FREQUENTLY ASKED QUESTIONS

VMWARE® ESX Server 3.x WITH AN EQUALLOGIC PS SERIES GROUP

ABSTRACT

This Frequently Asked Questions report addresses common questions on how to use VMware ESX Server 3.x with EqualLogic PS Series storage arrays.

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FAQ Revision Information

The following table describes the release history of this FAQ.

Version	Date	Change
1.0	5/2007	Updated access control info for ESX SW initiator
		Added info on QLogic rescan hang
		Clarified text regarding 2TB VMFS size limit
		Added text suggesting creating snapshots prior to resizing EqualLogic volumes
		Added text on getting rid of vss-control login errors
1.16	6/2007	Added QLogic disk timeout setting
		Removed QLogic 'auto-discovery' text
		Added info on performance problems after doing P2V
1.17	6/2007	Updated available patches list
1.18	6/2007	Syntax error in esxcfg command for QLogic CTQ and timeout value
		Added info on Mandatory ESX patch for MSCS and W2K3 R2 VMs
		Updated iSCLI to reflect new version info and syntax error in esxcfg cmd
1.19	7/2007	Can't use IP HASH teaming with Multiple Physical Switches (non-stacked)
1.20	10/2007	Don't upgrade 405x adapters to 3.1.x.x firmware
		Added QLogic: Info on why 'Fixed' is correct vs. 'MRU'
1.21	10/2007	Added info on VMKping IO error. . VSS-control info Updated info on adding extents
1.22	12 /2007	Update vss-control, Firewall blocking, Qlogic firmware update
1.23	01/2008	Fix for CHAP w/SW initiator
1.24	01/2008	Flowcontrol info
1.25	02/2008	Added: How to configure Jumbo Frames in ESX 3.5 Added: Info on setting disk and SP timeout values.
1.26	03/2008	New: >2TB volumes don't show connected in 3.5 VIC client New: Adding instructions for restoring a file from EQL snapshot
1.27	04/2008	Update: Jumbo Frames aren't supported on VMkernel ports

Introduction

This Frequently Asked Question (FAQ) report is intended to act as a resource for individuals implementing VMware Infrastructure 3 with EqualLogic PS Series storage arrays.

This FAQ addresses VMware ESX Server 3.0.x. – 3.5

VMware Release Notes are available at:

VMware 3.01 & Virtual Center 2.01 Release Notes

VMware 3.02 Release Notes

VMware 3.5 & Virtual Center 2.5 Release Notes

Note: Please insure that your Disk Time Out Values in your Virtual Machines are configured to at least 60 seconds. Information on setting these timeouts is available in our Firmware Release Notes. The release notes are available for download from our website. http://www.equallogic.com

Prerequisites

Should you need to access the array you need the following:

- Minimum firmware on the array is 3.2.x, 3.2.4 or above is suggested.
- Laptop or server running Windows XP, Windows 2003 Server, or Windows 2003 R2.
- 1 CAT-5E Ethernet cable.
- Web browser, such as IE or Mozilla with Sun's Java, version 1.5 Build 10 or higher.
- Linux users need to use JRE v1.4.x. or v1.6.x
- Serial port on your server / laptop. If you do not have one, you can use a USB-to-serial port converter cable.
- The serial port and null modem cables that ship with the array.
- A terminal emulation program. For example, you can use HyperTerminal or SecureCRT on Windows. Use the following settings:
  - 9600 baud
  - 1 stop bit
  - No parity
  - 8 data bits
  - No flow control

ESX Server iSCSI Software Initiator

The questions and answers in this section cover the use of the ESX iSCSI software initiator.

I upgraded to ESX v3.5 and I can't see iSCSI volumes anymore

Check that port 3260 isn't blocked by the firewall. Customers have reported that after upgrading to ESX 3.5 port 3260 was blocked by the firewall. See the section below; TCP port 3260, used for iSCSI is blocked by the ESX firewall for more information.

CHAP isn't working with ESX SW initiator

This could happen to one or all nodes. Connect to the ESX Service Console. Edit the file; `/etc/vmkiscsi.conf` Check that the line `OutgoingPassword="somethingwrong"` isn't commented out. Example:

```
OutgoingUsername="vmware"
#OutgoingPassword="somethingwrong"
```

You will have to remove the '#' sign and correct the password entry.

2TB volumes aren't visible in the VI Client GUI in 3.5

VMware ESX 3.x only supports LUNs that are 2TB or less. In ESX 3.5 the behavior of the GUI has changed. Prior to 3.5 you would see the volume in the VI client but it would show an incorrect size. In 3.5, it does not show the volume as being connected at all. However, at the ESX Service Console running `#vmkiscsi-ls` shows the volume being connected as well as the GUI on the array.

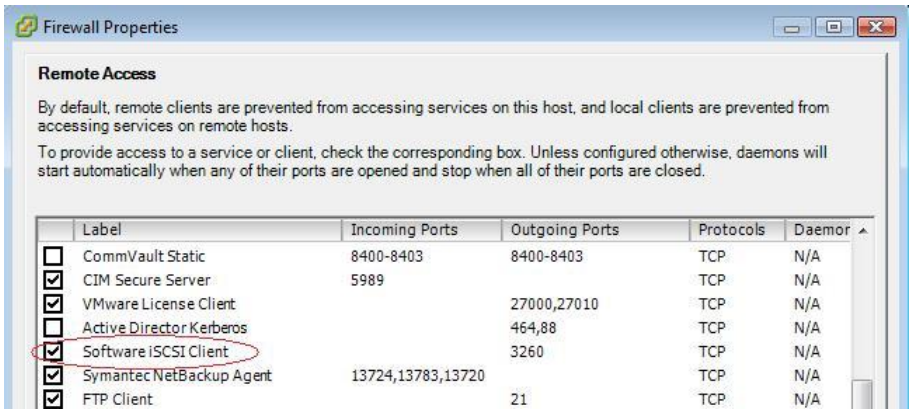
```
#vmkiscsi-ls

*******************************************************************************
TARGET NAME             : iqn.2001-05.com.equallogic:6-8a0900-61b011b01-743b9206
1df45032-esx-swinit-vol1
TARGET ALIAS            : esx-swinit-vol1
HOST NO                 : 2
BUS NO                  : 0
TARGET ID               : 2
TARGET ADDRESS          : 172.23.10.243:3260
SESSION STATUS          : ESTABLISHED AT Sun Feb 10 13:15:05 2008
NO. OF PORTALS          : 1
PORTAL ADDRESS 1        : 172.23.10.240:3260,1
SESSION ID              : ISID 00023d000001 TSIH d522
*******************************************************************************
```

If the volume is blank you can use the '*shrink*' CLI command on arrays w/3.2.x firmware and above to resize the volume under 2TB and rescan the volume in the VI client should then see the drive.

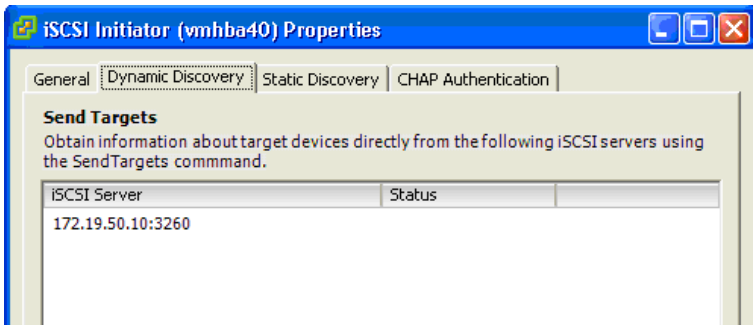
Existing volumes aren't visible to the Software Initiator

Some possible causes of this problem are:

- TCP port 3260, used for iSCSI is blocked by the ESX firewall.
    - Under the Configuration Tab ->Security Profile->Properties Make sure there's a check mark in the box next to "Software iSCSI Client"

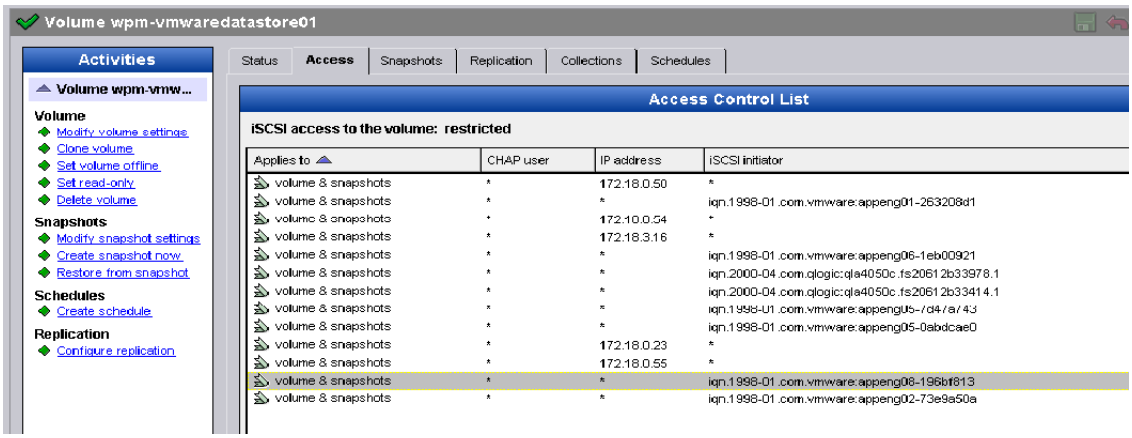


- The discovery address has not been set.
    - Connect the Virtual Infrastructure client to the ESX server directly, not through the Virtual Center Server
    - Go to the **Configuration** tab and select **Storage Adapters**
    - Select the software initiator and select **Properties**
    - Select the Dynamic Discovery tab. The IP address of the array should be displayed. If it is not displayed, add the array's IP address and try rescanning the storage adapters.



- The Access control for that volume may be missing both the Service Console IP address and VMkernel IP address; or, the Access control for that volume may be missing the ESX software initiator IQN initiator name.

The iSCSI Discovery process for the software initiator is done through the Service Console port. The iSCSI session "data" connection is done via the VMkernel network.



Please Note: This example demonstrates how to restrict access using IP access control or the iSCSI initiator name. Using the IQN name reduces the number of entries needed for each ESX server since it is not necessary to include the IP addresses for both the Service Console *and* the VMkernel ports. The maximum number of ACL entries per volume is 15; if you need more than 15 entries, you can use CHAP authentication.

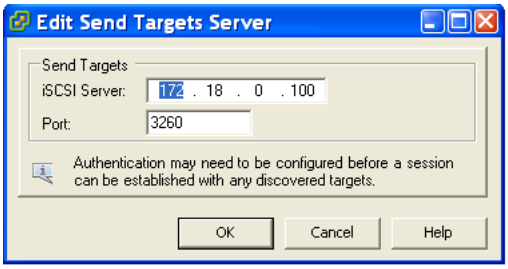
Alternatively, if you have a unique network scheme for the VMware ESX servers you can use wildcards '*' in the ACL entry. For example, if your iSCSI SAN network is a class 'B' (i.e., 172.16.0.0 / Netmask 255.255.0.0) you can create a unique class 'C' address schema (172.16.100.x) for your VMware ESX servers. Using this method, an ACL entry of 172.16.100.* would allow any ESX server with the 172.16.100.x addressing scheme to access to your volume(s).

> **Note:** You must exercise control over your IP address allocation. If you allow a non-VMware server to access a VMFS formatted volume, corruption could occur. When in doubt, use CHAP if you need more than 15 servers connected to a volume.

The software initiator doesn't see new volumes or snapshots

The software iSCSI initiator does not always discover new targets. There are a few workarounds:

- Try rescanning for volumes several times.
- Connect to the ESX server, *not* to the Virtual Center Server. Go to the Software initiator properties and edit the Dynamic Discovery address, but do not change a value. Click the address then **OK**. Then click **Close**. Then **Rescan**.



On rare occasions the `/etc/vmkiscsi.conf` file does not contain the discovery address. If this is the case, edit the `/etc/vmkiscsi.conf` file. Go to the bottom of the file and add:

DiscoveryAddress=<Group IP address>:3260

For example, if the Group IP address is 172.19.50.50, the line would look like this:

DiscoveryAddress=172.19.50.50:3260

Please Note: If the address is there, make sure that there is a blank line AFTER the discovery address entry. If the line after the discovery address is missing, the iSCSI daemon won't get the address at start up and no targets will be discovered. This issue tends to occur when the SW initiator discovery address is edited from the Virtual Center server (rather than from a directly connected ESX server console).

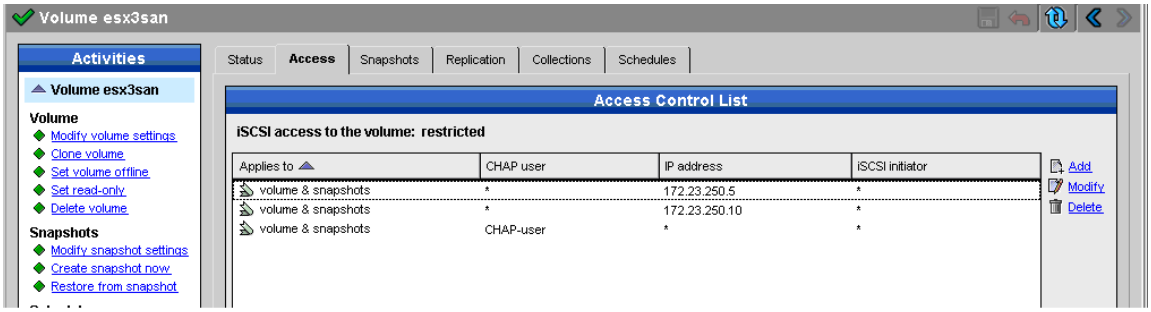
More information on this issue can be found at:

http://www.VMware.com/community/message.jspa?messageID=438912

At the ESX console type `#killall -HUP vmkiscsid`. Then try rescanning for new storage.

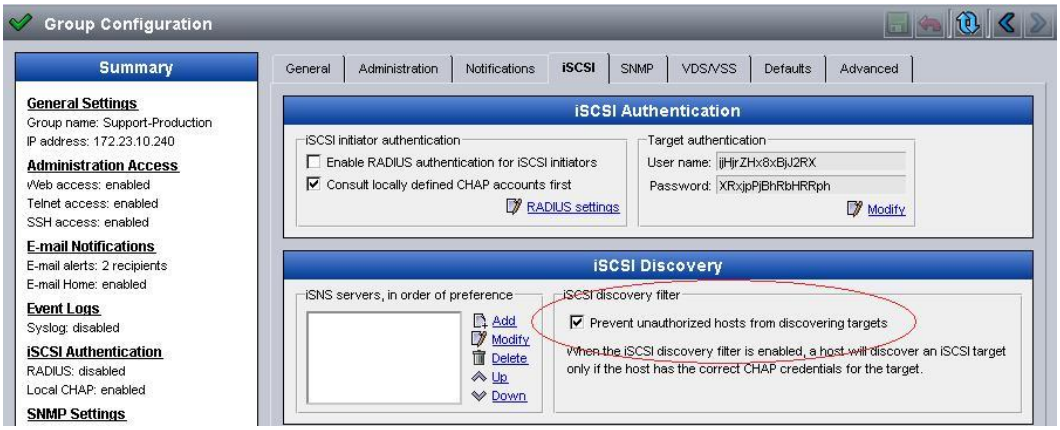
The ESX Server hangs when the Software iSCSI initiator is enabled

If you have CHAP enabled on existing volumes with no IP or IQN name restriction, the ESX Server iSCSI Software Initiator will periodically attempt to log-in to those volumes. Check the Access configuration on all volumes using CHAP. Restart the ESX server to clear this condition.



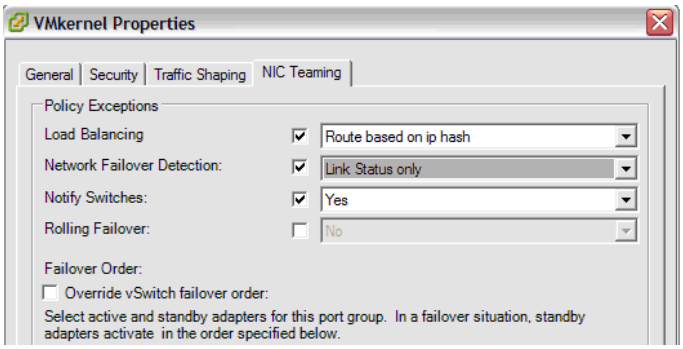
In the example above, the CHAP user entry allows any IP address to discover the volume. However, if the ESX Server isn't configured properly for CHAP, it will constantly attempt to log in to that target. When multiple volumes are configured this way the VMware ESX server is tied up indefinitely waiting for the login process to complete.

If you wish to use CHAP, use the EqualLogic Firmware v3.x option called "*iSCSI Discovery Filter*" in the Group parameters menu. This will prevent non-CHAP configured initiators from discovering CHAP authenticated volumes – as a result, the ESX software initiator will not try to log into CHAP authenticated volumes when CHAP is not configured in the ESX initiator.



How do I increase performance with the ESX software initiator?

You can increase IO connectivity between the ESX Server and EqualLogic array by creating multiple volumes on the EqualLogic array. Use the NIC teaming feature to utilize multiple NICs on your VMkernel switch; this will establish a unique connection for each volume, which the EqualLogic array can then load balance. Go to Configuration -> Networking -> Properties. Edit the VMkernel switch. Select NIC Teaming. Enable Load Balancing.



Please Note: To avoid severe performance degradation, please use the IP or MAC hash option with Multiple Physical trunked/channel group (non-stacked) switches. Having any 'stand-by' physical NICs in your vSwitch can also result in severe performance degradation.

Are Jumbo Frames supported and how are they enabled?

Per the ESX 3.5 Release notes Jumbo Frames are supported in a VM network.

ESX 3.5/3i currently does not support Jumbo Frames with VMkernel network.

http://www.vmware.com/support/vi3/doc/vi3_esx35_vc25_rel_notes.html

http://www.vmware.com/support/pubs/vi_pages/vi_pubs_35.html

http://www.vmware.com/pdf/vi3_35/esx_3/r35/vi3_35_25_3_server_config.pdf

From the VMware ESX Server Config Guide:

Chapter 4 Networking Scenarios and Troubleshooting

To create a Jumbo Frames-enabled vSwitch

1 Log in directly to your ESX Server SW host's console.

2 Use the command esxcfg-vswitch -m <MTU> <vSwitch> to set the MTU size for the vSwitch.

This command sets the MTU for all uplinks on that vSwitch. The MTU size should be set to the largest MTU size among all the virtual network adapters connected to the vSwitch.

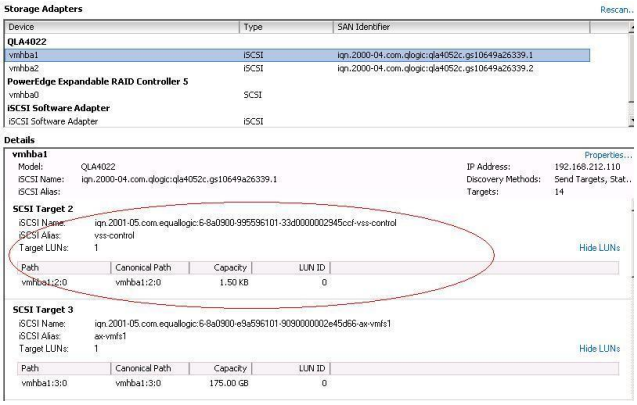
3 Use the command *esxcfg-vswitch -l* to display a list of vSwitches on the host, and check that the configuration of the vSwitch is correct.

4 Use the command *esxcfg-vmknic -l* to display a list of VMkernel interfaces, and check that the configuration of the Jumbo Frame-enabled interface is correct.

NOTE ESX Server SW supports a maximum MTU size of 9000.

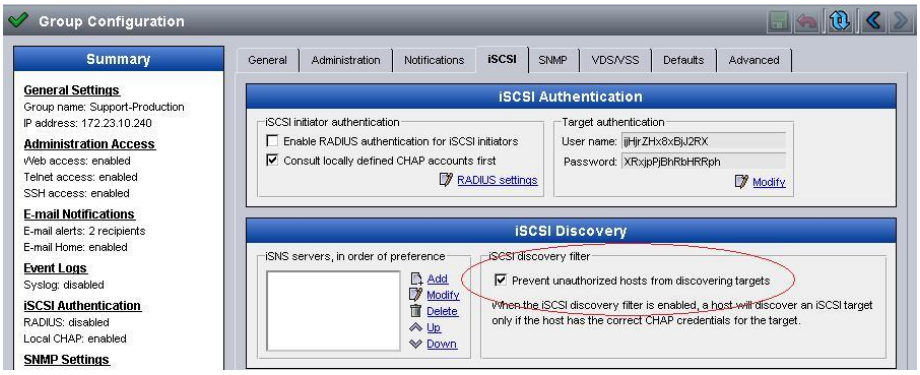
Error: initiator wanted to skip security phase but we cannot

If this message appears in the EqualLogic event log, then ESX is attempting to connect to a volume configured for CHAP credentials. The most common source is a control volume Microsoft Windows uses for Volume Shadow Services (VSS) called '*vss-control*'. By default, any initiator may discover this volume but cannot connect to it without CHAP credentials. The array is informing you that the ESX initiator (whether hardware or software) is attempting to connect to it without presenting a CHAP username/password.



If you will not be using VSS, one solution is to disable access to the VSS-control volume. In the Group Parameters menu in the EqualLogic GUI, select the VSS/VDS tab. Remove the 'vsadmin' access control entry.

If you are planning on using VSS, then use the EqualLogic option called "*iSCSI Discovery Filter*" in the Group Configuration->iSCSI menu. This will prevent non-CHAP configured initiators from discovering CHAP authenticated volumes – as a result, the ESX software initiator will not try to log into CHAP authenticated volumes when CHAP is not configured in the ESX initiator.



If you are using the QLogic HBA you can remove the VSS-control connection via the 'static mappings' tab under Configuration->Storage Adapters->QLA4022->Properties.

If you are using the ESX software initiator you must restart the ESX server to correct this condition. Once the initiator has discovered the target, only a reboot will remove it from memory.

How do I verify flowcontrol on ESX 3.0.x/3.5?

At the service console, type `#ethtool -a vmnicX` you should see something like this:

```
# ethtool -a vmnic0
Pause parameters for vmnic0:
Autonegotiate:  on
RX:             on
TX:             on
```

To determine which *vmnic* is being used for iSCSI, (VMKernel port) type the following:

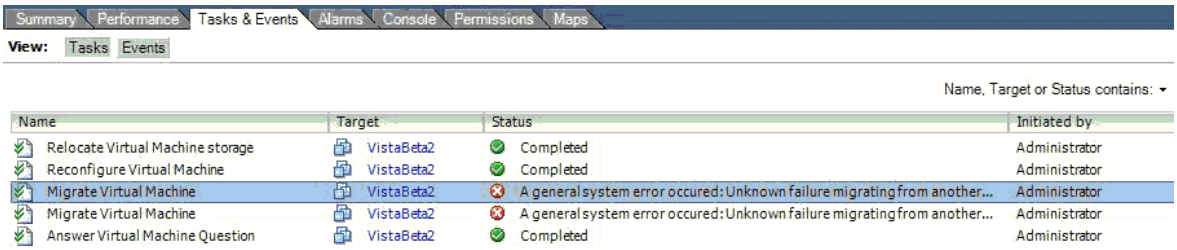
```
# esxcfg-vswitch -l
Switch Name     Num Ports   Used Ports  Configured Ports  MTU     Uplinks
vSwitch0        32          9           32                9000    vmnic5,vmnic0

  PortGroup Name       VLAN ID  Used Ports  Uplinks
  Lab Network          0        4           vmnic0,vmnic5
  Service Console      0        1           vmnic0,vmnic5
  VMkernel             0        1           vmnic0,vmnic5
```

VMotion

The questions and answers in this section cover the use of VMotion.

I can't migrate a VM to a new host, whether the VM is powered up or down

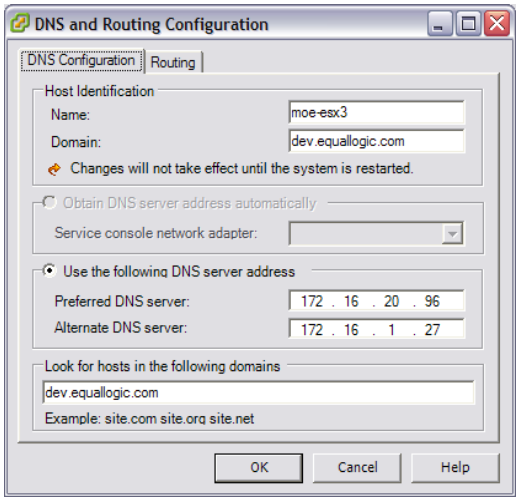
The following message appears: "*A general system error occurred: Unknown failure migrating from another host.*"



Please Note: When installing ESX, only use Static IP addresses – do not use DHCP.

This problem can be caused by a number of issues. Several solutions may solve this problem for you:

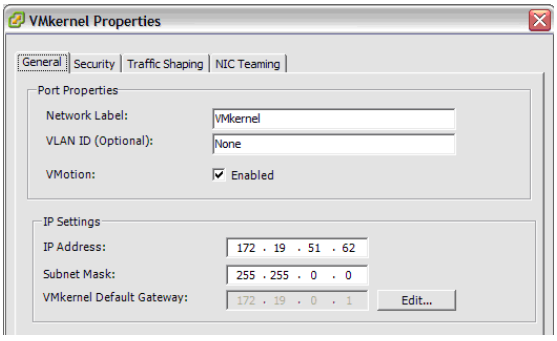
- Check DNS Settings



- Add the name and IP address of the DNS server into the `/etc/hosts` file of each ESX server:

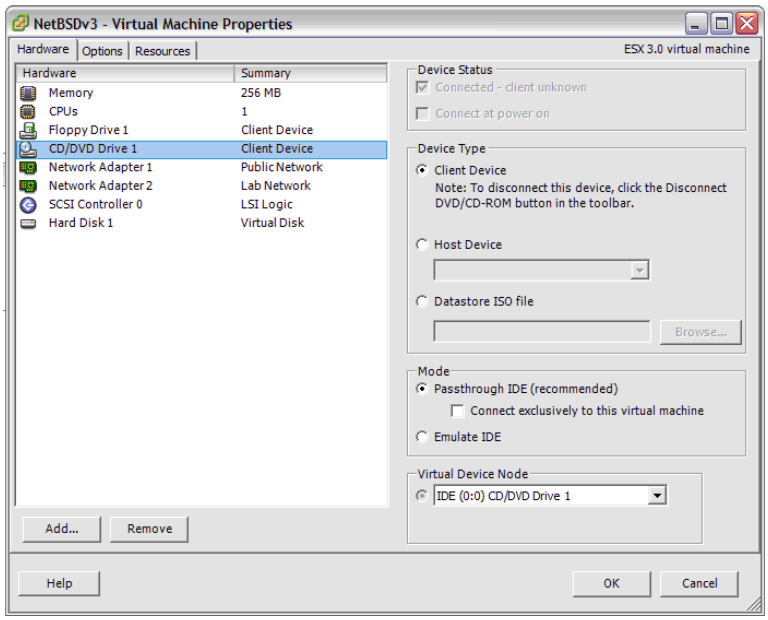
```
[root@esxbottom root]# cat /etc/hosts
127.0.0.1               localhost.localdomain localhost
172.16.25.100           esxbottom.selab.equallogic.com esxbottom
172.16.25.110           setop.selab.equallogic.com setop
```

- Confirm that the VMkernel Default Gateway is correctly set.



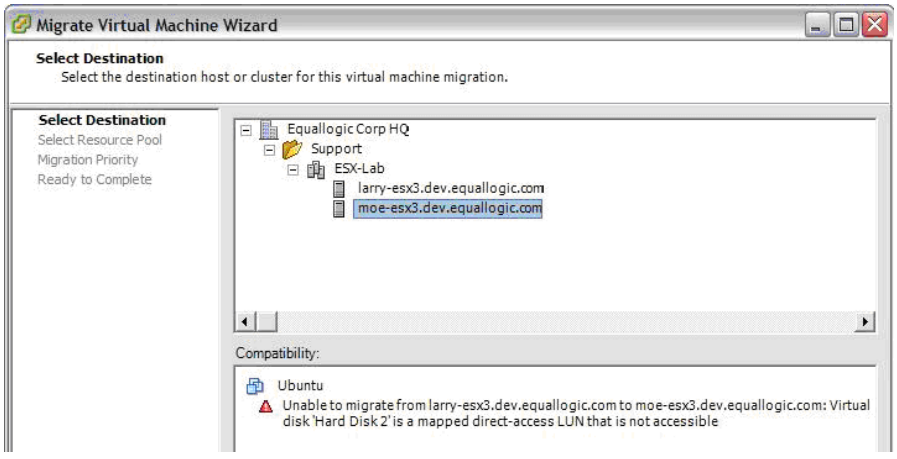
VMotion works when the VM is turned off, but not powered on

With the VM powered off, check the CDROM settings in the VM configuration. Try setting it to **Client Device** and **Passthru** mode. Power up the VM and try again.

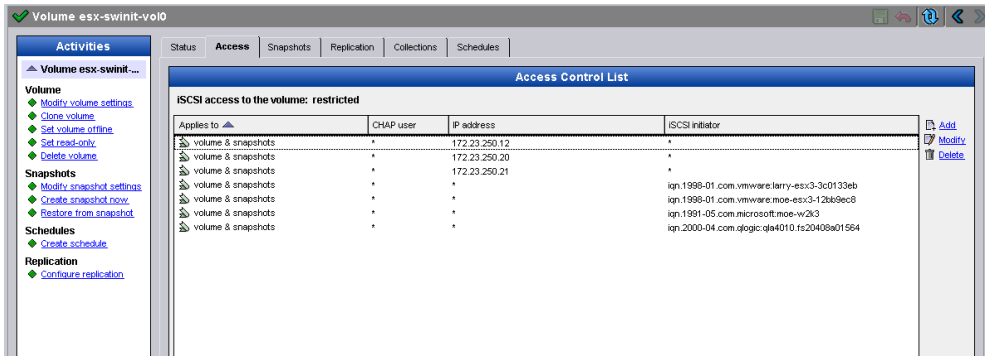


The System can't VMotion with a Mapped SAN LUN

When you try to move a virtual machine that has a mapped direct-access LUN, the error message shown below appears:



- Make sure the ACL for the volume includes the server you're migrating to.



Please Note: This example uses the software initiator. Each node needs an ACL entry for the Service console and the VMkernel Port. For large ESX clusters we recommend using the iSCSI initiator name instead of the IP addresses for each Service Console and VMkernel port. This will reduce the number of Access control entries needed since you don't have to include the IP addresses of both the Service Console and the VMkernel port. As are reminder, the maximum number of ACL entries per volume is 15; if you need more than 15 ACL entries, you can use CHAP.

Alternatively, if you have a unique IP scheme for ESX Servers you can use wildcards '*' in the ACL entry. For example, if your iSCSI SAN network is a class 'B' (i.e., 172.16.0.0 / Netmask 255.255.0.0) you can create a unique IP address schema (172.16.100.x) for your VMware ESX servers. With this method, an ACL entry of 172.16.100.* would allow any ESX server with the 172.16.100.x addressing scheme to access your volume(s).

Note: You must exercise control over your IP address allocation. If you allow a non-VMware server to access a VMFS formatted volume, corruption could occur. When in doubt, use CHAP if you need more than 15 servers connected to a volume.

VMotion completes but the VM client is non-responsive

If you are using DHCP in your VM, try switching to a static IP address – that may resolve the issue. If you are running VMware ESX v3.0.0, upgrading to ESX v3.0.1 will help.

Accessing VMware ESX Server

In this section we provide answers to your questions regarding accessing the VMware ESX Server.

I can't SSH login to the root account on my VMware ESX server

By default, the root login is not allowed SSH access since direct root access could compromise system security. The best practice is to create a non-root user account; use that account to login with SSH, and then switch to the root user with the '**su -**' command.

Follow these steps to create a non-root user account for SSH server login:

1. Using the Virtual Center Client, log in to the ESX server as root.
2. Click the **Users & Groups** tab.
3. Right-click the Users & Groups page. In the shortcut menu that appears, select **Add**.
4. Create the new user. Ensure that the **Grant shell access to this user** checkbox is selected.

Another approach is to edit the `/etc/ssh/sshd_config` file to allow root login access.

If you select this approach, follow the steps below:

1. Look for the line that says, "*#PermitRootLogin yes*"
2. Remove the # sign and save the file.
3. Restart the SSH daemon using the command:
   `#service sshd restart`

I can't login as root with Putty after editing the sshd_config file

By default, Putty sends passwords in clear text; however, also by default, the SSH daemon doesn't support this. Follow these steps to allow Putty access:

1. Edit the `/etc/ssh/sshd_config` file.
2. Find the line that says "`#PasswordAuthentication yes`"
3. Remove the "`#`" sign.
4. Restart the SSH daemon with the command
   `#`**`service sshd restart.`**

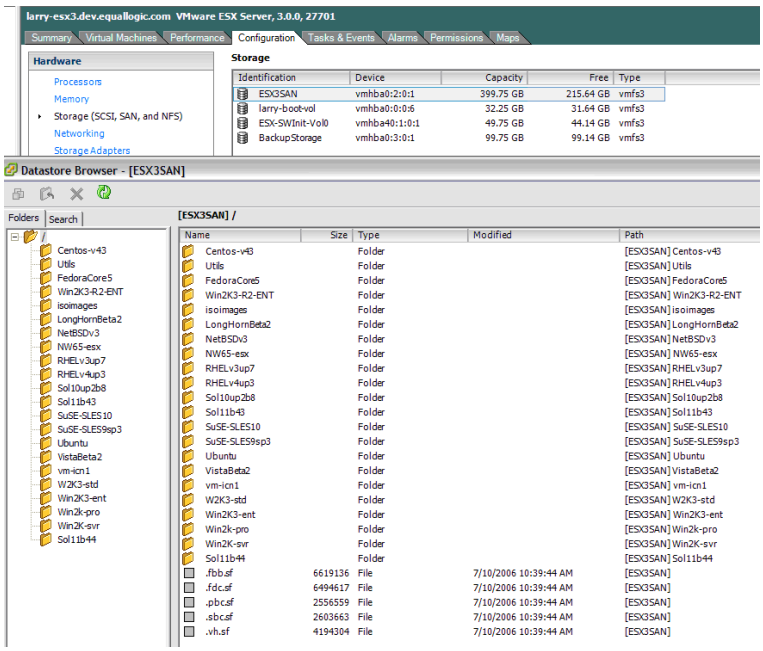
Virtual Machines

The answers in this section will help with questions regarding the use of virtual machines.

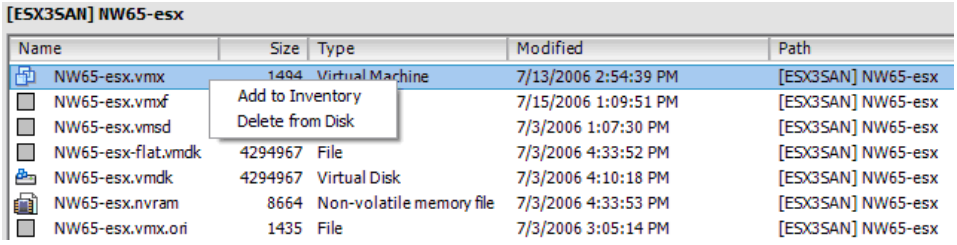
How do I get my virtual machines back into the inventory?

Follow the steps below to move a virtual machine image into the inventory:

1. Go to the **Configuration Tab** and select **Storage**.
2. Select the volume where the VM images are stored. Right-click that volume and in the shortcut menu that appears, select **Browse Datastore…**



3. Double-click the directory folder containing the VM you wish you register.
4. Right-click the `<VirtualMachineName>.vmx` file for the virtual machine. In the shortcut menu that appears, select **Add to inventory**. The virtual machine will now be available as part of the inventory.



Do I need to enable flowcontrol inside the VM Guest OS?

No, flowcontrol is enabled at the ESX server level. See: [How do I verify flowcontrol on ESX 3.0.x/3.5?]

How do I set the Disk Timeout Value in the VM?

This info is available in our firmware release notes, which are downloadable from our website. http://www.equallogic.com The suggested setting is 60 seconds. Most operating systems have a default timeout of 30 seconds.

How do I set the SP Failover timeout?

VMware documentation refers customer to Dell EqualLogic support to get the "*SP Failover Timeout*" values. This is the same as the VM Guest OS Disk Timeout information that is in our Firmware release notes. The Release notes are available on our website. http://www.equallogic.com VMs should have a Disk Timeout value of at least 60 seconds.

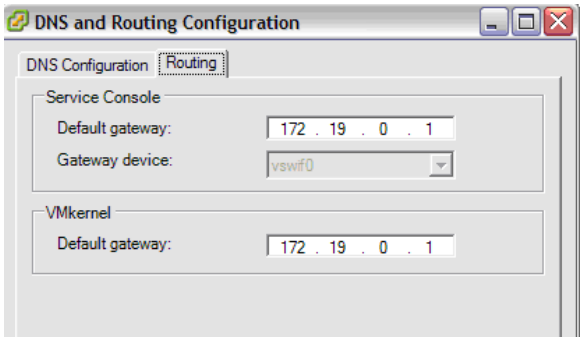
VMkernel

VMkernel questions are answered in this section.

What do I use for the VMkernel network default gateway?

Some users are unsure of what to use if they already have a default gateway defined.

The answer depends on your network infrastructure. Typically, it is the same as the Console Gateway; if you are doing VMotion or iSCSI across networks, use the appropriate router address.



I get "IO error" doing a 'vmkping'

If you specify the incorrect VMkernel gateway, and the VMkernel port is not on the same subnet as the array, an "*IO error*" may occur when using 'vmkping' to verify VMkernel connectivity.

ESX 3.0.2 Update 1 has a specific issue that causes VMKping to fail. Install patch; 1002424 to address this issue. It's available at: http://kb.vmware.com/kb/1002424

Miscellaneous VMware Issues

Various questions that do not fit in other categories are answered in this section.

Slow I/O performance w/SW or HW initiator after P2V conversion

A physical-to-virtual conversion by default uses the BusLogic SCSI adapter; in order to use the LSI logic SCSI adapter, you must upgrade the VM. First, ensure that the appropriate driver is installed on the Guest.

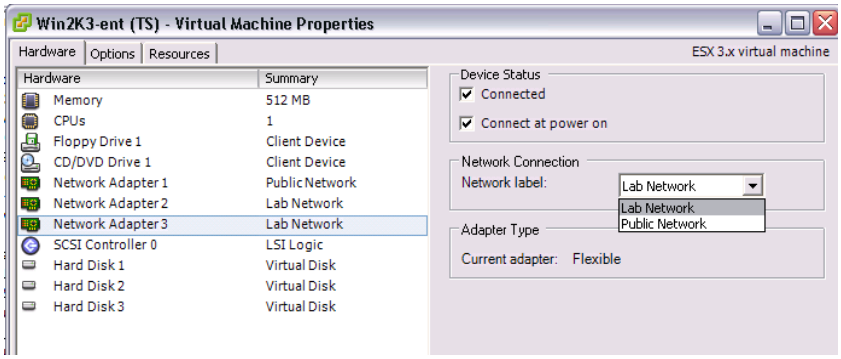
To check which SCSI driver the virtual machine is using and edit it for ESX Server:

1. Log on to the ESX Server management interface.
2. Double-click the virtual machine.
3. Click **Hardware** > **SCSI Controller**.
4. Click **Edit** to change the driver to LSILogic.

Can't access SAN network from VM

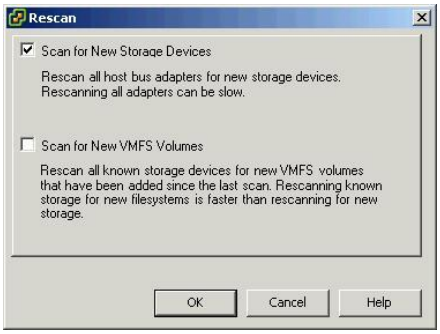
In one instance, after upgrading ESX 3.0.1 to build number **34176** and then adding a separate '*VM Network*' for VM access to the SAN network, the Guest VM could not access the SAN network at all.

Recommended **workaround:** Edit the VM guest settings, and change the affected Virtual NIC to a different VM network. Press 'OK' to save it. Next, re-edit the VM settings to change it back to the original network.



ESX server freezes when doing a SAN 'rescan' operation

A bug has been identified in Virtual Center v2.0.1. If the option to scan for new devices and new VMFS volumes is checked, the resulting LUN 'thrashing' can cause the ESX server to hang. For now, you can solve this problem by selecting only one option at a time. First, scan for Storage devices, and then separately, scan for VMFS volumes.



Please Note: Customers with eight or more targets connected to the QLogic 405x series HBA should upgrade their Qlogic HBA to firmware 2.00.0.62.

Additional information is available at: Qlogic KB Article on issue with targets

Note: Do NOT upgrade the Qlogic 405x series HBA to firmware revision 3.1.0.24! QLogic released 2.0.0.62 firmware which maintains compatibility with VMware ESX.

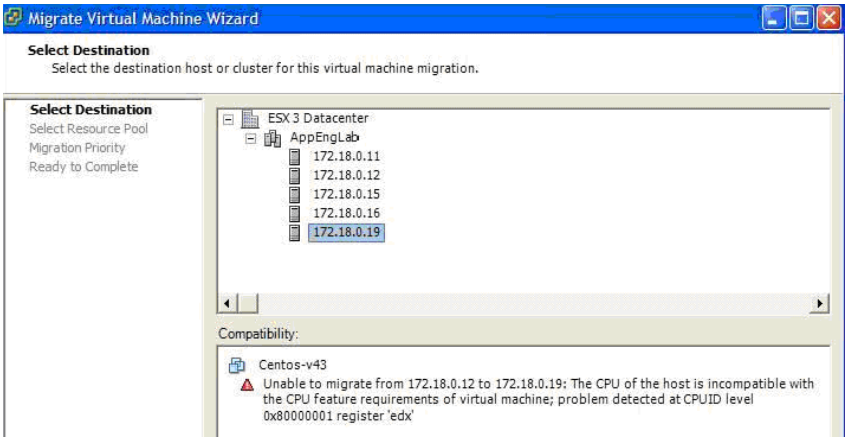
Do I need to align disk sectors on VMFS volumes?

When using the VMware VIC, aligning the partition table is done automatically – no action is required. Please follow the link below for additional information.

http://www.VMware.com/pdf/esx3_partition_align.pdf

I get a "CPU incompatible" error when migrating a running VM

This problem may occur when the processor in the destination server is not the same generation as the source server, or when the processors are from different vendors. Migrating the running virtual machine to the destination server could cause the virtual machine to crash.



Workarounds: One way to resolve this is to ensure that each cluster uses servers with the same hardware. Another solution is to remove the "odd" server from the cluster and run it as a standalone server.

Visit this VMware knowledge base article for more information.

I get a "Failed to serialize results" error when checking Storage Properties

If you encounter this error, try disabling CHAP on the ESX iSCSI software initiator and on the EqualLogic array access control for all ESX VMFS volumes. Instead, try restricting access by IP address or IQN iSCSI initiator name. For more information about setting the access control on the EqualLogic array, see: Existing volumes aren't visible to the Software Initiator.

I expanded an EqualLogic volume for the 5th time but I can't create a new Extent

For best results, before resizing a volume on the array, create a snapshot on the EqualLogic array first – this will allow you revert to the old size. VMware v3.x has a limit of four extents on a single LUN. If you are running 3.2.x firmware on the EQL array you can use the 'shrink' command to return the volume to the previous size. Please contact EqualLogic customer support for assistance with this command. If you're running earlier firmware and without a snapshot prior to the resize, there is no way to undo this change. If you do not have a snapshot, you must create a new volume and move the data from the first volume. Once that is complete, delete the old volume to reclaim the space.

As an alternative to expanding an existing EqualLogic volume, you can always create a new volume on the array and add it to an existing VMware Datastore.

Please Note: The maximum size disk a VMFS volume supports is 2TB.

What is the maximum filesystem size for VMFS volumes?

The largest individual disk a VMFS volume will supports is 2TB. Before resizing any volume, we recommend that you create a snapshot of the volume on the EqualLogic array. Should you resize past 2TB, the volume size will show 0MB. Please contact EqualLogic customer support immediately. Arrays running 3.2.x firmware have a command to return the volume to the previous size. If you are not running 3.2.x firmware and you did not create a snapshot prior to the resize your data is lost.

However, you may chain thirty-two 2TB volumes together to create a 64TB VMFS Datastore. No VMDK can exceed 2TB. Use the "Add Extent" function in the VI client to add new EqualLogic volumes to the VMFS Datastore.

A list of SAN related specs is available here.

Broadcom 5700 v14/5701 v15 NICs stop transmitting under load

During heavy I/O operations these NICs have been known to stop transmitting, resulting in dropped connections. The only solution is to use a different NIC model for iSCSI traffic.

This VMware KB article has more information about this issue.

Problems with Intel PRO1000 NICs (Single/Dual/Quad)

Symptoms of problems with these NICs include transmit hangs, and inability to see the NICs in the GUI. The quad PRO1000 requires a patch, which is available for ESX 3.0.1 here.

Does ESX v3.0.x support Jumbo Frames?

Currently, ESX does not support Jumbo Frames in the networking stack. Support for Jumbo frames is available in ESX 3.5. Jumbo frames can be enabled on the QLogic 405x series of iSCSI HBAs via the BIOS utility (v1.09 or above); another option is to install the 'iscli' utility. For instructions on installing and using the QLogic iscli configuration utility, see How do I configure settings on the QLogic HBA not found in the ESX GUI?

Can I use MS Volume Shadow Services (VSS) technology with ESX?

Currently, the only way to use VSS with ESX is to connect to a volume on the array using the Microsoft software iSCSI initiator from within the Guest OS. To do this, you will need EqualLogic's Host Integration Toolkit which can be downloaded from our website: http://www.equallogic.com Please note that you cannot use ESX's Raw Disk Mapping (RDM) feature with VSS.

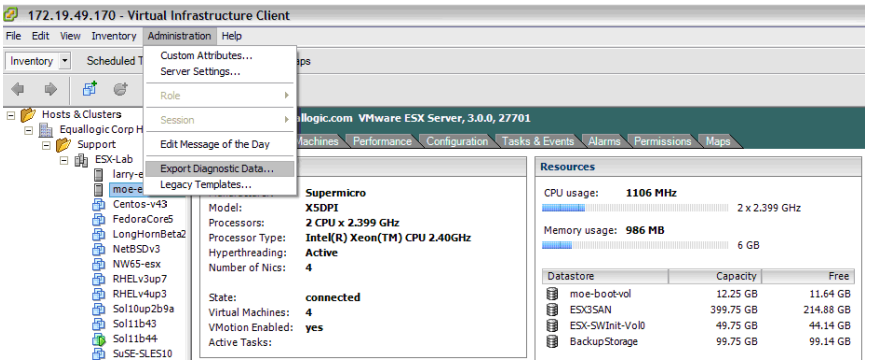
Where can I get a list of available patches for ESX v3.x?

The current patch list is available from VMware here.

How do I gather Diagnostic Data?

Follow these steps to gather diagnostic data:

1. Go to the Administration Menu and Select **Export Diagnostic Data**.



2. Select the servers from which to gather the report; identify the filename and a location for saving the files.

I upgraded to v3.01 from v3.0.0 but I can't see any files on my Datastore

Please be sure that you have upgraded the Virtual Infrastructure Client to v2.0.1. Go to the IP address of the v3.0.1 ESX server, where you will find a link from which to download the client.

Error "Failed to install Virtual Center Agent" when adding a host/cluster

Some users have encountered this error after upgrading the Virtual Center Server to v2.0.1, especially when adding a cluster. On the ESX service console(s) run; #**service mgmt-VMware restart**. If that fails, restart the ESX server(s).

QLogic iSCSI HBAs

The questions and answers in this section cover QLogic HBAs.

QLogic QLA4010 Support

Note that the QLogic 4010 HBA is not supported by VMware ESX Server 3.x.

Note: Do NOT upgrade the QLogic 405x series HBA to firmware revision 3.1.0.24!
QLogic has released 2.00.0.62 firmware which maintains compatibility with VMware ESX.

For additional information, please refer to:

Vmware IO guide

Download link for Qlogic 'iscli' utility

VMware VI3 release notes

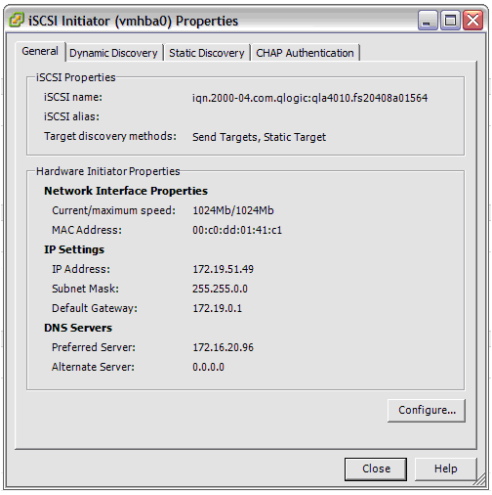
The QLogic 405x series HBA in the VIC GUI shows as a 4022. Is that correct?

The ESX driver is identifying the chipset on the QLogic card – 4022 is correct for 405x series cards.

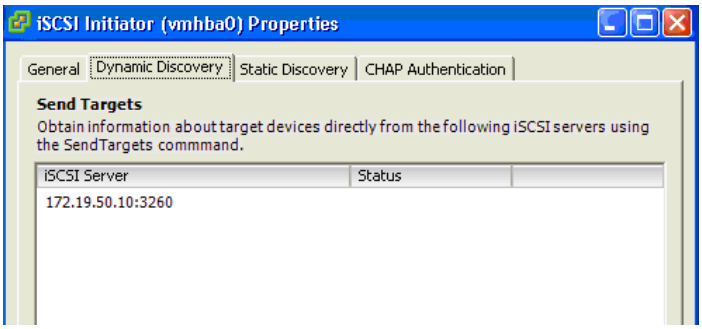
I've booted from the SAN, but I can't see other volumes on the QLogic HBA

Verify that the Discovery address is set on that adapter.

3. Go to the Configuration Tab and select **Storage Adapters**.
4. Select the **QLA4022 Storage Adapter (*vmhba0*)** and then **Properties**.



- Select the **Dynamic Discovery** Tab and make sure the Group IP address of the array is there. If not, add the Group IP address and click **Close** to save it.
- Try rescanning the storage adapter – the volume(s) should now be visible.

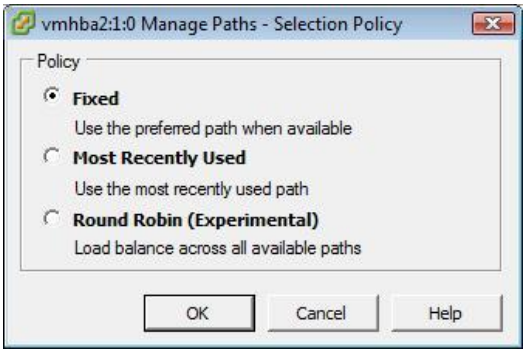


Can I add the QLogic HBA later?

Yes – After installing the HBA, VMware will install drivers for the HBA, and then restart to make the change effective. For detailed information on configuring the QLogic HBA, see the section, 'How do I configure settings on the QLogic HBA not in the GUI'.

How do I configure Multipath Support with the QLogic 405x iSCSI HBA?

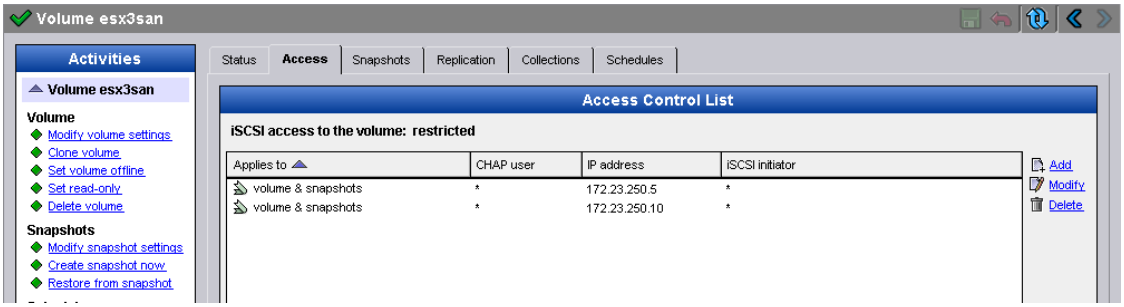
Note: ESX v3.5 (GA Release) has an experimental feature '*Round-Robin*' which will balance IO between the two ports automatically.



However, the following procedure works with all revisions of ESX 3.x.

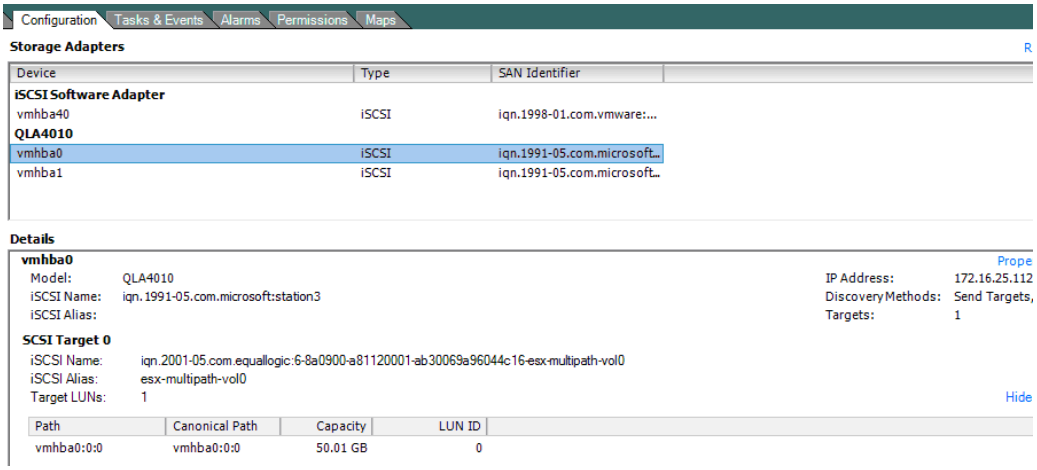
Follow these steps to configure multipath support (MPIO) for the QLogic 405x:

1. Make sure that the array volume allows access by both iSCSI HBAs.



In this example there are two IP addresses in the access list: one for each QLogic HBA.

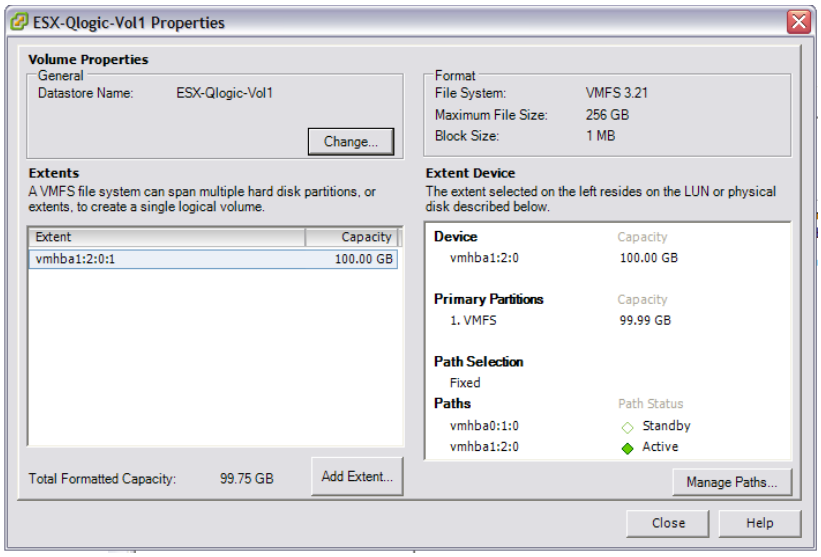
2. Go to **Configuration,** select **Storage Adapters** ->**Properties**.
3. Make sure each iSCSI HBA can discover the volume.

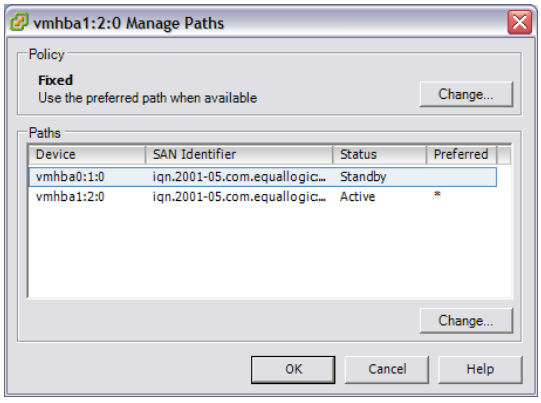


4. Add the storage into the system and format as VMFSv3 (if required).

-
-

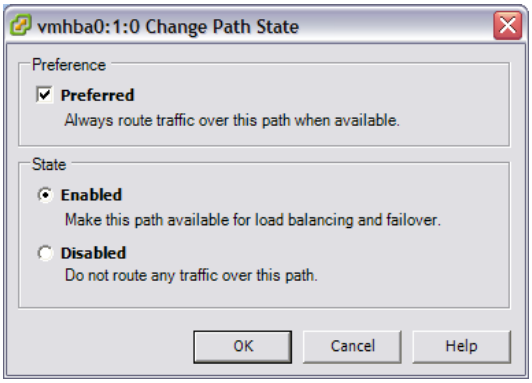
5. Go to **Configuration**, select **Storage**->**Properties**. You should see the iSCSI adapters, one as Active and one Standby.
6. Click the **Manage Paths** button to select which HBA will be the preferred path.





Notes:

- There is a bug in v3.0.1. The result is that even if you change the connection to another port, it may still show as connected to the original port on the QLogic HBA.
- You cannot change the path preference if ESX has pending I/Os in queue.

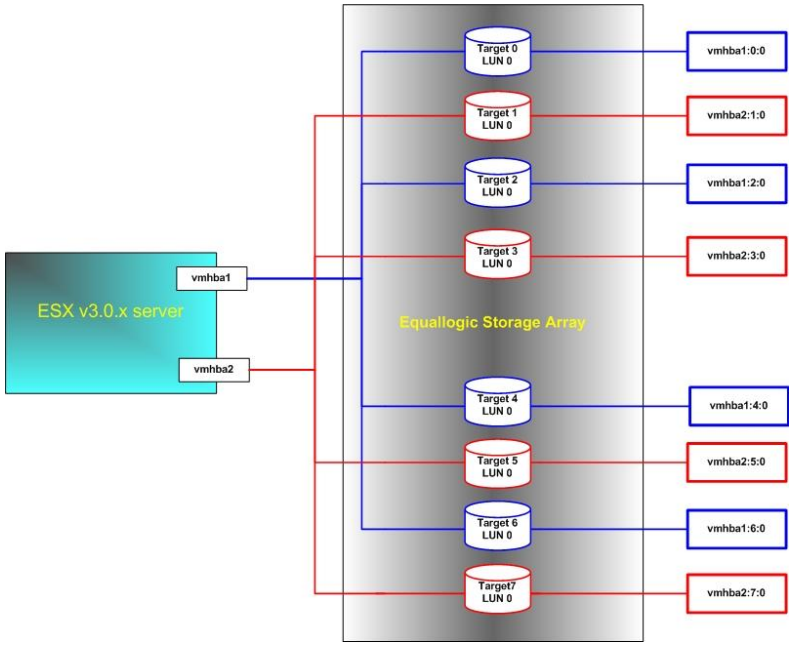


The policy must be set to '*Fixed*'. Click the bottom '*Change*' button to set the active path you wish to use. Set the '*Preferred*' checkbox and then press '*OK*'. Repeat this process for the other volumes.

The 'fixed' policy is correct since EqualLogic arrays appear to the ESX Server as an Active/Active Storage Processor. This eliminates the potential for 'thrashing' that can occur with an Active/Passive Storage Processor.

For more information on thrashing and setting the policy modes, see http://www.VMware.com/pdf/vi3_san_design_deploy.pdf .

The diagram below shows how to balance volumes across the two HBAs for better performance and redundancy. Should an HBA or link fail, the remaining HBA will be used for all iSCSI operations.



A storage device address is composed of three parts: *HBA ID*, *target ID* and *LUN ID*:

Example: vmhbaX:Y:Z, where:

- X is the HBA ID (example: vmhba1)
- Y is the Target ID (example: vmhba1:0)
- Z is the LUN ID (example: vmhba1:0:0)

Please Note: EqualLogic volumes will always have a LUN of zero (0).

How do I configure settings on the QLogic HBA not found in the ESX GUI?

To do this, you must install the QLogic '`iscli`' program from the QLogic website

Download Link for iscli utility

Manual for command line utility

Secure copy (scp) the file to the ESX server. (http://www.winscp.org)

Login as the root user.

If you have an earlier version of the utility, uninstall that first.

```
#rpm –e iscli
```

You must uncompress the file.

```
#gunzip iscli-1.1.00-13_linux_i386.rpm.tgz
 #rpm –ivh iscli-1.1.00-13_linux_i386.rpm to install it.
```

Settings that need to be set are:

- ARP Redirect: **ON**
- Keep Alive Timeout: **60** (secs) *Set to 120 seconds if booting ESX from SAN.
    - Optional setting
        - Execution Throttle: **128** - **200** (Max: 256) *128 is a starting point.

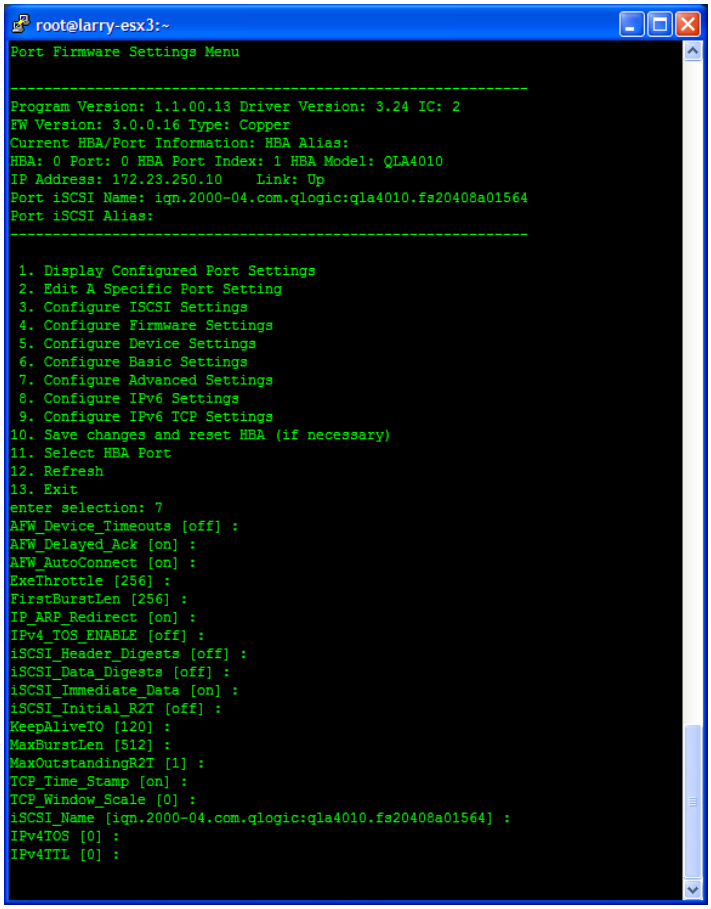
To set them, run 'iscli' at the Service Console. To get to the settings:

- Enter '4' (*Port Level Info & Operations*)
- Enter '3' (*Edit Configured Port Settings Menu*),
- Enter '3' (*Port Firmware Settings Menu*),
- Finally '7' (*Configure Advanced Settings*)
    - Press 'enter' until you see "*ExeThrottle.*" The default is 64, maximum value is 256. Higher values increase performance. A setting of 128 is safe and a good starting point.
    - Continue to press 'enter' until you see '*IP_ARP_Redirect*' and set that to 'on'
    - Continue to press 'enter' until you see '*KeepAliveTO*' and set that to '60.' Set to '120' if you are booting the ESX server from the array.
    - Continue to press 'enter' until you return to the previous menu

  If you have two ports, Select '11' (*Select HBA Port*) and configure that port.

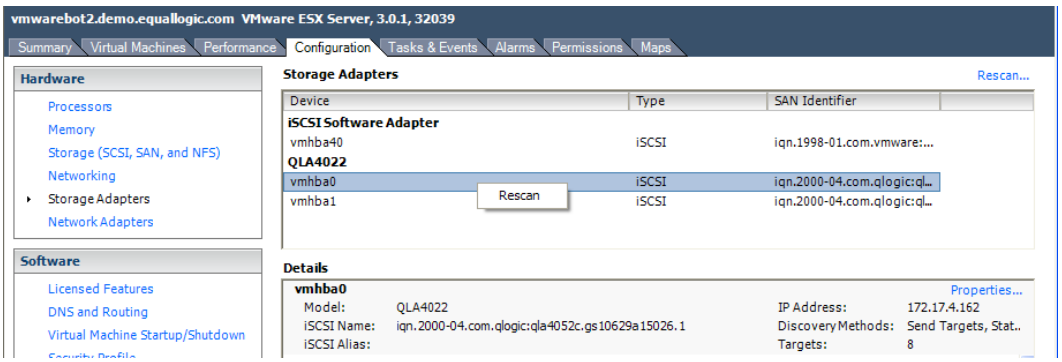
  When finished, select '10' (*Save Changes and reset HBA*).

Please Note: If you are booting from SAN you will be prompted to save the changes and reboot to make the changes effective.



I used iscli to make recommended changes, but now I can't discover volumes

Check the discovery address settings for the HBA. The HBA may no longer be listed after using the 'iscli'utility. Add it back in using the VIC GUI, and then rescan that adapter by right clicking on that QLogic HBA port and selecting 'rescan'.



How do I change the disk timeout value for the QLogic 405x?

The default disk timeout value is 30 seconds – it should be set to 60 seconds.

```
#esxcfg-module –s ql4xportdownretrycount=60 qla4022
```

When finished run:

```
#esxcfg-boot –p
```

Please Note: A reboot is required to make this change effective. If you have previously set the Command Tag Queue value for the QLogic HBA you must include that setting here again.

```
#esxcfg-module –s 'ql4xmaxqdepth=200 ql4xportdownretrycount=60' qla4022
```

For information on setting the Command Tag Queue option, see: How do I change the Command Tag Queue depth for the QLogic 405x?.

```
# esxcfg-boot -q vmkmod
   vmkapimod vmkapimod
   vmklinux linux
   e1000.o nic
   qla4022.o scsi ql4xmaxqdepth=200 ql4xportdownretrycount=60
```

Increasing the ESX iSCSI QLogic 405x iSCSI initiator performance

This section covers configuration settings for the QLogic 405x series iSCSI HBA.

What is the QLogic 'Execution Throttle' setting?

QLogic has a firmware setting called '*Execution Throttle*' which sets the maximum number of simultaneous commands the adapter will send out. The default is typically 64, with a maximum of 256. QLogic support tells customers to set it to MAX. However, this can cause contention issues on the SAN; informal testing has shown improvement with settings up to 200, but little difference above that.

Some experimentation may be required to determine the optimal setting in your environment. A good first step is to start with a setting of 128 and evaluate your performance. See the section, How do I configure settings on the QLogic HBA not found in the ESX GUI? for instructions on setting Execution Throttle.

Note: If you are booting from SAN, you will have to reboot the host for the change to take effect.

How do I enable Jumbo Frames on the QLogic 405x iSCSI HBA?

If you have the QLogic iscli utility installed you can enable it from the shell prompt with:

```
#iscli 0 –n Large_Frames on    (This changes the 1st adapter)

#iscli 1 –n Large_Frames on    (This changes the 2nd adapter)
```

You can also use the iscli menu. See the section titled, "How do I configure settings on the QLogic HBA not found in the ESX GUI?" for more information. As an alternative, with BIOS v1.09 and above you can set Jumbo Frames via the QLogic FastUtil BIOS utility.

How do I change the Command Tag Queue depth for QLogic 405x?

The Command Tag Queue Depth (CTQ) determines how many commands can be queued from the QLogic HBA to a volume on the array. A higher CTQ can increase the amount of IO the card can generate, with a maximum value of 256. CTQ is a negotiated value at connection time.

```
#esxcfg-module –s ql4xmaxqdepth=200 qla4022
```

Then run: `#esxcfg-boot –p`

A reboot is required to make this change effective.

To verify the setting, after rebooting run the following:

```
# esxcfg-module -g qla4022
    qla4022 enabled = 1 options = 'ql4xmaxqdepth=200'
```

Please Note: If you have previously set the disk timeout value for the QLogic HBA you must include that setting here again.

```
#esxcfg-module –s 'ql4xmaxqdepth=200 ql4xportdownretrycount=60' qla4022
```

For information on configuring the QLogic disk timeout value, see: How do I change the disk timeout value for the QLogic 405x?.

```
# esxcfg-boot -q vmkmod
   vmkapimod vmkapimod
   vmklinux linux
   e1000.o nic
   qla4022.o scsi ql4xmaxqdepth=200 ql4xportdownretrycount=60
```

EqualLogic Snapshots

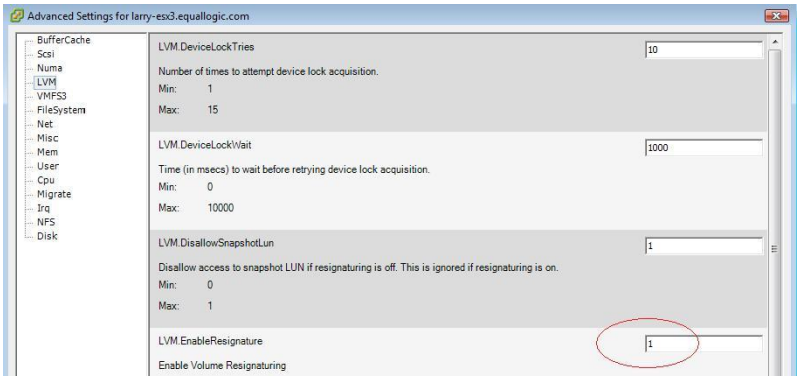
Questions regarding EqualLogic snapshots are answered in this section.

ESX Server wants to format snapshots, replicas, and clones

To prevent this, you must enable the *LVM.EnableResignature* parameter. If the VMware ESX Server sees that a volume already has a VMFS signature that matches an existing volume, it will treat the volume as new and ask you to format it. If you set LVM.EnableResignature, the ESX server gives you access. You must set this parameter for every ESX server on which you expect to mount snapshots, promoted replicas, or clones.

Follow these steps to set LVM.EnableResignature:

1. From the **Configuration Tab** of the ESX server, select **Advanced Settings**.



2. Select **LVM** on the menu on the left. In the information pane you will see **LVM.EnableResignature** field. The default setting is 0; change the setting to 1.
3. Now when you scan for new storage, it should see the snapshot, promoted replica, or clone as a pre-existing VMFS volume and mount it.

Please Note: It's very important, when you're done with the snapshot, reset the LVM setting back to '0' do not leave it enabled. This could cause regular volumes, not snapshots to have their LVM signatures re-written. This could cause VMotion and HA to fail.

How do I remove a snapshot once I'm done with it?

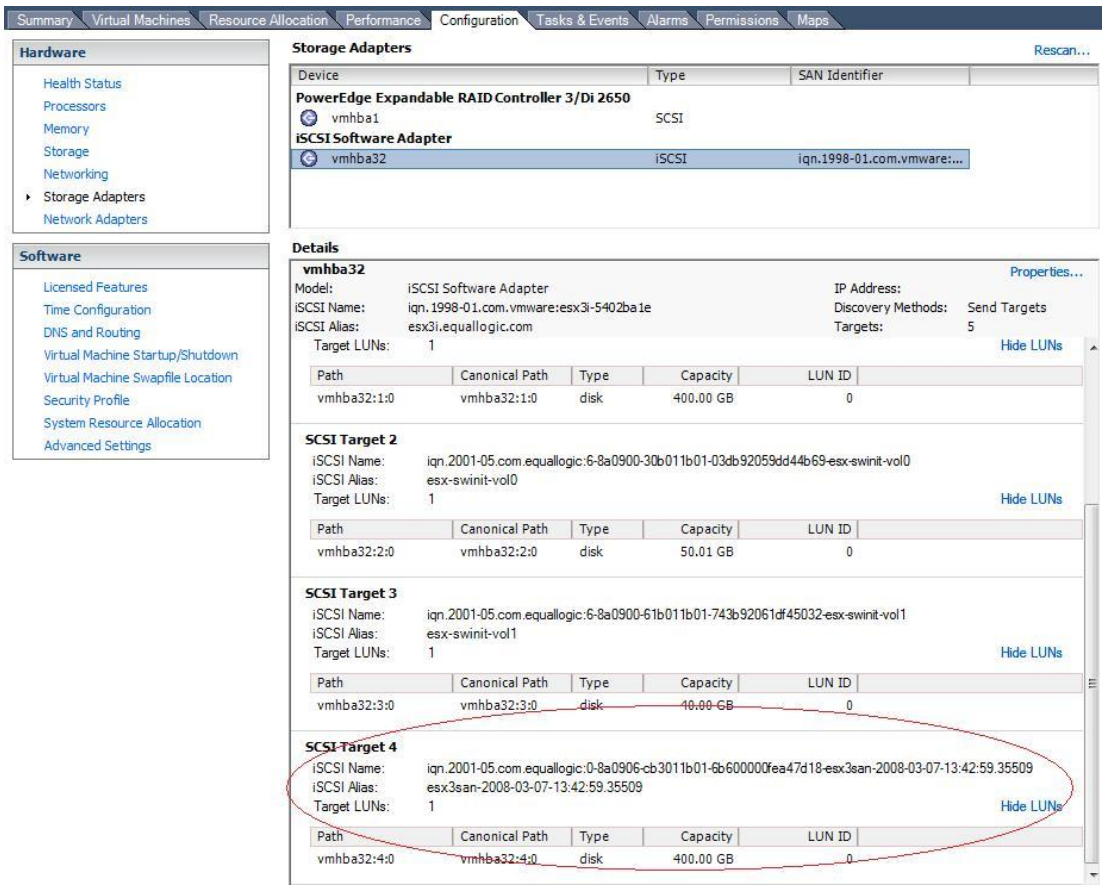
To remove the snapshot volume from the list of Datastores, in the EqualLogic GUI place the snapshot offline. In the VMware VIC client, in the Storage Adapters menu, use the 'rescan' link; the snapshot will no longer appear.

My Datastore vol, not a snapshot, has SNAP-00000x in front of it.

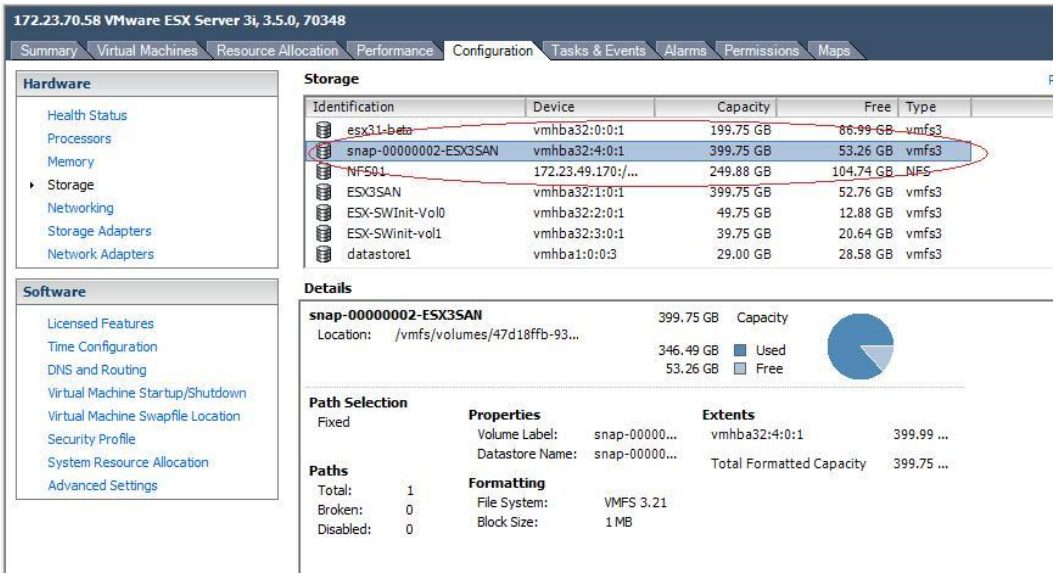
The '*LVM.EnableResignature'* feature is enabled – change the setting back to 0. You will have to remove access to that volume in the EqualLogic GUI for that ESX Server. Rescan to remove that volume from the list. Re-enable access and rescan again to see the Datastore correctly.

How do I restore a VMDK from an EQL snapshot?

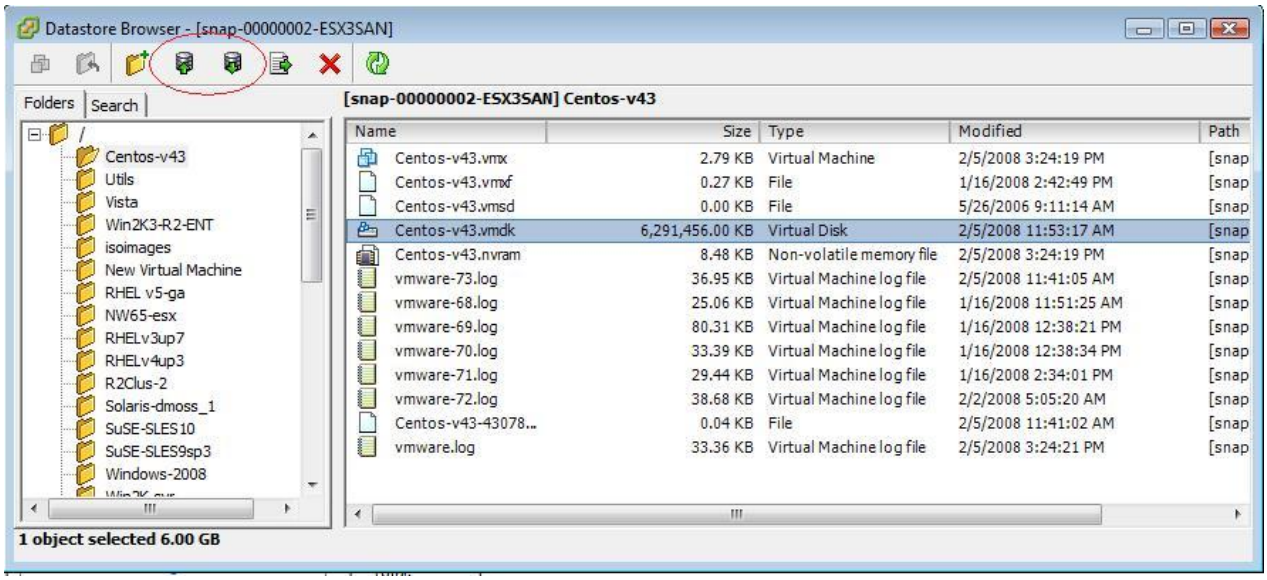
1. Shutdown the VM to be restored.
2. In the EQL GUI, put the EQL snapshot online.
3. Verify the LVM Resignature is set.
4. Rescan the iSCSI storage adapter.
5. In the Storage Adapters screen you'll see the snapshot is connected.



The snapshot should show up as SNAP-00000000x-<Datastore Name>.

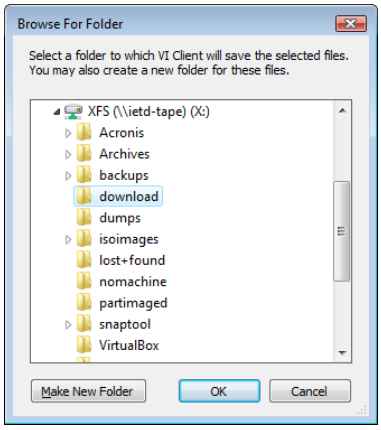


You now can browse that datastore by right clicking the mouse over the snapshot of the datastore. Select the directory that has the VMDK you wish to restore. Select the VMDK file, you'll notice two icons with arrows on the GUI. This will allow you do download or upload files from the ESX server.

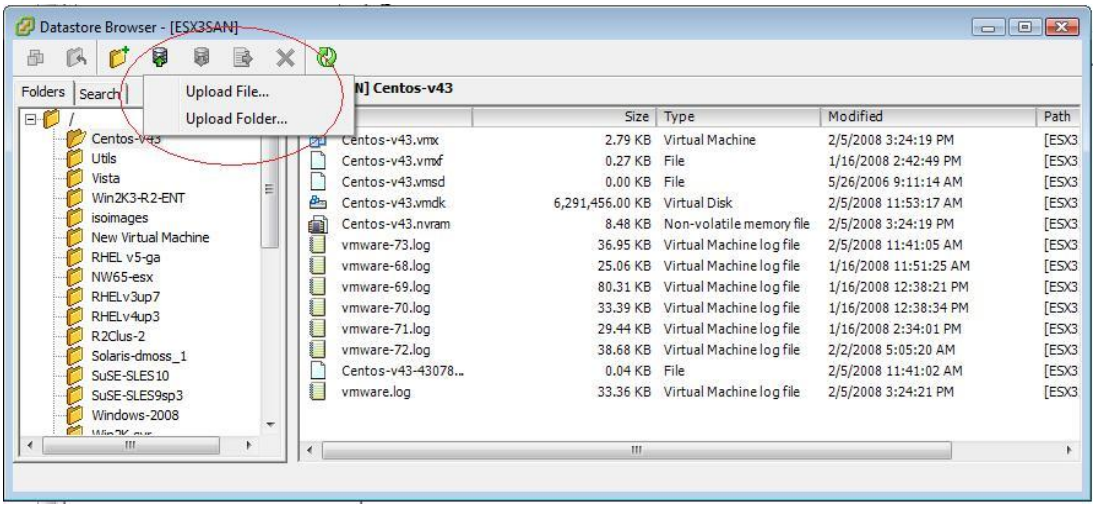


Press the icon with the arrow pointing down to download the file to your local system.

Select the folder you wish to download it to.



To restore the file browse the datastore of the original volume and again select the directory of the VM you wish to restore.



Microsoft Clustering Service

The questions and answers in this section cover the Microsoft Clustering Service.

Can Microsoft Clustering Service in W2K3 (SP1/SP2) use VMDK disks?

Windows 2003 (SP1) introduced a change that resulted in MSCS clusters not functioning in any ESX Server version. VMware is working with Microsoft support to resolve the issue.

Recommended Workaround: Use the Microsoft iSCSI initiator and place the Quorum and Cluster volumes outside of VMware, directly on the EqualLogic array. This also enables the

full range of PS Series Array features (including replication, snapshots of individual volumes, VSS for backups, etc.) When using MSCS with the PS Series Array firmware revisions 3.x, you must install SP2.

Please Note: Windows 2000 (and its service packs) and Windows 2003 RTM continue to function in ESX Server virtual machines.

Important Alert: If you are running ESX 3.0.1, you must install patch ESX-3199476 if you are using MSCS Windows 2003 SP1 or Windows 2003 R2. This patch can be downloaded from the link below.

http://www.VMware.com/support/vi3/doc/esx-3199476-patch.html