



IBM XIV Host Attachment Kit for HP-UX

Version 1.6.x

Host Attachment Guide

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This edition applies to IBM XIV Storage System Software and to all subsequent releases and modifications until otherwise indicated in new editions.

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Introduction

This guide describes the host attachment capabilities for the IBM XIV Storage System.

Purpose and Scope

You can configure the IBM XIV Storage System for the following adapter types and protocols:

- Fibre Channel adapters for support of Fibre Channel Protocol (FCP)

As explained in the *IBM XIV Storage System Product Overview*, the IBM XIV Storage System has six Interface modules and three Host Interface modules that connect to them. Each Interface module contains four Fibre Channel ports. These ports are used to attach to hosts.

Note: All host traffic is served through six Interface modules (numbers 4-9).

Although the IBM XIV Storage System distributes the traffic between I/O modules and Data modules, it is important to understand that it is the storage administrator's responsibility to ensure that host I/Os are equitably distributed among the various Interface modules. This workload balance must be watched and reviewed over time when host traffic patterns change.

The host must be properly configured before it can perform I/O operations on the IBM XIV Storage System.

The Host Attachment Kit (HAK) provides a set of tools that simplifies the host configuration and management.

Audience

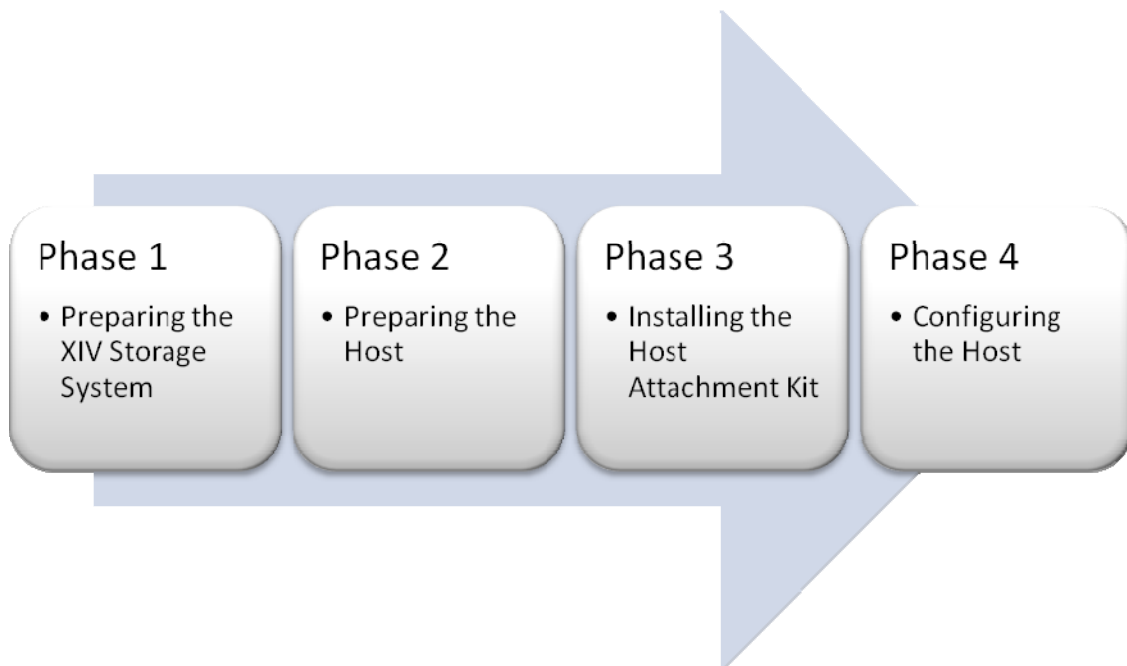
This document is for users who want to connect the IBM XIV Storage System to a host. To use this guide, you must have a basic understanding of the subject operating system and familiarity with the IBM XIV Storage System.

The XIV Host Attachment Flow

The Host Attachment process consists of the following four phases:

- Preparing the XIV Storage System for host Connectivity
- Preparing the host
- Installing the Host Attachment Kit
- Configuring the host

Each phase can include several steps.



Related Documentation

All the host attachment related documents are available at the following web address:

<http://publib.boulder.ibm.com/infocenter/ibmxiv/r2/>

Conventions Used in this Guide

The following conventions for notes, warning and figures are used in this document:

Code

These notices indicate referenced text from a source file, scripts and commands.

 Code

Screen output

These notices indicate text from the standard output of the system, host or both.

 Screen output


Warning

These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage can occur.

 Warning

Pay attention

These notices provide important tips, guidance, or advice to help you avoid inconvenient or problem situations.

 Pay attention

Before You Proceed

Before you proceed reading this document, you must have a workstation that is equipped with the IBM XIV Storage System management software: the XIV GUI and the XCLI. For additional assistance and more information on how to get, use and install the IBM XIV Storage System management software, see the *IBM XIV Product Overview*.

How to Send Your Comments

Your feedback is important in helping us to provide the most accurate and high-quality information. If you have comments or suggestions for improving this document, send us your comments by e-mail to xivdoc@il.ibm.com

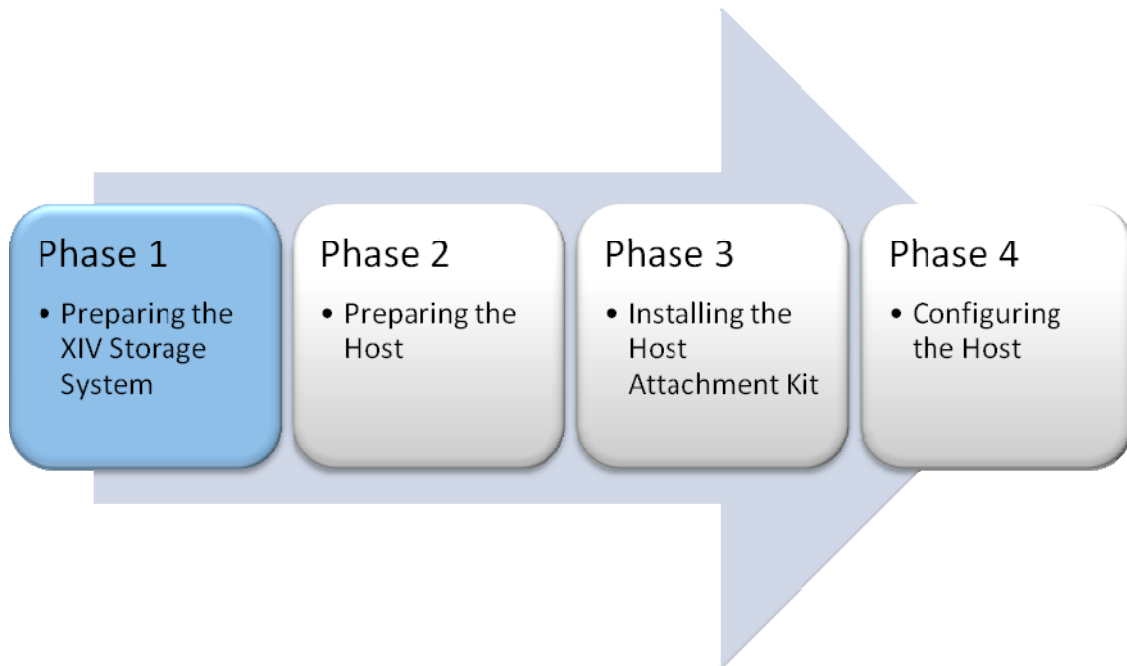
Be sure to include the following:

- Exact publication title
- Form number
- Page numbers to which you are referring

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Preparing the IBM XIV Storage System

The first phase in connecting a host to the IBM XIV Storage System is to prepare the storage system.



Overview of XIV Physical Host Connectivity Features

The IBM XIV Storage System supports Fibre Channel protocols for communication with HP-UX host systems. The system includes a patch panel in the back of the rack for the physical connections.

Hosts can attach to the Fibre Channel ports through an FC fabric or a Gigabit Ethernet switch. The following figure provides an example for connecting a host through either a storage-attached network (SAN) or an Ethernet Network to the IBM XIV Storage System:

- Fibre Channel connectivity

Fibre Channel connectivity

In the following image, Fibre Channel cables connect between the Fibre Channel switch to the designated ports on the IBM XIV Storage System.

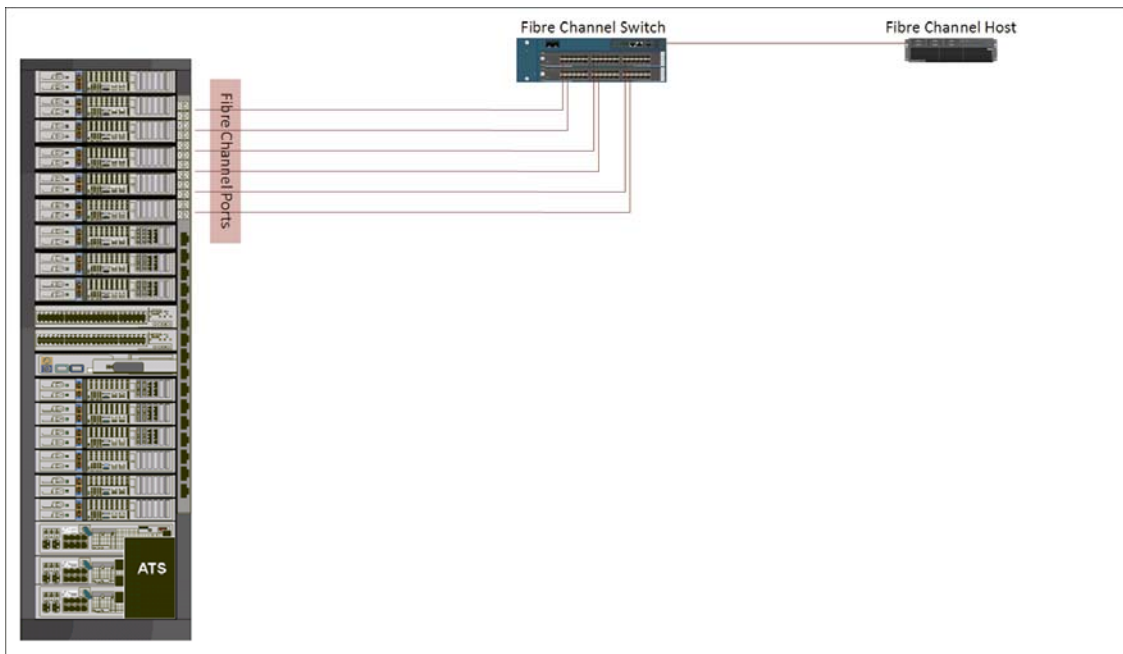


Image 1: Fibre Channel connectivity


Preparing for Fibre Channel Connectivity

This section focuses on Fibre Channel connectivity topics that apply to the IBM XIV Storage System in general.

Planning the Fibre Channel Topology

Hosts can attach to the Fibre Channel ports either directly or through an FC fabric. Several configurations are technically possible, and they vary in terms of their cost and the degree of flexibility, performance, and reliability that they provide.

To achieve a highly available and high performance solution, avoid a single point of failure in the connectivity solution through using as many connections as possible. However, to keep the cost of the solution in-line with the business requirement, less expensive, less desirable solutions can be used.

 The optimal high availability (HA) configuration is illustrated in Image-1 above.

A high availability configuration has the following characteristics:

- Each host is equipped with dual HBAs. Each HBA (or HBA port) is connected to one or two FC switches.
- Each of the FC switches has a connection to a separate FC port of each of the six Interface Modules.
- There is no single point of failure:
 - If a module fails, each host remains connected to the other five modules.
 - If an FC switch fails, each host remains connected to all modules through the second FC switch.
 - Upon an HBA port failure, the host can still connect over the other HBA port.

Zoning

Zoning is required when a SAN fabric is used to connect hosts to the IBM XIV Storage System. The concept is to isolate any single HBA for security and reliability reasons. Zoning allows for finer segmentation of the switched fabric. Zoning can be used to create a barrier between different environments. Only the members of the same zone can communicate within that zone, and all other attempts from the outside are rejected.

The following are examples of situations that can be avoided with proper zoning:

- HBAs from different vendors behave differently when they perform error recovery, which can impact other hosts connected to the same switch if they are not isolated through zoning.
- Any change in the SAN fabric, such as a change caused by a server restarting or a new product being added to the SAN, triggers a Registered State Change Notification (RSCN).

An RSCN requires that any device that can see the affected or new device to acknowledge the change while interrupting its own traffic flow.

Zoning helps to avoid these situations. The most secure zoning is to have zones that consist of a single initiator and single target.

⚠ In large implementations, this approach increases the zoning management effort. Therefore, a common way of zoning is to have a single initiator with multiple targets.

Follow these best practices recommendations:

- For general configurations, zone each host HBA to a single port from each of three Interface modules. This provides six paths to dual HBA hosts.
- For high workload applications, consider zoning each HBA to one port from each of the six Interface modules.

⚠ Do not configure more than 24 logical paths per host because this can impact overall stability. There is no advantage to configuring more than 24 logical paths to a single host.

Managing the Fibre Channel Ports

The FC port has a unique name that is used for the following purposes:

- Setting up the zoning
- Checking that the connection to this port is correctly set up

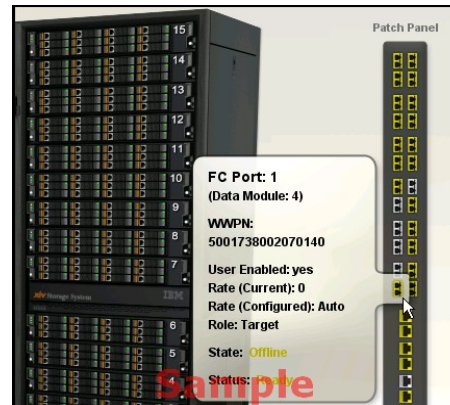
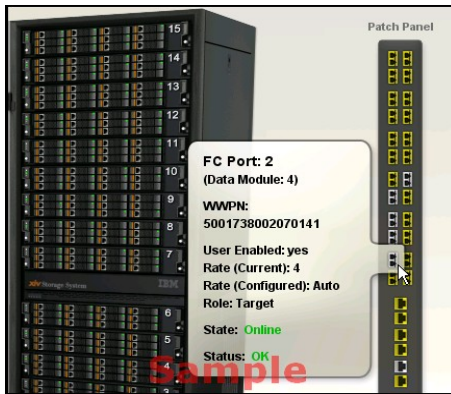
The unique name that identifies an FC port is called the worldwide port name (WWPN). You can use the XIV GUI or the XCLI to determine the WWPN.

Perform the following steps in the XIV GUI to view the WWPN:

1. Select the main view of an IBM XIV Storage System. Use the arrow at the bottom of the picture of the XIV storage array to reveal the patch panel.



2. Move the mouse cursor over a particular port to reveal the port details, including the WWPN. The following figures show examples of the detailed information that is displayed for two FC ports in module 4:



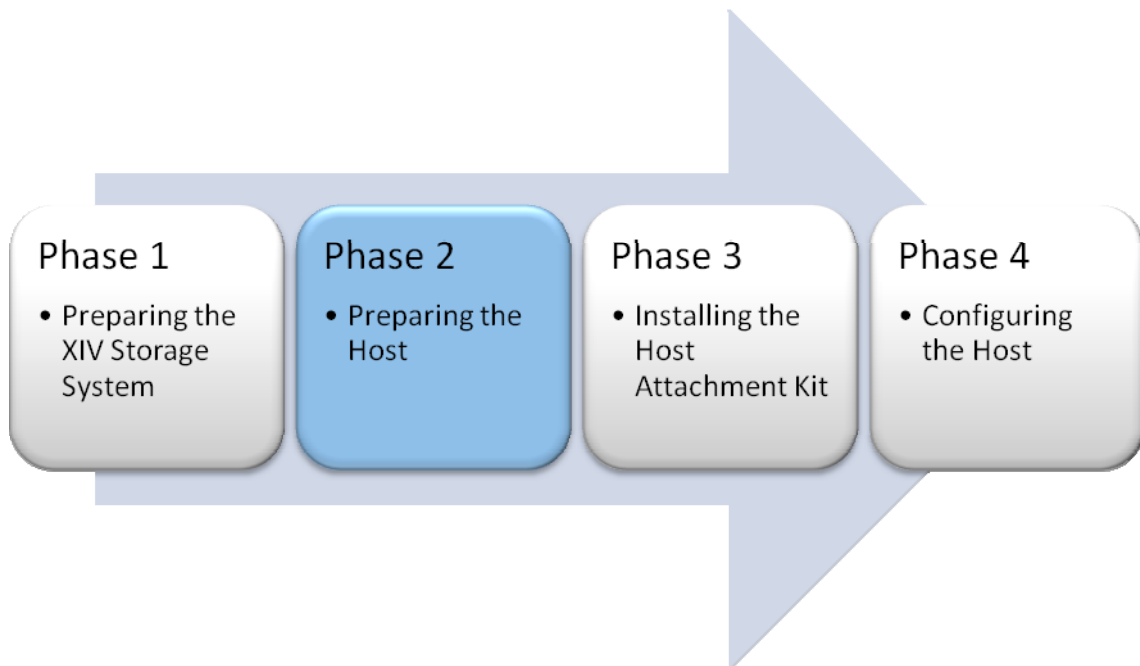
Issue the following XCLI command to view the WWPN:

```
fc_port_list [ module=ComponentId | fcport=ComponentId ]
```

- ▲ The WWPNs of an IBM XIV Storage System are static. The last two digits of the WWPN indicate from which module and port the WWPN came.
- ▲ In the default IBM XIV Storage System configuration, port number 4 of each interface module is configured as an initiator.

Preparing the Host

The second phase in connecting a host to the IBM XIV Storage System is to prepare the host.



Validating the System Requirements


Before installing the Host Attachment Kit on the host, verify that the installed operating system meets the system requirements as detailed in the *Release Notes* document of this version of the Host Attachment Kit ([See Related Documentation](#)).

The following sections will guide you through installing the fixes for the operating system.

Installing the Operating System on an XIV Volume (Boot From SAN)

Before you boot an operating system on the XIV volume, you must complete the following prerequisite tasks:

1. Get the WWN of the HBA
2. Configure the host and mapping a boot volume
3. Configure the host to boot from the XIV volume
4. Install the operating system

 The IBM XIV Storage System provides Fibre Channel-only Boot from SAN capabilities (no iSCSI).

Getting the WWN of the HBA

Because there is no operating system installed on the host at this time, you must obtain the WWN of the host HBA ports directly by taking the HBA out of the host chassis and looking on its label, or by looking for that information with the BIOS configuration utility of the HBA.

▲ If the host is installed with an existing version of the HP-UX operating system, you can use the **fcmsutil** command to obtain the WWN of an HBA.

The following is an example of viewing the WWN of an HBA on a preinstalled HP-UX system:

1. List the detected HBAs using the **ioscan** command.

```
# ioscan -kfnC fc
Class      I  H/W Path  Driver S/W State  H/W Type  Description
-----
fc         0  0/4/1/0  fcd   CLAIMED  INTERFACE  HP A6826-60001 2Gb
Dual Port PCI/PCI-X Fibre Channel Adapter (FC Port 1)
/dev/fcd0
fc         1  0/4/1/1  fcd   CLAIMED  INTERFACE  HP A6826-60001 2Gb
Dual Port PCI/PCI-X Fibre Channel Adapter (FC Port 2)
/dev/fcd1
```

2. Issue the **fcmsutil** command on the desired HBA device-file.

```
# fcmsutil /dev/fcd0
Vendor ID is = 0x1077
Device ID is = 0x2312
PCI Sub-system Vendor ID is = 0x103C
PCI Sub-system ID is = 0x12BA
PCI Mode = PCI-X 133 MHz
ISP Code version = 3.3.175
ISP Chip version = 3
Topology = PTTOPT_FABRIC
Link Speed = 2Gb
Local N_Port_id is = 0x861000
Previous N_Port_id is = None
N_Port Node World Wide Name = 0x50060b00001d81c5
N_Port Port World Wide Name = 0x50060b00001d81c4
Switch Port World Wide Name = 0x20d0000dec271ac0
Switch Node World Wide Name = 0x2002000dec271ac1
N_Port Symbolic Port Name = hp2_fcd0
N_Port Symbolic Node Name = hp2_HP-UX_B.11.31
Driver state = ONLINE
Hardware Path is = 0/4/1/0
Maximum Frame Size = 2048
Driver-Firmware Dump Available = NO
Driver-Firmware Dump Timestamp = N/A
Driver Version = @(#) fcd B.11.31.0809.%319 Jul 7 2008
```

Configuring the Host and Mapping a Boot Volume

Now that you have the WWNs of the host HBA ports, you can do the following:


- Define the host in the IBM XIV Storage System.
- Map a volume to the host for which you want to load the operating system

See [Configuring the Host in the XIV Storage System](#) in this guide for assistance on how to perform this step.

Installing the Operating System

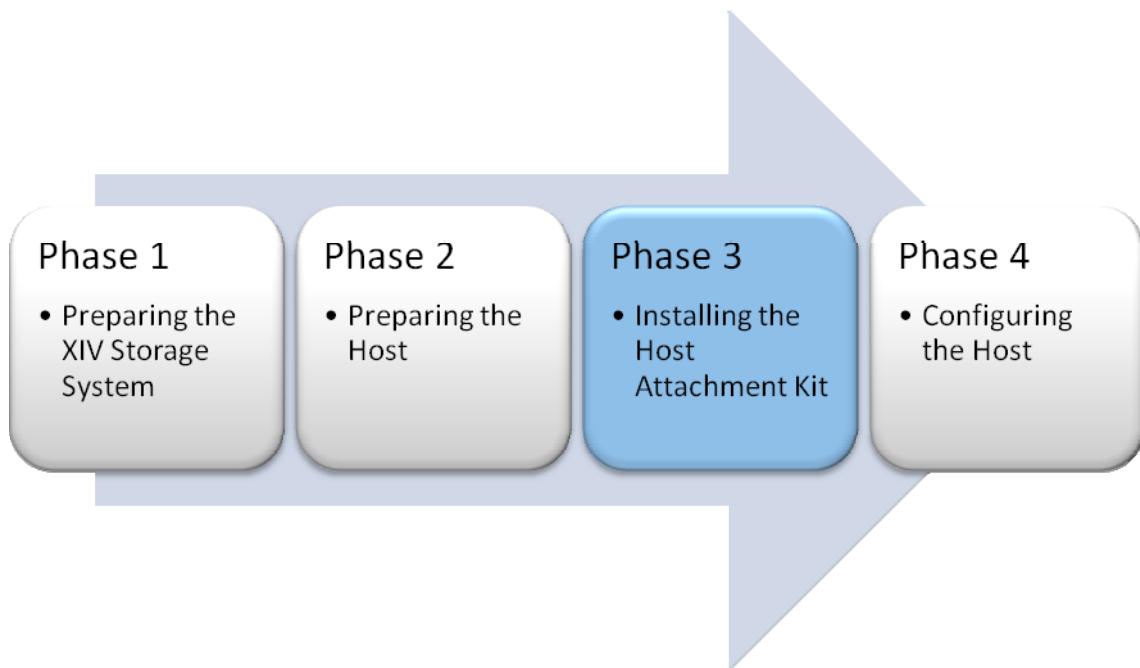
During the HP-UX installation, ensure the following options are chosen:

- If the HP-UX version is 11v2, choose the VERITAS VxVM as the default volume manager
- Select the XIV volume as the boot device

 Make sure only one path is connected at the time of the installation.

Installing the Host Attachment Kit

After the preparations are complete, you can start with the HAK installation.



Installing the Host Attachment Kit

1. Obtain the XIV Host Attachment Kit archive and copy it to the host.
2. Open a terminal to the host.
3. Go to the directory that contains the Host Attachment Kit archive and extract the archive:

```
# gunzip -c host_attachment-1.5-*.tar.gz | tar xvf -
```

4. Go to the newly created directory and start the Host Attachment Kit installer. Issue the following commands to start the installer:

```
# cd host_attachment_kit-1.5
# /bin/sh ./install.sh
Welcome to the XIV Host Attachment Kit installer.
Would you like to proceed and install the Host Attachment Kit? [Y/n]:
```

5. Enter `y` to confirm the installation process. The installer proceeds with the installation. The following is an example of the output that is displayed:

```
Please wait while the installer validates your existing configuration...
-----
Please wait, the Host Attachment Bundle is being installed...
-----
Installation successful.
Please refer to the Host Attachment Guide for information on how to
configure this host.
```

▲ Installing the Host Attachment Kit does *not* configure the host for the IBM XIV Storage System. To configure the host, see the [Host Configuration](#) chapter of this document.

Upgrading the Host Attachment Kit

1. Obtain the XIV Host Attachment Kit archive and copy it to the host.
2. Open a terminal to the host.
3. Go to the directory that contains the Host Attachment Kit archive and extract the archive:

```
# gunzip -c host_attachment-1.5-*.tar.gz | tar xvf -
```

4. Go to the newly created directory and start the Host Attachment Kit installer. Issue the following commands to start the installer:

```
# cd host_attachment_kit-1.5
# /bin/sh ./install.sh
Welcome to the XIV Host Attachment Kit installer.
Would you like to proceed and install the Host Attachment Kit? [Y/n]:
```

5. Enter `y` to confirm the installation process to proceed. The Installer detects the existing Host Attachment Kit installation and offers an upgrade operation.

```
Please wait while the installer validates your existing configuration...
-----
NOTICE: Another version of Host Attachment Kit is already installed.
The installer will replace the currently installed version.
Would you like to replace the installed Host Attachment Kit? [Y/n]:
```

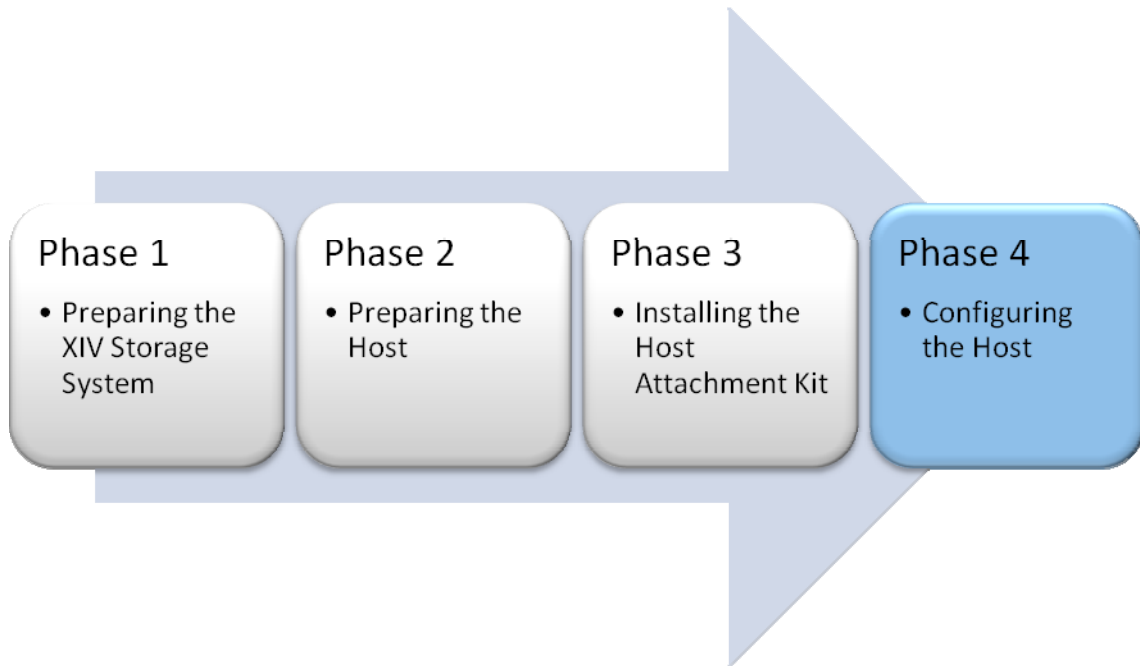
6. Enter `y` to confirm the upgrade process to complete the installation.

```
☐ Please wait, the Host Attachment Bundle is being installed...
-----
Installation successful.
☐ Please refer to the Host Attachment Guide for information on how to
  configure this host.
```

- ▲ Installing the Host Attachment Kit does *not* configure the host for the IBM XIV Storage System. To verify that the host configuration is up-to-date, see the [Host Configuration](#) chapter of this document.
-

Host Configuration

The last stage in connecting a host to the IBM XIV Storage System is the configuration of the host.



Configuring the Host for Multipath I/O

The Host Attachment Kit provides an interactive command-line utility to configure and connect the host to the IBM XIV Storage System.

1. Open a terminal to the host and start the Host Attachment Kit Wizard:

```
xiv_attach
```

2. If you meet all of the prerequisites and you are ready to configure and connect the host, enter Yes.

```
-----
Welcome to the XIV host attachment wizard, version 1.5

This wizard will guide you through the process of attaching your host to the XIV
system.

The wizard will now validate host configuration for the XIV system.
Press [Enter] to proceed
```

3. Choose a connectivity type.

```
Only fibre-channel is supported on this host.
Would you like to set up an FC attachment? [default: yes]:
```

4. If the host requires configuration, the following prompt appears. Confirm that you want to update the configuration.

```
-----
Please wait while the wizard validates your existing configuration...
The wizard needs to configure the host for the XIV system.
Do you want to proceed? [default: yes ]: yes
Please wait while the host is configured...
```

5. Based on the chosen connectivity type, the wizard offers to attach this host to new storage arrays.

In Fibre Channel connectivity, the attachment wizard displays the port WWNs of all Fibre Channel HBAs that you can zone.

You are then prompted to rescan for new storage devices. Enter yes to scan for new storage devices.

```
Would you like to rescan for new storage devices now? [default: yes ]: yes
Please wait while rescanning for storage devices...
```

6. The host attachment wizard scans for attached XIV storage arrays and displays a list of the attached systems. The following is an example of the output that is displayed:

```
The host is connected to the following XIV storage arrays:
Serial          Version          Host Defined     Host Name
MACHINE1        10.0             True             xiv-demo
MACHINE2        10.1             False            --
```

7. If the host is defined in all of the attached IBM XIV Storage Systems, you can press Enter and the Host System Attachment Kit wizard ends. The following is an example of the output that is displayed:

```
⌘ This host is defined on all attached XIV storage arrays
```

```
⌘
```

```
⌘ Press [ENTER] to proceed.
```

```
⌘
```

```
⌘ -----
```

```
⌘ The XIV host attachment wizard successfully configured this host
```

8. If the host is not defined in all of the attached XIV storage arrays, the Host Attachment Kit wizard defines this host in the XIV storage arrays that were previously listed:

```
⌘ Do you wish to define this host on these systems now? [default: yes ]: yes
```

```
⌘ Please enter a name for this host [default: xiv-demo ]:
```

```
⌘ Please enter a username for system MN00022 : [default: admin ]: admin
```

```
⌘ Please enter the password of user admin for system MN00022:
```

```
⌘
```

```
⌘ Connecting to the storage array...
```

```
⌘
```

```
⌘ Press [ENTER] to proceed.
```

9. Proceed to [Managing XIV Volumes on the Host](#) section.

Configuring the Host in the XIV Storage System

Before the host can see XIV volumes, it must be defined in the IBM XIV Storage System. The following sections guide you through using the XIV GUI and the XCLI to manually define a host in the IBM XIV Storage System.

Defining the Host manually

Defining a host from the XIV GUI

- From the IBM XIV Storage System main GUI window, move the mouse cursor over the Hosts and Clusters icon and select **Host** from the pop-up menu.



The Hosts window opens with a list of hosts that are already defined. If nothing is displayed, no hosts are defined.

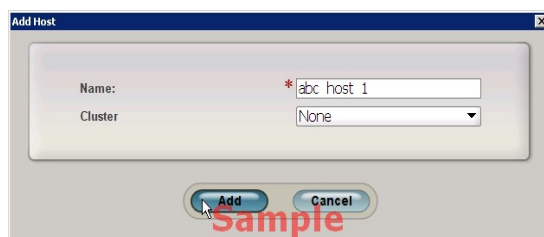
- To add a new host or cluster, click **Add Host**.
 - If you want to change an existing host, right-click the host and select **Change Type**. When the Change Host Type window opens, select **hpux** from the list and click OK.

Hosts				
	Name	Type	Cluster	Access
+	mrwolf	default		
+	new_host	default		
+	pro176	default		
+	vmware4-poc	default		
+	cluster1	default		

- Enter a name for the host. If a cluster was created in the previous step, it is available from the **Cluster** drop-down list.

To add a server to a cluster, select a cluster name.

In the following example, None is selected because a cluster is not being created.



- Click **Add**. The host is added.

Defining a host using XCLI

The following XCLI commands can be used to list the existing hosts and define new ones:

Lists a specific host or all hosts:

```
host_list [ host=HostName ]
```

Define a new host to connect to the IBM XIV Storage System:

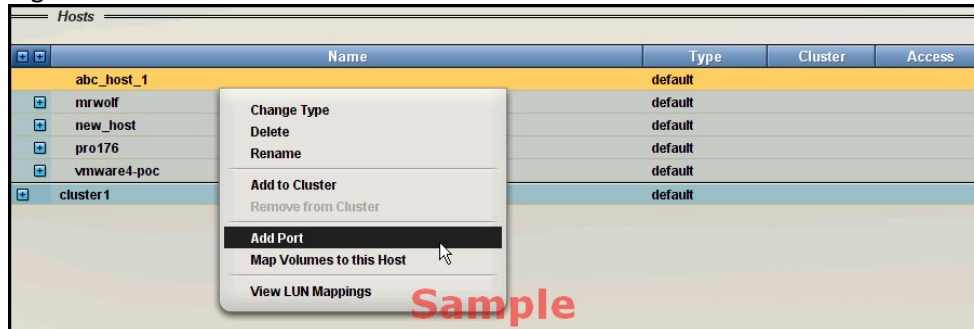
```
host_define host=HostName [ cluster=ClusterName ]
```

Adding Fibre Channel ports to a Host

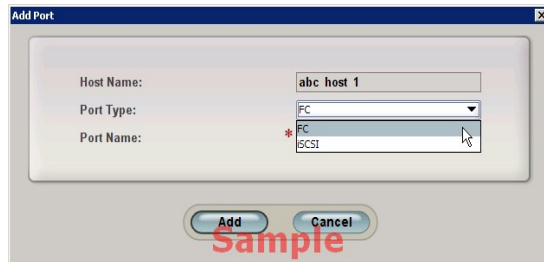
Host access to LUNs is granted depending on the host adapter ID.

Perform the following steps to add a WWPN or IQN to a host definition:

1. Right-click the host and select **Add Port** from the context menu.

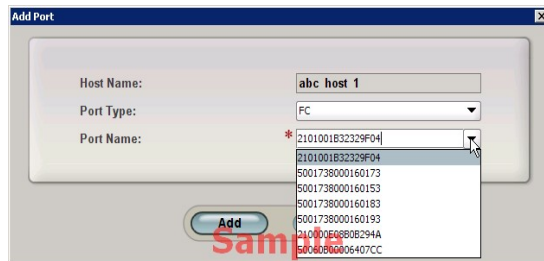


2. Select port type FC.



3. If the host is correctly connected and has done a port login at least one time, the WWPN is shown in the drop-down list. Otherwise, you can manually enter the WWPN.

Note: HP-UX only performs login when actively performing I/O operations so some WWPNs might not appear in the list. You can add them manually.

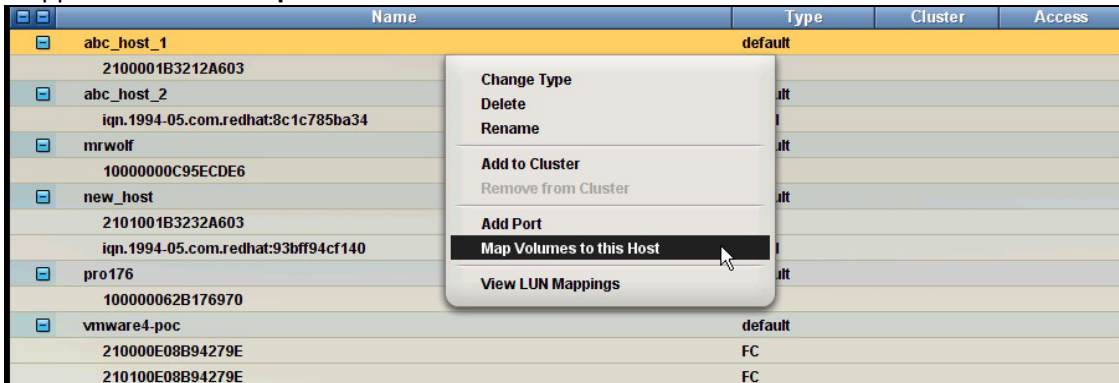


If the host is connected to the IBM XIV Storage System by more than one HBA port, follow the previous step to add the other HBA WWPNs. The IBM XIV Storage System does not care which FC port name is added first.

Mapping a volume to a Host

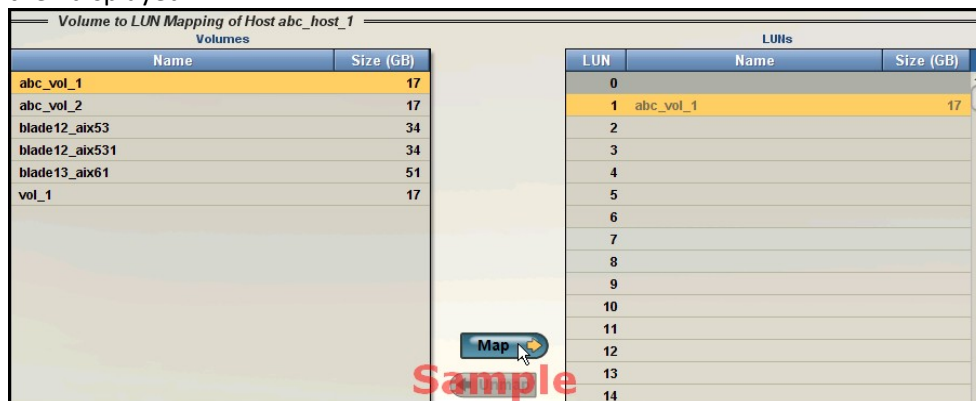
The final configuration step is to map the volume to the host.

While still in the Hosts configuration pane, right-click the host to which the volume is to be mapped and select **Map Volumes to this Host** from the context menu.

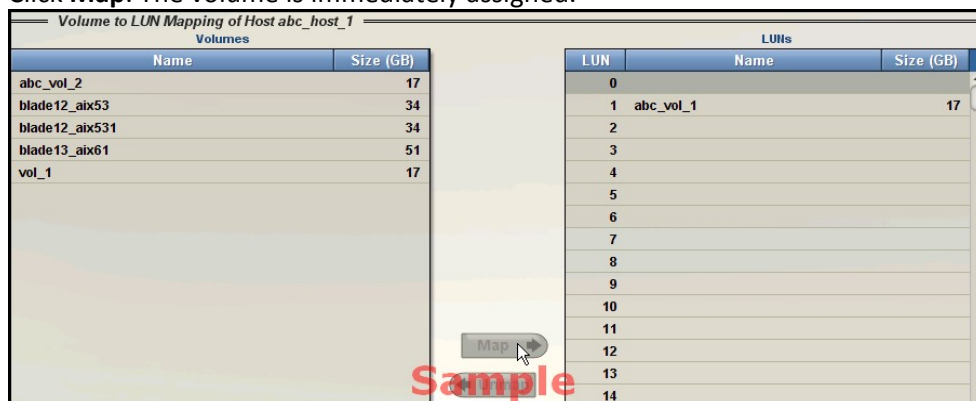


Perform the following steps to add a volume to a host definition:

1. Select an available volume from the left pane. The LUN ID to map to the volume is then displayed.



2. Click **Map**. The volume is immediately assigned.

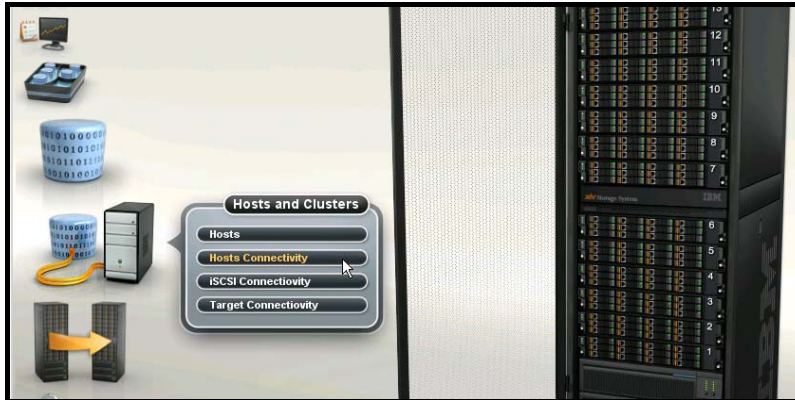


Monitoring host connectivity

The IBM XIV Storage System has a real-time connectivity status overview that can be monitored either from the XIV GUI or from XCLI commands.

From the XIV GUI

1. Select **Hosts Connectivity** from the Hosts and Clusters menu to access the connectivity status.



2. The host connectivity window is displayed (from the IBM XIV Storage System point of view).

Hosts Connectivity				
Name	1:4	1:5	1:6	
abc_host_1 2100001B3212A603	✓ ₁	✓ ₁	✓ ₁	✓ ₁
abc_host_2 iqn.1994-05.com.redhat:8c1c785ba34				
mrwolf 1000000C95ECDE6	✓ ₂	✓ ₁ ✓ ₂	✓ ₁	✓ ₁
new_host 2101001B3232A603 iqn.1994-05.com.redhat:93bff94cf140	✓ ₁	✓ ₁	✓ ₁	✓ ₁
pro176 10000062B176970	✓ ₂	✓ ₁ ✓ ₂	✓ ₁	✓ ₁
vmware4-poc 210000E08B94279E 210100E08B94279E	✓ ₂	✓ ₁ ✓ ₂	✓ ₁	✓ ₁
cluster1				
cluster_node_1 2101001B3232BD03	✓ ₁	✓ ₁	✓ ₁	✓ ₁
cluster_node_2 2101001B32325632	✓ ₁	✓ ₁	✓ ₁	✓ ₁

Sample

From the XCLI

Monitoring host connectivity from the XCLI can be done with the following commands:

The following command lists FC connectivity for a predefined host:

```
host_connectivity_list [ host=HostName | fc_host_port=WWPN ] [
  module=ComponentId | fcport=ComponentId ]
```

The following command lists the status and configuration of the FC ports for the system:

```
fc_port_list [ module=ComponentId | fcport=ComponentId ]
```

Managing XIV Volumes on the Host

You can use the host to discover new volumes and then run the **xiv_devlist** utility to list all volumes.

Discovering for new Fibre Channel Volumes

You can use the interactive Host Attachment Kit wizard to discover the IBM XIV Storage System volumes mapped to this host.

▲ To properly discover XIV volumes with multipathing abilities, the host must first be configured using either the interactive wizard or the **xiv_fc_admin** utility.

1. Open a terminal to the host and enter the **xiv_attach** command.

```
xiv_attach
```

2. Enter **yes** to confirm that you are ready to configure the host.

```
-----
Welcome to the XIV host attachment wizard, version 1.5

This wizard will guide you through the process of attaching your host to the XIV
system.
The wizard will now validate host configuration for the XIV system.
Press [Enter] to proceed
```

3. The wizard will verify the host configuration. If you have already configured this host as described in the previous tasks, enter **yes** to discover any new XIV storage device.

```
-----
Please wait while the wizard validates your existing configuration...
This host is already configured for the XIV system
```

The wizard offers to set up Fibre Channel connectivity.

4. Enter **yes** to rescan for devices.

```
Would you like to rescan for Fibre Channel storage devices now? [default:
yes]:
```

The host attachment wizard scans for attached XIV storage arrays and displays a list of the attached systems:

```
The host is connected to the following XIV storage arrays:
Serial          Version          Host Defined     Host Name
MACHINE1       10.0             True             xiv-demo
```

10. If the host is defined in all of the attached XIV systems, the attachment wizard will end.
11. You can use the **xiv_devlist** command-line utility to view the discovered devices on this host. See the [xiv_devlist](#) topic.

Utilities

The Host Attachment Kit includes the following utilities:

- xiv_fc_admin
- xiv_devlist
- xiv_diag

xiv_fc_admin

The xiv_fc_admin utility provides a non-interactive command-line interface for performing administrative attachment tasks and querying attachment related information.

▲ Most actions provided by this tool are also available when using the xiv_attach wizard.

Command-line usage

Print usage information for the utility

```
-h -help:
```

The **-h** option prints a brief description of the command-line options for the utility.

Verify host configuration tasks

```
-v -verify:
```

The **-v** option lists all of the Fibre Channel related configuration tasks for the host along with their current state.

The state of configuration tasks can be one of the following:

- **Ok** - The configuration task is already applied on the host
- **Not Ok** - The configuration of the host requires an update
- **Reboot** - The configuration was updated but the host requires a reboot

Configure this host for attachment

```
-C -configure:
```

The **-C** option lists all of the Fibre Channel related configuration tasks for the host along with their current state.

If a task is not configured, the utility performs the configuration task prior to listing it.

Rescan devices

```
-R -rescan:
```

The **-R** option performs a rescan action for storage devices. The rescan action is not XIV specific and applies to all types of storage devices.

Define this host on a system

```
-D -define:
```

The **-D** option defines the host, along with all the HBA WWPN ports in an XIV Storage Array.

The **-D** option requires additional command-line options that provide credentials to authenticate to the XIV Storage Array. See the Host Definition Options topic.

List attached XIV systems

```
-L - list:
```

The **-L** option lists all the XIV Storage Arrays that are detected from this host even if the host is not yet defined on them.

The following information is provided by the columns in the list:

- Serial - The serial identification of the XIV Storage Array
- Version - The major version of the XIV Storage Array
- Host Defined - Indicates if the host is defined within the XIV Storage Array
- All Ports Defined - Indicates if all of the host initiator ports are defined in the XIV Storage Array
- Host Name - The name of the host as defined in the XIV Storage Array. This is available when the host is defined.

Print initiator ports of the relevant connectivity method

```
-P -print:
```

The **-P** option prints all the Fibre Channel related Initiator WWPNs in a formatted list.

Host Definition Options

The following options are only used with the **-D** option:

Username for XCLI

```
-u USERNAME, --user=USERNAME:
```

This option is required.

Password for XCLI

```
-p PASSWORD, --pass=PASSWORD:
```

This option is required.

Hostname for this host

```
-H HOSTNAME, --hostname=HOSTNAME:
```

This option is optional. If you do not specify the **-H** option, the network host name is used.

Serial of machine

```
-S SERIAL, --serial=SERIAL:
```

This option is required. A list of the available XIV Storage Array Serial numbers can be obtained using the **-L** option.

xiv_devlist

The `xiv_devlist` utility lists XIV volumes that are available to the host. The following information is provided for each volume:

- Device
- Volume name
- XIV host
- Size
- Paths
- XIV ID
- Vol

The `xiv_devlist` utility lists XIV and non-XIV devices separately.

xiv_diag

The Host Attachment Kit provides a diagnostic data collector utility called `xiv_diag`. While the `xiv xray` utility gathers diagnostic utility from the IBM XIV Storage System, the `xiv_diag` is a cross-platform utility that gathers diagnostic data from supported operating systems.

The `xiv_diag` utility gathers information from the operating system and stores it in a zip file. You can then send this zip file to IBM XIV support teams for review and analysis.

Issue the following command to run the `xiv_diag` utility:

```
xiv_diag
```

Output example of xiv_diag

```
xiv_diag
Please type in a directory in which to place the xiv_diag file [default:
/tmp]:
Creating xiv_diag zip file /tmp/xiv_diag-results_2009-5-17_15-7-45.zip

...

INFO: Closing xiv_diag zip file /tmp/xiv_diag-results_2009-6-24_19-18-
4.zip
Deleting temporary directory...
DONE
INFO: Gathering is now complete.
INFO: You can now send /tmp/xiv_diag-results_2009-6-24_19-18-4.zip to IBM-
XIV for review.
INFO: Exiting.
```

Additional Topics

Removing the Host Attachment Kit

Removing the Host Attachment Kit is done by starting the Uninstall Wizard that is included in the kit:

Open a terminal to the host and start the Uninstall Wizard of the Host Attachment Kit.

```
■ # /opt/xiv/host_attach/bin/uninstall
```

You are then prompted to complete the removal process.

Troubleshooting

For troubleshooting of the installation phase of the Host Attachment Kit, see the *Release Notes*.

Attaching Clusters to the XIV Storage System

The following section will guide you through the process of attaching a multi-node Windows cluster to an IBM XIV Storage System.

Installing the Host Attachment Kit on the Cluster Nodes

Like in the single Host Attachment process, the first step is to install the Host Attachment Kit on the cluster nodes.

If you are creating a new cluster, you can install the Host Attachment Kit simultaneously.

If you are attaching an existing cluster to an IBM XIV Storage System, install the Host Attachment Kit on the cluster nodes in the following manner:

1. Install the Host Attachment Kit on the passive node or nodes and restart the server when you are prompted.
2. Fail-over the cluster groups and resources from active nodes to the passive nodes that you have just installed the Host Attachment Kit on.
3. Install the Host Attachment Kit on the remaining nodes.

The installation instructions for the Host Attachment Kit on cluster nodes are the same as described in the [Installing the Host Attachment Kit](#) section.

Managing Clusters in the XIV Storage System

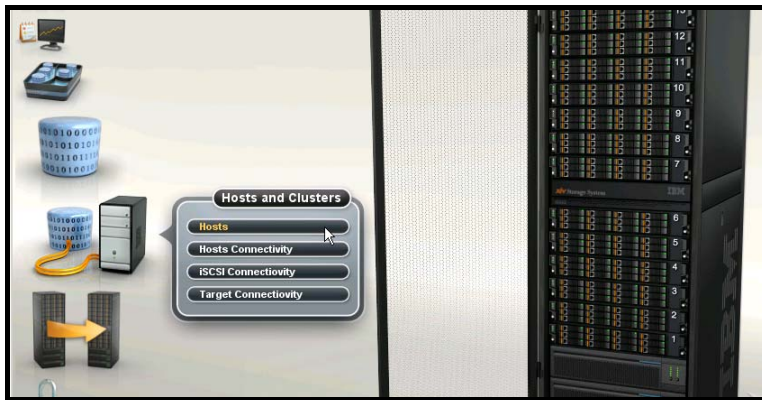
In clustered environments, the defined hosts that take part in the cluster must be joined into a cluster within the XIV Storage System Management.

The following example demonstrates how to perform the following tasks:

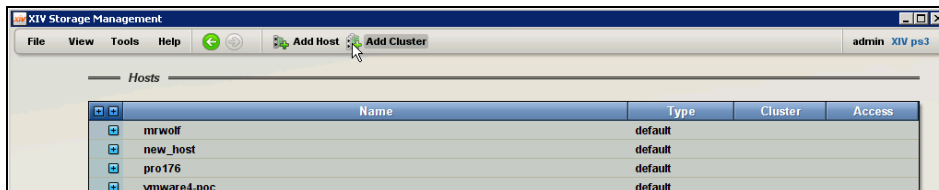
- Define a cluster with the XIV GUI and XCLI
- Add hosts into the cluster
- Map a volume to the cluster

Defining a Cluster with the XIV GUI

1. From the main XIV GUI window, hover with the mouse over the Hosts icon, and click **Hosts**.



2. If the hosts are not yet defined in the IBM XIV Storage System, define them now. In this example the hosts are already defined in the system.
3. To define a new cluster, click the **Add Cluster** icon on the top toolbar.

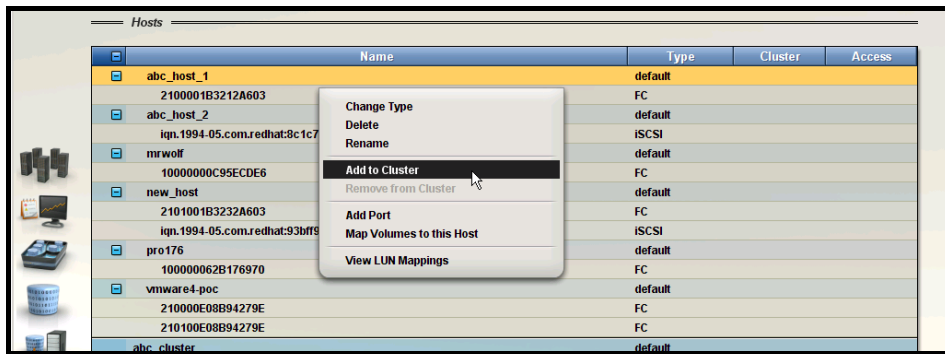


4. Enter a name for the new cluster, and click **OK**.



5. Right-click the host you want to add to the cluster, and select **Add to Cluster**. **Add host to cluster** screen opens.

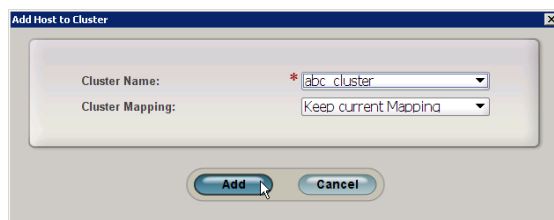
In this example, we add the host `abc_host_1` to the cluster `abc_cluster`.



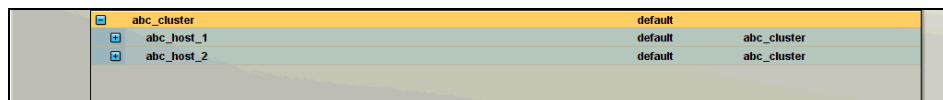
- On the Add host to cluster screen, select the cluster you want to join the host to from the Cluster Name list.
Select a cluster volume mapping option from the Cluster Mapping list.

By default the Keep current Mapping option is selected, which means that the cluster volume mappings are not changed and that all the mappings that were done prior to this host joining the cluster are undone.

The Copy from Host option means that the current volume mappings to the host are copied to the cluster.



- Repeat steps 5 to 6 for each host you want to add to the cluster.
- The cluster is now configured. In this example, we have the hosts `abc_host_1` and `abc_host_2` joined into the cluster `abc_cluster`.



Defining a Cluster with the XCLI

- Issue the following command to create a new cluster:

```
cluster_create cluster=ClusterName
```

- Issue the following command to add an existing host to a cluster:

```
cluster_add_host cluster=ClusterName host=HostName map=<cluster|host>
```

- Issue the following command to list the clusters that already exist:

```
cluster_list [ cluster=ClusterName ]
```

Mapping Volumes to Clusters

The IBM XIV Storage System differentiates between shared volumes and private volumes.

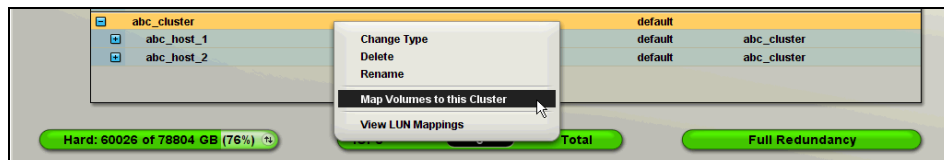
Shared volumes are volumes that are mapped to all the hosts in the cluster, and are used by the clustered applications. These are the generally used volumes in a clustered environment.

Private volumes are mapped to a single host in the cluster, and are required in scenarios where a single host requires exclusive access to a volume. For example, private volumes are used in environments that have boot volumes in the cluster. Each node in the cluster requires an exclusive access to a boot volume so that other nodes in the cluster cannot corrupt the operating system on the boot volume. In these environments, map a designated private boot volume for each host and map the shared volumes to the cluster.

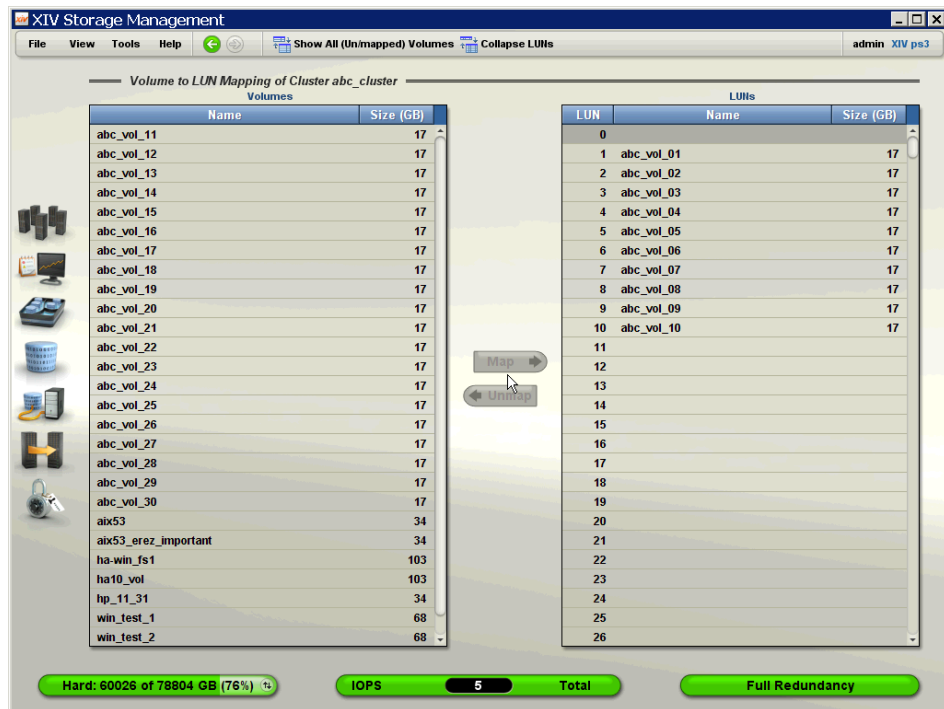
The following examples demonstrate the mapping of shared and private volumes to clusters:

Mapping shared volumes to a cluster

1. From the Hosts screen in the XIV GUI, right-click on the cluster and select **Map Volumes to this Cluster**.



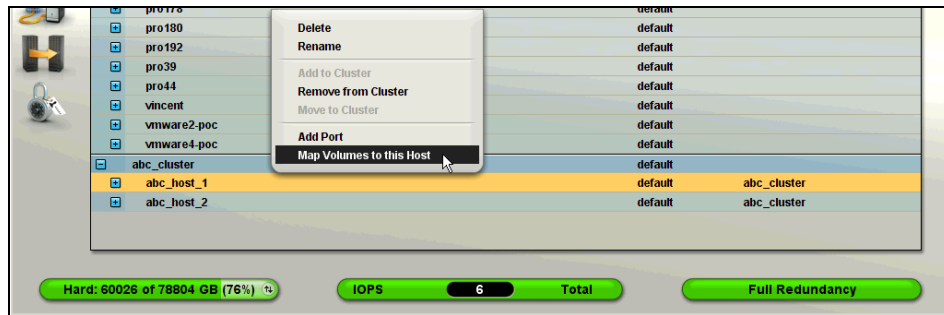
2. Map the volumes that you want that you want accessible to all nodes in the cluster. These volumes are referred to as shared volumes. In this example, 10 volumes (abc_vol01...10) are mapped as shared volumes to the cluster called abc_cluster.



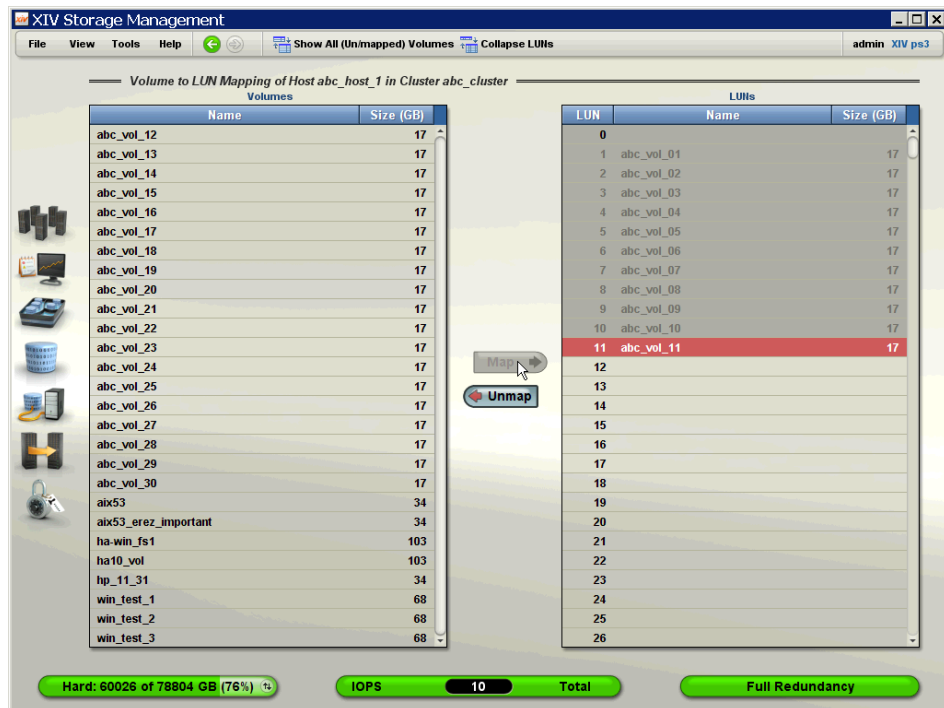
Mapping private volumes to each host

This example demonstrates how to map private volumes to each host in the cluster. In this example, a different private volume is mapped to each host in the cluster.

1. From the Hosts screen in the XIV GUI, right-click on a node you want to map a private volume to and select **Map Volumes to this Host**.

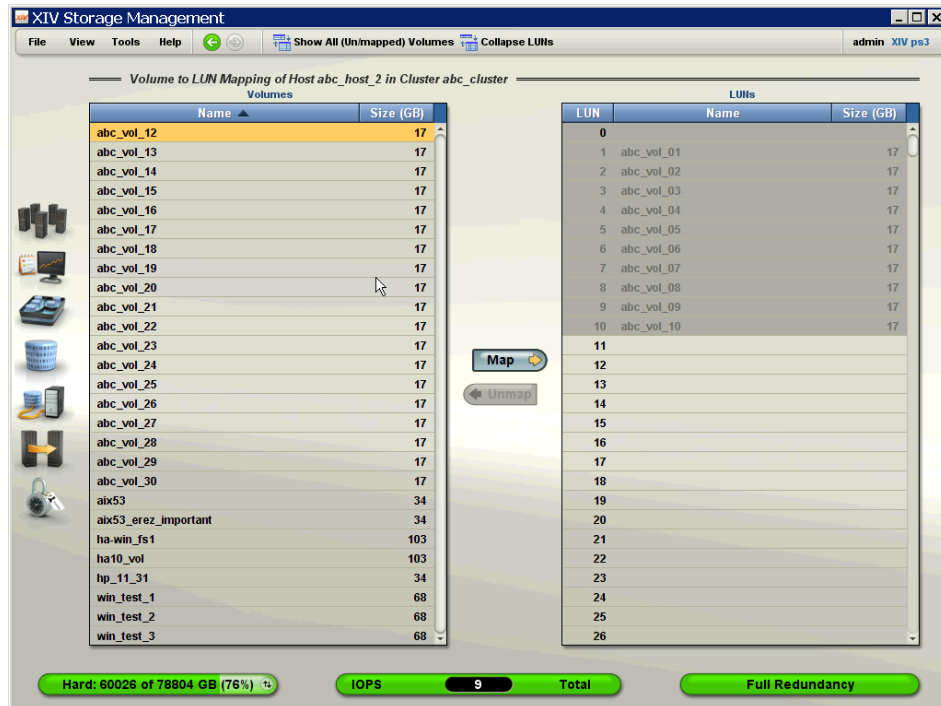
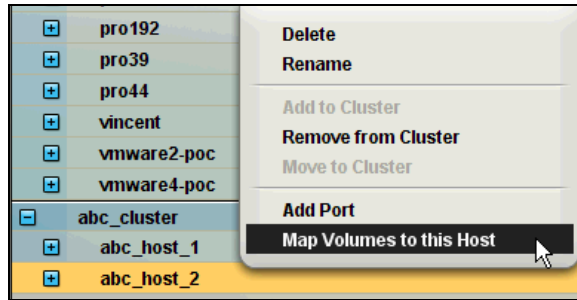


2. Map the volumes that you want only this host to access. These volumes become the private volumes of this host.



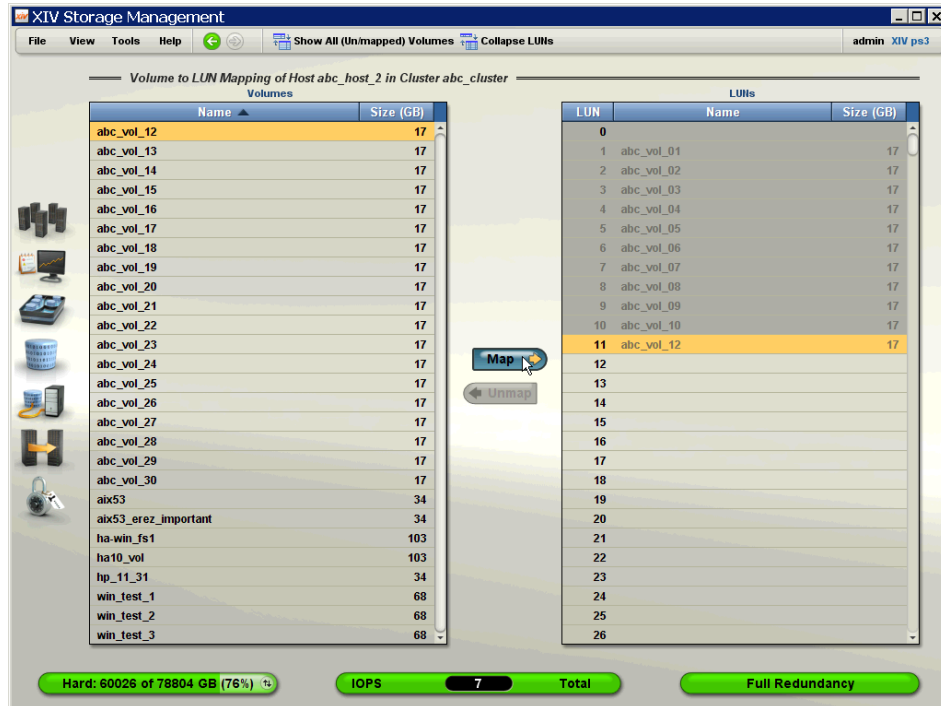
By mapping this to the right, all the shared volume mappings are grayed out and cannot be altered.

- Map a private volume for the other hosts in the cluster.



You can see on the mapping list to the right all the shared volumes, but not the private volumes of the other hosts. In this example, 10 shared volumes are mapped to LUNS 1...10, and a private volume to another host and LUN11.

A different volume can be mapped as a private volume for this host at LUN11.



⚠ When mapping private volumes to a host, the private mapping is listed in the cluster mapping list as Private Mapping as shown below.

