume. Alternatively, place the mouse pointer on the graphic image of the storage pool, and then click and slide the space marker rightward to set the new volume size (marked in yellow). The numerical value in Volume Size is automatically updated accordingly.

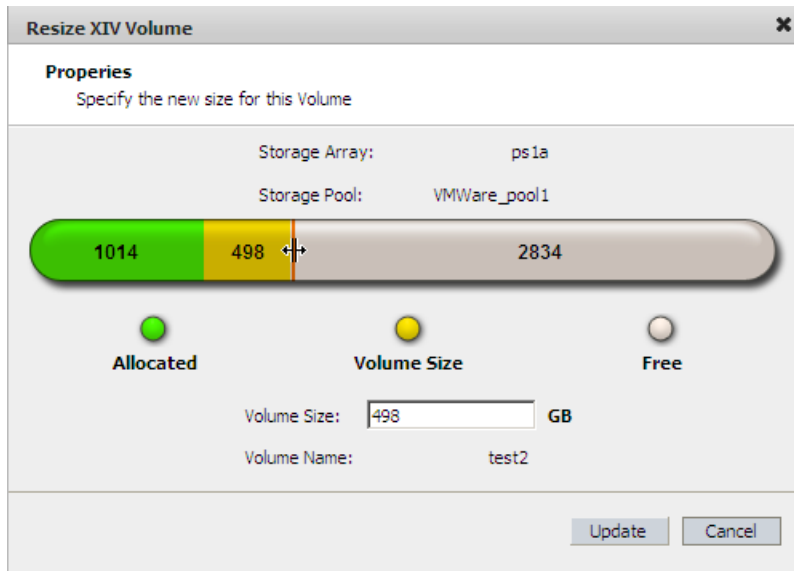


Figure 42. Resize XIV Volume dialog box – using the mouse pointer

Note: XIV-based volume sizes are automatically rounded to the next multiple of 17.1 GB.

3. Click **Update**.

Important: Extending the size of a volume does not automatically increase the datastore capacity. For more information, see *Increasing datastore capacity on an extended volume*.

Increasing datastore capacity on an extended volume

After you have extended the size of a volume (LUN), you can increase the capacity of any datastore located on that volume.

Perform the following procedure to increase the size of a datastore.

1. Go to **Home** → **Inventory** → **Datastores**.
2. Click the datastore that you want to extend, and then click **Properties**.

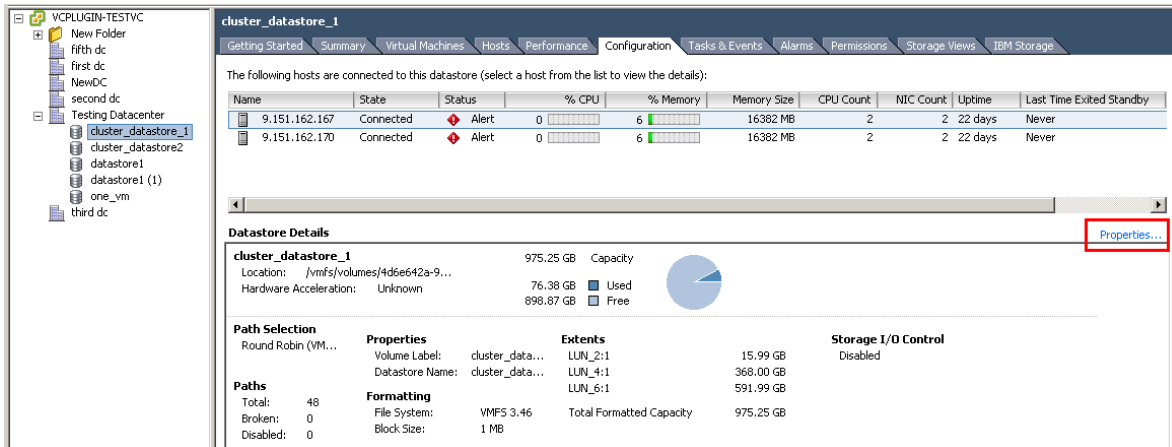


Figure 43. Datastore Configuration tab – Properties button

The datastore Properties dialog box is displayed.

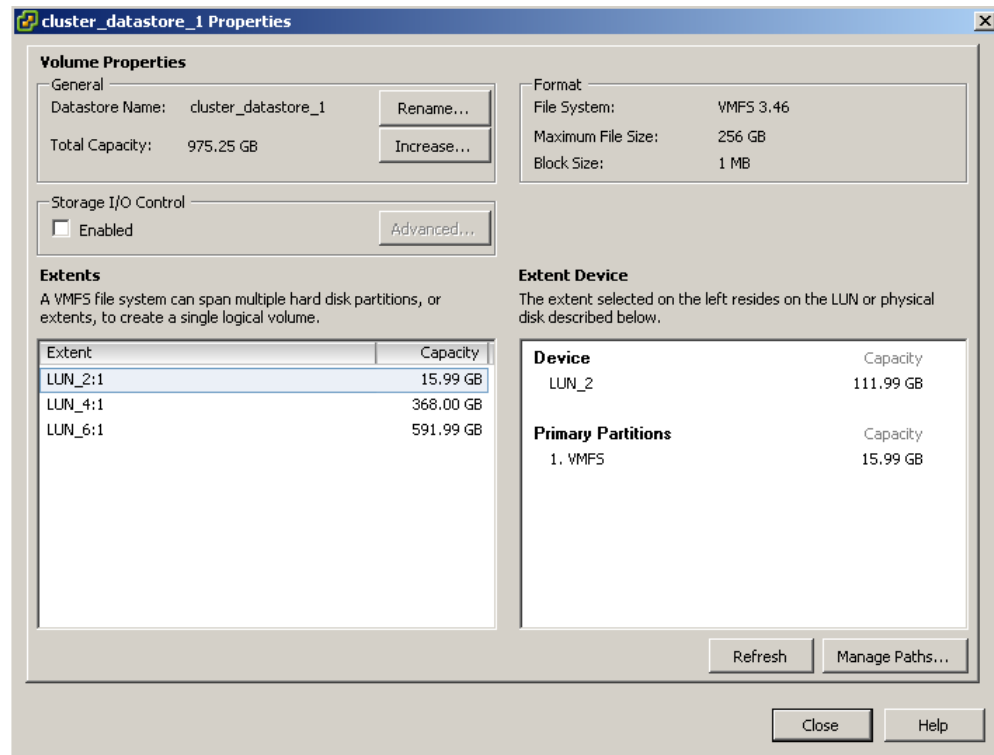


Figure 44. Datastore Properties dialog box

3. Click **Increase**. The Increase Datastore Capacity wizard is displayed.
4. Select the volume (referred to as Extent Device by vSphere) you have resized, click **Next**, and then complete the remaining steps of the Increase Datastore Capacity wizard.

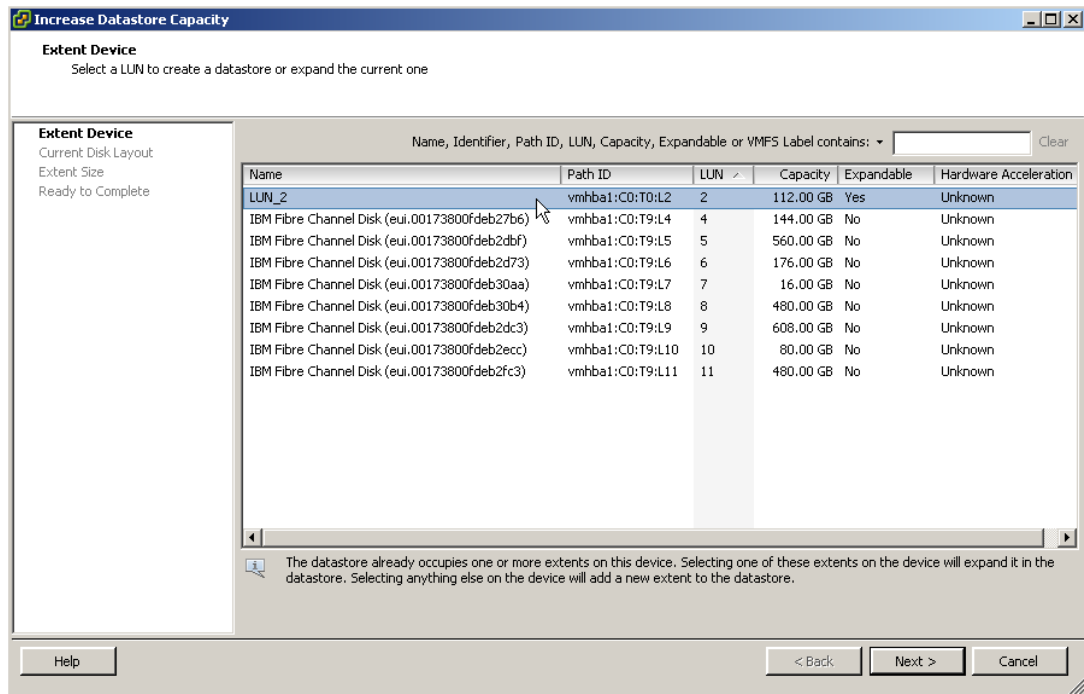


Figure 45. Selecting the extended volume for the datastore size increase

Note: When selecting the resized volume (Extent Device), a notification below indicates that the datastore already has an extent on that volume.

Renaming a volume

Whenever required, you can rename any existing volume by performing the following procedure.

Note: Renaming a volume does not have any physical effect on the volume or its logical connections.

1. In one of the Inventory views, right-click the row of the volume that you want to rename, and then click **Rename** on the pop-up menu.
The Rename XIV Volume dialog box is displayed.
2. In **New Name**, enter the new name that you want to assign to the volume.
3. Click **Rename**. The new Volume Name is updated in the LUN Details pane.


Show All LUNs ▾

Identifier	Array	Model	Capacity(GB)	Use
eui.00173800fdeb1fc5	XIV HostDev2c	2810XIV	384	Extent
eui.00173800fdeb1786	XIV HostDev2c	2810XIV	688	Extent
eui.0017380000160aee	ps1a	2810XIV	464	Mapped Raw LUN

Extend
Rename
 Move
 Map
 Unmap
 Delete

LUN Details

View : Summary Snapshots Mirroring



498 GB Capacity
0 GB Used
498 GB Free

Volume Name: test2 **Number of Snapshots:** 0

Pool Name: VMWare_pool1 **Last Snapshot:**

Serial Number: 2798 **Mirroring:** Synchronized

Consistency Group: test

Figure 46. Clicking Rename on the pop-up menu to rename the volume name

Moving a volume to another storage pool

If you want to move a volume to a different storage pool (for example, when the current storage pool has ran out of space), perform the following procedure.

Note: Moving a volume to another storage pool is a logical action. No data is moved on the volume as a result.

1. In one of the Inventory views, right-click the row of the volume that you want to move, and then click **Move** on the pop-up menu.
The Move XIV Volume dialog box is displayed.
2. From the drop-down list, select the storage pool to which you want to move the volume, and then click **Move**.
The new storage pool location is updated in the LUN Details pane.

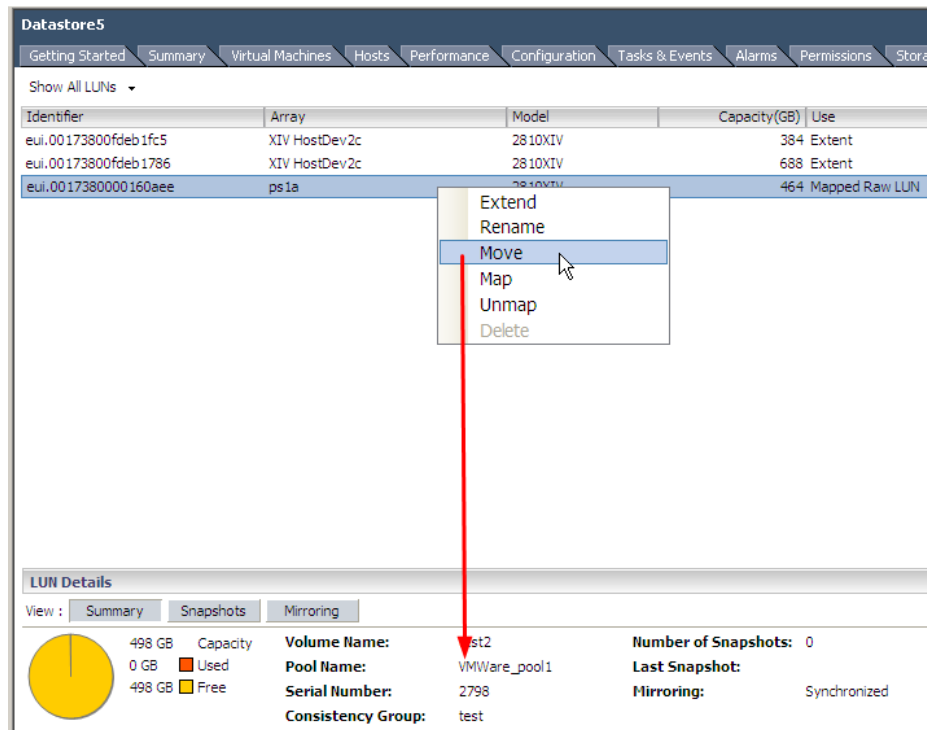


Figure 47. Clicking Move on the pop-up menu to move the volume to another pool

Mapping an XIV-based volume to one or more ESX hosts

Only volumes that are mapped to one or more ESX hosts can be used for creating datastores. Without the mapping operation, you will not be able to create datastores to which virtual machines can be connected (for more information, see *Creating VMware datastores on XIV-based volumes (LUNs)* and *Creating a virtual machine and connecting it to a datastore*).

Important: You can map volumes only to hosts that were predefined on the storage system. Accordingly, contact your storage administrator if the mapping option is not available on your vSphere client. For more details about mapping restrictions, see *Restrictions on mapping and unmapping volumes*.

Perform the following procedure to map XIV-based volumes to ESX hosts.

1. Access the view under **View: Unused LUNs** (see *Viewing unused volumes*).
2. Right-click the volume that you want to map, and then click **Map** on the pop-up menu. The Map XIV LUN to Hosts dialog box is displayed.

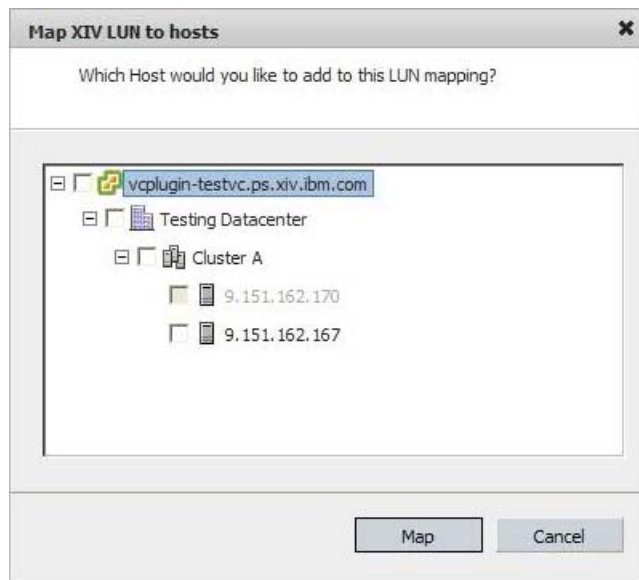


Figure 48. Map XIV LUN to Hosts dialog box

3. Select the hosts or clusters to which you want to map the volume, and then click **Map**.

Note: Grayed-out hosts are either already mapped or not defined on the storage system, and therefore cannot be selected.

Unmapping an XIV-based volume from one or more hosts

When volumes or hosts are no longer needed, or if new ones are to replace the current ones, you can unmap volumes from the host(s).

Perform the following procedure to unmap a volume.

1. In one of the Inventory views, right-click the row of the volume that you want to unmap, and then click **Unmap** on the pop-up menu.

The Remove LUN Mapping dialog box is displayed.

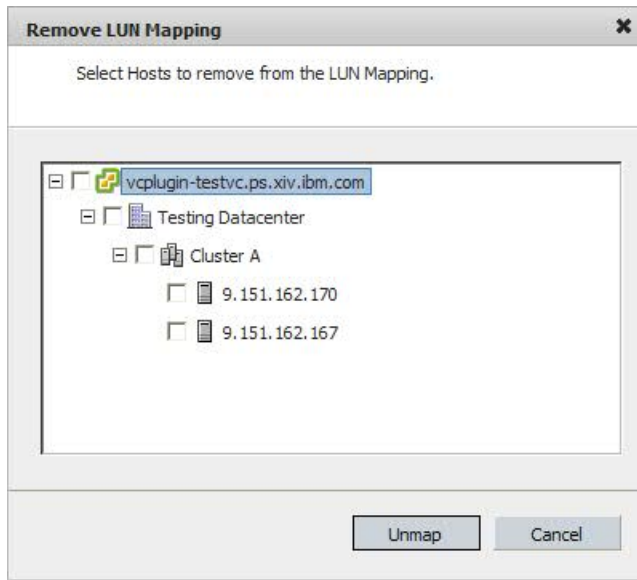


Figure 49. Remove LUN Mapping dialog box

2. Select the hosts or clusters from which you want to unmap the volume, and then click **Unmap**.

Restrictions on mapping and unmapping volumes

Volume mapping and unmapping operations are available or may become unavailable based on different factors and conditions, as summarized in the following table.

Table 3. Volume-to-host mapping scenarios and restrictions

Number of hosts mapped to the LUN	Definition on the XIV storage system	Definition on vCenter	Performed operation	Result on the XIV storage system
Single host	Single host	Single host	Mapping	The host is added to the LUN mapping list.
Single host	Single host	Single host	Unmapping	The LUN cannot be unmapped from the host unless it is mapped to another host or cluster on vCenter.
2 or more hosts	2 single hosts	2 single hosts	Mapping	The LUN is mapped to each host.
2 or more hosts	2 single hosts	2 single hosts	Unmapping	The LUN can be unmapped from each of the hosts independently, but not both at the same time.
2 or more hosts	Cluster	2 single hosts	Mapping	The LUN is mapped to the cluster defined on the XIV system.

Number of hosts mapped to the LUN	Definition on the XIV storage system	Definition on vCenter	Performed operation	Result on the XIV storage system
2 or more hosts	Cluster	2 single hosts	Unmapping	The LUN cannot be unmapped from the hosts in the cluster separately and cannot be unmapped from the cluster unless it is mapped to another host or cluster in vCenter.
2 or more hosts	Cluster	Cluster	Mapping	The LUN is mapped to the cluster defined on the XIV system.
2 or more hosts	Cluster	Cluster	Unmapping	The LUN cannot be unmapped from the hosts in the cluster separately, and cannot be unmapped from the cluster unless it is mapped to another host or cluster in vCenter.
Any number of hosts	Part of a cluster	Selected single hosts	Mapping	The LUN is mapped to the whole XIV cluster on the XIV storage system.
Any number of hosts	Part of a cluster	Selected single hosts	Unmapping	The LUN is unmapped from the whole cluster on the XIV storage system.

Deleting an unused XIV-based volume

When a storage volume is unused (see *Viewing unused volumes*) and no longer required, you can delete it.

Attention: You cannot delete volumes that are currently used by datastores.

Perform the following procedure to delete an unused volume (LUN).

1. Access the **Unused LUNs** list.
2. Right-click the row of the volume that you want to delete, and then select **Delete** from the pop-up menu.

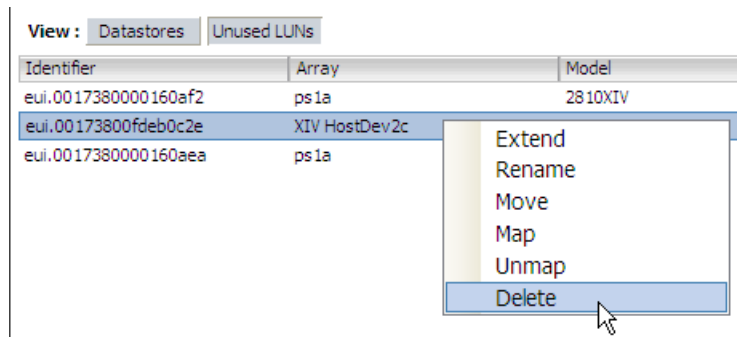


Figure 50. Clicking Delete on the pop-up menu

The Volume Delete Confirmation dialog box is displayed.

3. Click **Delete** to confirm the deletion, or **Cancel** to exit without deleting the volume.

Chapter 7. Standard vSphere Client operations

This chapter briefly explains the following standard VMware operations that can be performed on the vSphere client:

- Creating VMware datastores on XIV-based volumes (LUNs)
- Creating a virtual machine and connecting it to a datastore

Reference to existing VMware documentation:

VMware already provides documentation for the operations described in this chapter. For more detailed information about basic and advanced vSphere operations, visit the VMware Documentation website:

<http://www.vmware.com/support/pubs>

Creating VMware datastores on XIV-based volumes (LUNs)

When the storage volumes you have created are ready for use by datastores, you can start assigning the volumes to the new datastores that you create.

Use the vSphere **Add Storage** wizard to create datastores on XIV-based volumes you have created (for more information, see *Creating an XIV-based volume (LUN)*).

1. Start the vSphere Add Storage wizard.
2. On the **Select Host** panel, select the ESX host to which XIV-based volumes are mapped, and then click **Next**.

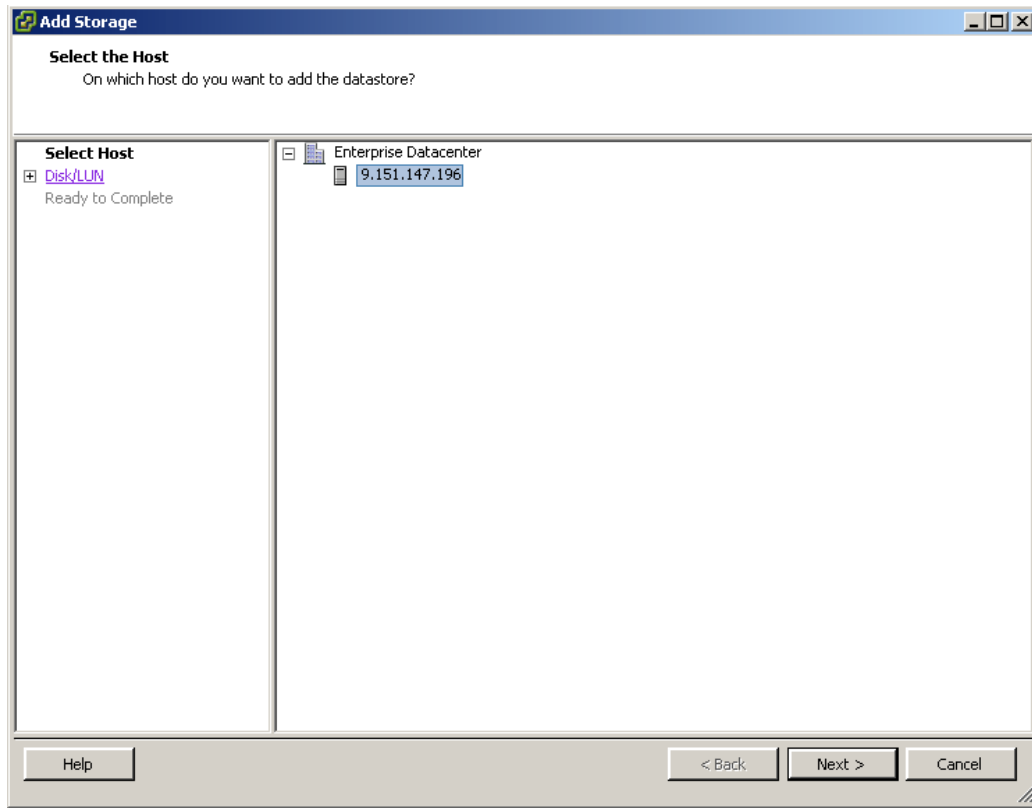


Figure 51. Add Storage wizard – Select Host panel

The Select Storage Type panel is displayed.

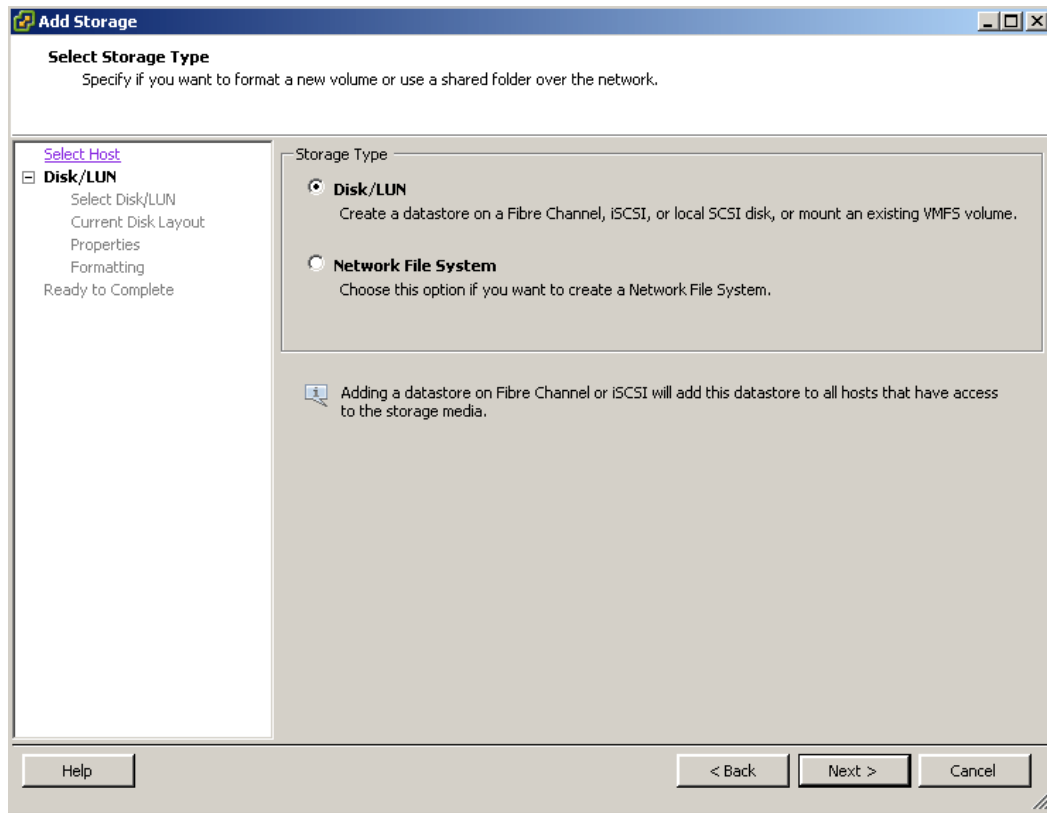


Figure 52. Add Storage wizard – Select Storage Type panel

3. Select **Disk/LUN**, and then click **Next**. The Select Disk/LUN panel is displayed.
4. From the list of available volumes (LUNs), select the volume on which you want to create the datastore, and then click **Next**.

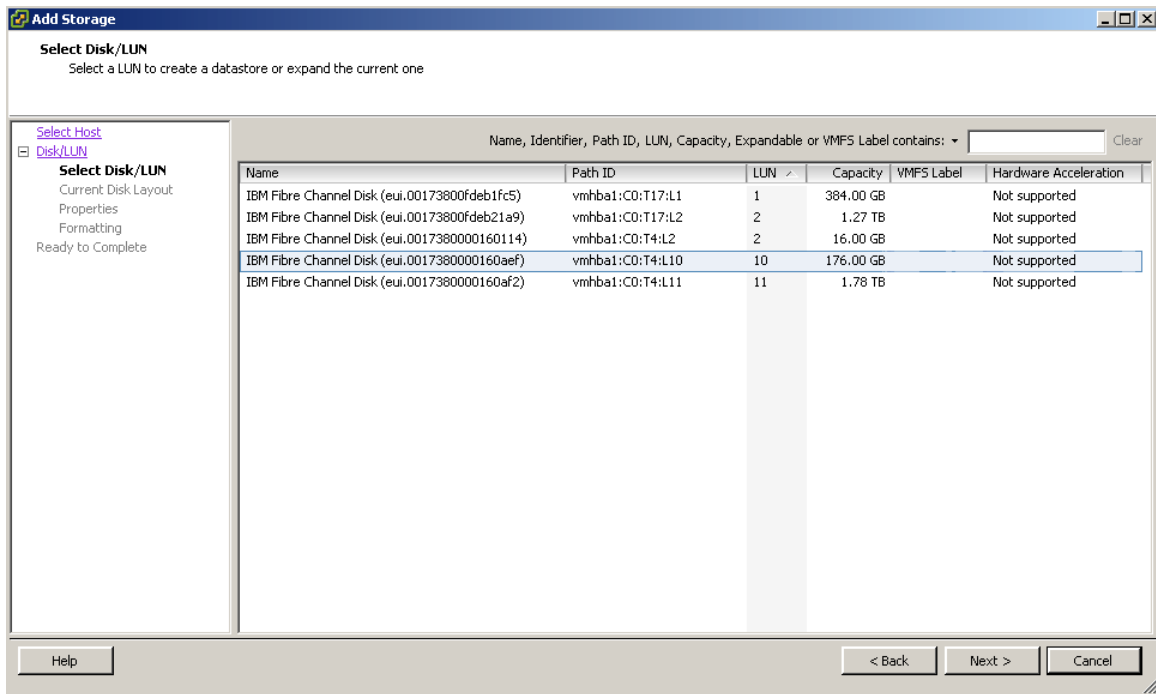


Figure 53. Add Storage wizard – Select Disk/LUN panel

The Current Disk Layout panel is displayed.

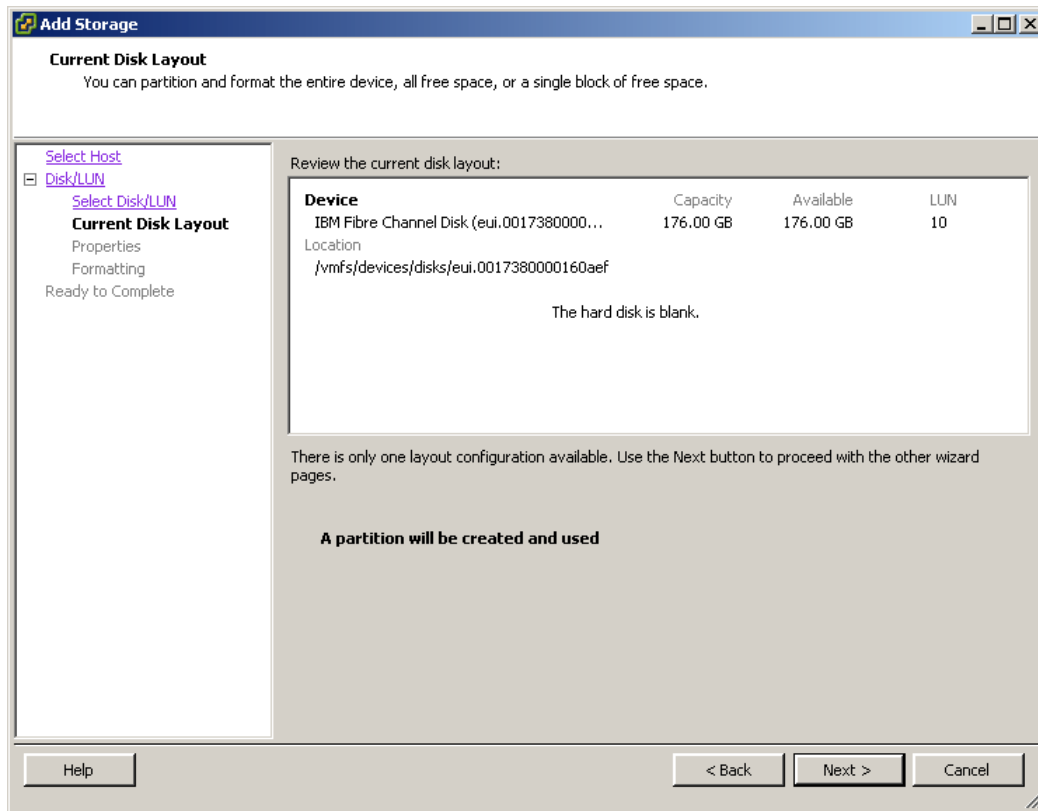


Figure 54. Add Storage wizard – Current Disk Layout panel

5. Click **Next**. The Properties panel is displayed.
6. Enter the name of the datastore that you want to create, and then click **Next**.



Figure 55. Add Storage wizard – Entering a datastore name

The 'Disk/LUN – Formatting' panel is displayed.

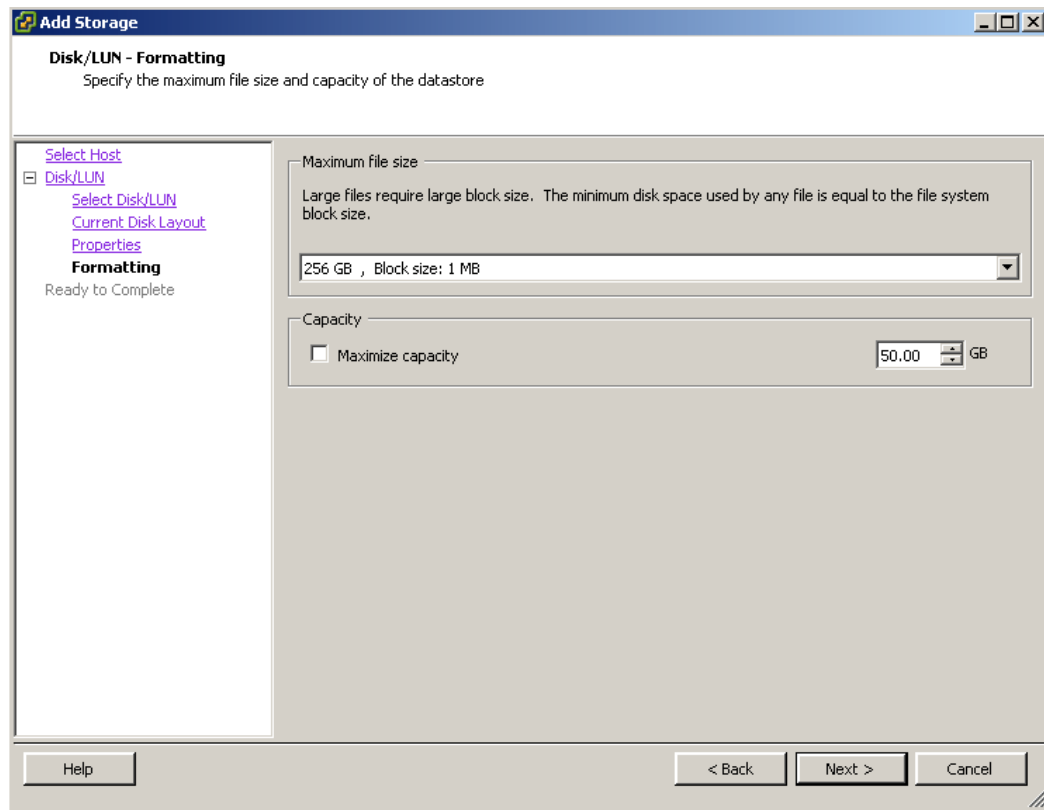


Figure 56. Add Storage wizard – 'Disk/LUN – Formatting' panel

7. From the drop-down list, select the maximum file size for the datastore, and specify any maximum capacity that you want to enforce on the datastore. Then, click **Next**.

The 'Ready to Complete' panel is displayed.

8. Click **Finish**. The new datastore is now created on the volume you selected (as explained on step 4 of this procedure).

Creating a virtual machine and connecting it to a datastore

After you create the required datastores, you can assign each datastore to a virtual machine. Use the **Create New Virtual Machine** wizard to create virtual machines and select the datastores for these virtual machines.

Note: For more detailed information about virtual machine creation, refer to the relevant VMware documentation (see *Publications and related information* on page 1).

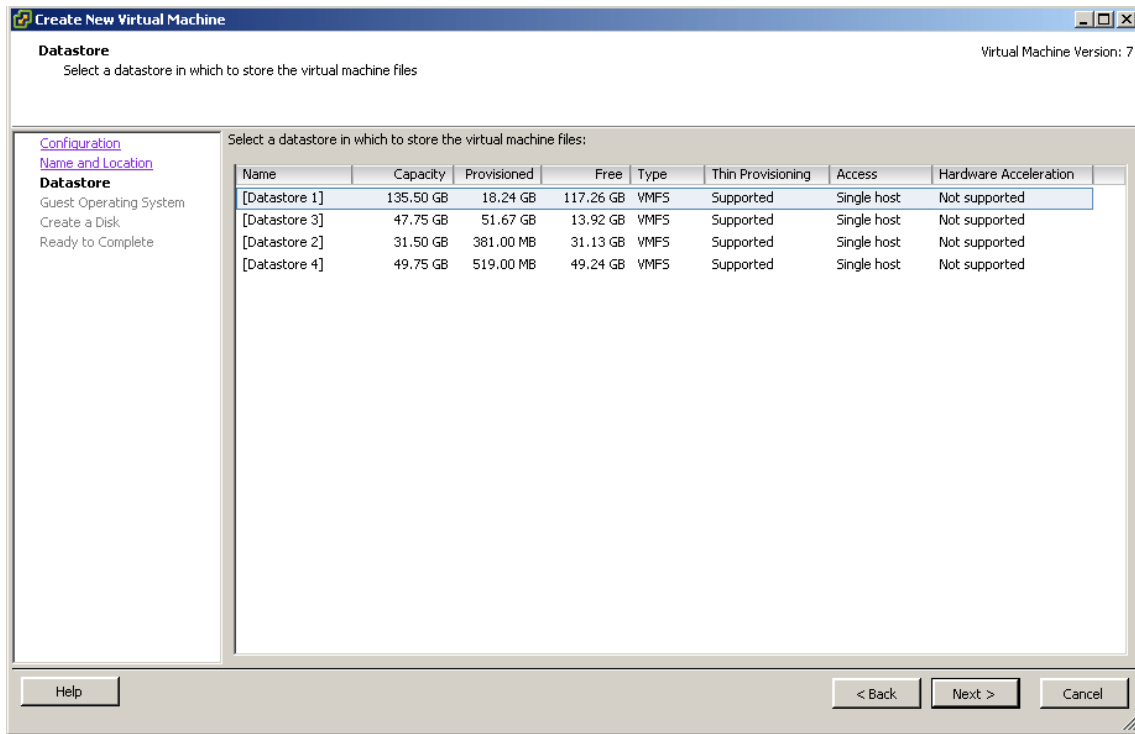


Figure 57. Create New Virtual Machine wizard – Datastore selection panel

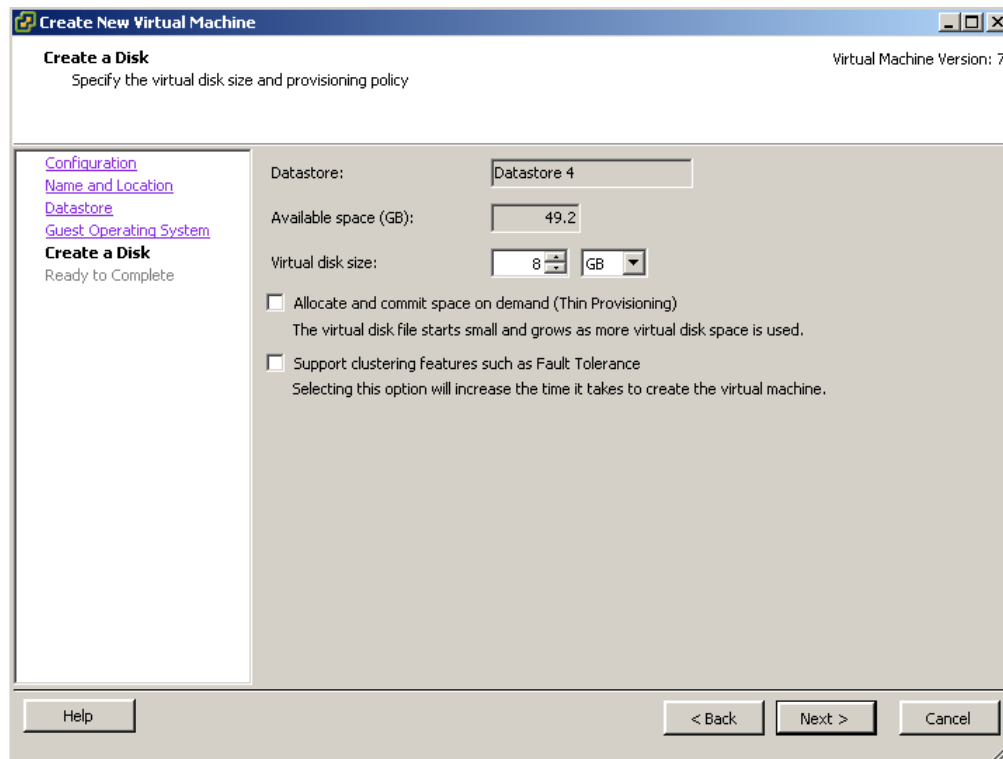


Figure 58. Create New Virtual Machine wizard – Create a Disk panel

Chapter 8. Monitoring and troubleshooting

This chapter describes:

- Monitoring the status of recent tasks and triggered alarms
- Viewing the event log
- Event messages in vSphere
- Event messages in Windows Server
- Resolving miscellaneous issues

Monitoring the status of recent tasks and triggered alarms

As you work with the IBM XIV Management Console for VMware vCenter, use the vSphere **Recent Tasks** and **Triggered Alarms** monitoring panels to detect any possible error or malfunction in the storage usage.

Name	Target	Status	Details	Initiated by	vCenter Server	Requested Start Time	Start Time	Completed Time
Set logical unit policy	9.151.162.167	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:33:26 AM	28-Mar-11 12:33:26 AM	28-Mar-11 12:33:35 AM
Retrieve IBM Storage Information fr...	VCPLUGIN-TESTVC	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:33:13 AM	28-Mar-11 12:33:13 AM	28-Mar-11 12:33:37 AM
Refresh host storage system	9.151.162.167	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:33:05 AM	28-Mar-11 12:33:05 AM	28-Mar-11 12:33:12 AM
Rescan all HBAs	9.151.162.167	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:32:54 AM	28-Mar-11 12:32:54 AM	28-Mar-11 12:33:04 AM
Set logical unit policy	9.151.162.170	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:32:34 AM	28-Mar-11 12:32:34 AM	28-Mar-11 12:32:39 AM
Set logical unit policy	9.151.162.170	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:32:27 AM	28-Mar-11 12:32:27 AM	28-Mar-11 12:32:33 AM
Retrieve IBM Storage Information fr...	VCPLUGIN-TESTVC	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:32:19 AM	28-Mar-11 12:32:19 AM	28-Mar-11 12:32:42 AM
Refresh host storage system	9.151.162.170	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:32:07 AM	28-Mar-11 12:32:08 AM	28-Mar-11 12:32:17 AM
Rescan all HBAs	9.151.162.170	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:31:57 AM	28-Mar-11 12:31:57 AM	28-Mar-11 12:32:07 AM
Retrieve IBM Storage Information fr...	VCPLUGIN-TESTVC	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:31:49 AM	28-Mar-11 12:31:49 AM	28-Mar-11 12:31:53 AM
Add IBM Storage LUN	VCPLUGIN-TESTVC	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:31:41 AM	28-Mar-11 12:31:41 AM	28-Mar-11 12:31:47 AM
Retrieve IBM Storage Information fr...	VCPLUGIN-TESTVC	Completed		Administrator	VCPLUGIN-TESTVC	28-Mar-11 12:31:29 AM	28-Mar-11 12:31:29 AM	28-Mar-11 12:31:43 AM
Retrieve IBM Storage Information fr...	VCPLUGIN-TESTVC	In Progress		Administrator	VCPLUGIN-TESTVC	27-Mar-11 10:00:09 PM	27-Mar-11 10:00:09 PM	
Retrieve IBM Storage Information fr...	VCPLUGIN-TESTVC	30%		Administrator	VCPLUGIN-TESTVC	27-Mar-11 7:52:30 PM	27-Mar-11 7:52:30 PM	

Figure 59. vSphere Recent Tasks monitoring panel

Object	Status	Name	Triggered	Acknowledged	Acknowledged By
VCPLUGIN-TESTVC	Warning	Health status monitoring	15-Mar-11 11:47:50 AM		
9.151.162.170	Alert	Host IPMI System Event Log status	01-Mar-11 4:56:33 PM		
9.151.162.170	Alert	Status of other host hardware objects	01-Mar-11 4:56:33 PM		
9.151.162.156	Alert	Host connection and power state	24-Mar-11 7:28:34 PM		

Figure 60. vSphere Triggered Alarms monitoring panel

For more information about the different messages that may be displayed in the monitoring panels, see *Event messages in vSphere*.

In addition, any event related to IBM storage processes or components appears in the Windows Application log (on the vCenter server), available through **Server Manager** → **Diagnostics** → **Windows Logs** → **Application**.

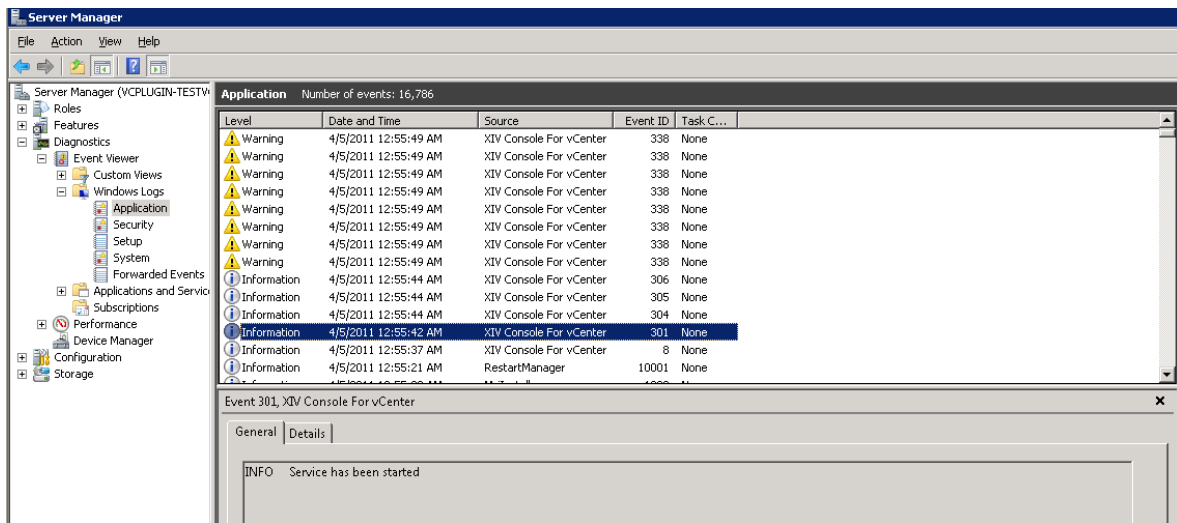


Figure 61. Windows Application log

For more information about the different message types and IDs, see *Event messages in Windows Server*.

Viewing the event log

The event log file is located at:

```
c:\windows\temp\xiv_console_for_vcenter.log
```

You can view the contents of the file in any plain-text viewer or editor such as Notepad.

Note: When the log file reaches a size of 4.76 MB, a new log file is created and named with a sequential number: `xiv_console_for_vcenter.log.1`, `xiv_console_for_vcenter.log.2`, and so on.

Event messages in vSphere

This section summarizes the different event types that may be displayed on the vSphere client, including:

- vSphere information event messages
- vSphere warning event messages
- vSphere error event messages

Note: The events also appear in the Event list of the vCenter server. The list is accessible from the vSphere client.

vSphere information event messages

Information event messages are non-critical messages that notify you about the different performed operations. The following table summarizes the information event messages that the IBM XIV Management Console may generate and display in the vSphere monitoring panels (see *Figure 59* and *Figure 60*).

Table 4. vSphere information event messages

ID	Message	Description
401	Multipath policy for LUN %s has been modified from %s to %s	Indicates that the multipath policy of this LUN has been set
402	%s has been created	Indicates that a LUN was created
403	%s has been deleted	Indicates that a LUN was deleted
404	%s has been renamed to %s	Indicates that a LUN was renamed
405	%s has been resized, new size is %s	Indicates that a LUN was resized
406	%s has been relocated in the storage system, details: %s	Indicates that a LUN was relocated within the storage system
407	%s has been mapped to hosts: %s	Indicates that a LUN was mapped to a host
408	%s has been unmapped from hosts: %s	Indicates that a LUN was unmapped from a host

vSphere warning event messages

Warning messages bring to your attention any condition that may result in an error or malfunction. The following table summarizes the warning event messages that the IBM XIV Management Console may generate and display in the vSphere monitoring panels (see *Figure 59* and *Figure 60*).

Table 5. vSphere warning event messages

ID	Message	Description
431	Datastore Extent %s is inaccessible	This datastore extent cannot be probed. It might indicate that your host information is not updated. Rescan the host and refresh host information, and then click the Update link in the IBM Storage tab.
432	Virtual Machine %s has a Raw Mapping LUN filename %s with no matching LUN	Information could not be retrieved regarding a Raw mapped LUN. Click the Update link in the IBM Storage tab.
433	VPD information could not be found for LUN. Run the Rescan operation to fix this problem.	It might indicate that your host information is not updated. Rescan the host and refresh host information, and then click the Update link in the IBM Storage tab.

ID	Message	Description
434	Storage Pool %s, which is attached to vCenter, has been deleted from Storage Array %s. Please work with the Storage Administrator to resolve this issue. Either recreate the Storage Pool in the Storage Array or detach it from vCenter.	The storage pool which is attached has been deleted from the storage. Contact the Storage administrator and either detach the storage pool or recreate it using the storage GUI.
435	Cannot retrieve Virtual Disk attributes for virtual machine %s. It may be inaccessible. Run the Rescan operation to fix this problem.	It might indicate that your host information is not updated. Rescan the host and refresh host information, and then click the Update link in the IBM Storage tab.

vSphere error event messages

Error event messages are critical messages regarding errors or malfunctions that have occurred. The following table summarizes the error event messages that the IBM XIV Management Console may generate and display in the vSphere monitoring panels (see *Figure 59* and *Figure 60*).

Table 6. vSphere error event messages

ID	Message	Description
461	A general error has occurred: %s	Describing a general error that occurred.
462	Error while setting Multipath policy for %s: %s.	Describing an error that occurred during multipath policy set.
463	Failed while adding LUN on storage array %s: %s	LUN addition failure
464	Failed while deleting LUN on storage array %s: %s	LUN deletion failure
465	Failed while extending LUN on storage array %s: %s	LUN extent failure
466	Failed while moving LUN to another storage pool on storage array %s: %s	LUN move failure
467	Failed while mapping LUN on storage array %s: %s	LUN mapping failure
468	Failed while unmapping LUN on storage array %s: %s	LUN unmapping failure
469	Failed while renaming LUN on storage array %s: %s	LUN rename failure
470	Failed while trying to connect to storage array %s. Reason: %s	Describing an error which occurred while trying to connect to storage array.

Event messages in Windows Server

The IBM XIV Management Console for VMware vCenter generates event messages in the Windows Server application event log (located on the vCenter server), including:

- Windows information event messages
- Windows warning event messages
- Windows error event messages

Windows information event messages

Information event messages are non-critical messages that notify you about the different performed operations. The following table summarizes the information event messages that the IBM XIV Management Console may generate and display in the Windows Server application event log (see *Figure 61*).

Table 7. Windows information event messages

ID	Message	Description
301	Service has started	IBM Storage plug-in service has started
302	Service has stopped	IBM Storage plug-in service has stopped
303	Service is stopping	Plug-in service is in the process of stopping
304	Initializing cache maintainer	Cache maintainer initialization has started
305	Cache maintainer has been initialized	Cache maintainer initialization has been completed
306	Running cache maintainer	Cache maintainer currently runs
307	Cache maintainer is stopping	Cache maintainer is in the process of stopping
308	Multipath policy for LUN %s has been set to %s (was %s)	Multipath policy set
309	IBM Management Console plug-in extension was unregistered	IBM Storage plug-in service has been unregistered

Windows warning event messages

Warning messages bring to your attention any condition that may result in an error or malfunction. The following table summarizes the warning event messages that the IBM XIV Management Console may generate and display in the Windows Server application event log (see *Figure 61*).

Table 8. Windows warning event messages

ID	Message	Description
331	Cache manager did not find any volume that matches extent %s. Please check your VMware environment for inaccessible datastore LUNs.	Volume not found
332	Datastore %s is of type %s, which is unsupported. Please notify IBM support.	Unsupported datastore type
333	Cache manager did not find any volume for Raw Mapping LUN with filename %s, which belongs to VM %s.	Volume not found by cache manager
334	Cache manager reported an error that might be temporary: %s	Temporary cache problem
335	Cache manager found an XIV volume but cannot access its properties. Volume serial = %s The 'Rescan' operation from the host configuration tab may resolve this problem.	XIV-based volume cannot be accessed
336	Timeout occurred while waiting for Cache update. It appears that multiple updates to the Cache were initiated and did not finish within the timeout. If this persists, please notify IBM support.	Cache timeout problem
337	Cache manager failed to connect to XIV system %s. Reason: %s Please update the system properties using the IBM Storage link.	Connection failure due to a specified reason
338	Cache manager found a volume from an undefined XIV system. You should to define this XIV system in the IBM Storage Configuration tab in order to view its properties. Volume serial = %s	The XIV storage system needs to be added
339	Storage Pool %s, which is attached to vCenter, has been removed from Storage Array %s. Please work with the storage administrator to resolve this issue. Either recreate the storage pool in the storage array or detach it from vCenter.	Storage pool is not attached

ID	Message	Description
340	Failed to match host HBA to a SCSI LUN topology. Searching interface adapter %s for host id %s.	HBA does not match the SCSI LUN topology
341	Cannot retrieve virtual disk attributes for virtual machine %s. It may be inaccessible.	Virtual disk attributes are not available

Windows error event messages

Error event messages are critical messages regarding errors or malfunctions that have occurred. The following table summarizes the error event messages that the IBM XIV Management Console may generate and display in the Windows Server application event log (see *Figure 61*).

Table 9. Windows error event messages

ID	Message	Description
361	An error has occurred while updating the cache: %s	Cache error
362	IBM XIV Management Console for VMware vCenter failed to unregister from vCenter server with message: %s. You can remove the plug-in manually using the extension manager address: https://vc.server.dns.name/mob	Plug-in removal failure
363	IBM XIV Management Console for VMware vCenter failed to remove the service with message: %s	Service removal failure
364	IBM XIV Management Console for VMware vCenter failed to register plug-in with message: %s	Plug-in registration failure
365	IBM XIV Management Console for VMware vCenter failed to login to the vCenter Server with current credentials. Please run the Configuration Wizard in order to change username and password.	Login failure due to credentials
366	IBM XIV Management Console for VMware vCenter failed to set multipath policy for %s: %s	Multipath setting failure
367	IBM XIV Management Console for VMware vCenter failed in LUN operation: %s	LUN operation failure
368	IBM XIV Management Console for VMware vCenter failed while trying to use keyring: %s	Keyring error

Resolving miscellaneous issues

For up-to-date information about known issues and possible workarounds, refer to the latest release notes of the IBM XIV Management Console for VMware vCenter.

Chapter 9. Best practices

This chapter provides general guidance and best practices that you should apply when:

- Handling datastores
- Handling ESX hosts

Handling datastores

For best performance of datastores:

- Create each datastore on a separate XIV volume (LUN).
- If you use snapshots/mirroring for XIV volumes, place all Datastore Extents volumes (the build blocks LUNs of a datastore) in a consistency group (defined using the XIV GUI or CLI only).

Handling ESX hosts

For best performance of ESX hosts, all ESX hosts within a cluster should be defined as a cluster hosts on the XIV storage system as well.

Following this practice prevents situations in which an XIV volume is mapped to different ESX hosts in a cluster using different LUN numbers, thus making this LUN unusable.

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