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## Obtaining LUN pathing information for ESX hosts

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## Purpose

This article explains using tools to determine LUN pathing information for ESX hosts.

## Resolution

There are two methods used to obtain the multipath information from the ESX host:

- Using the ESX command line. Use the command line to obtain the multipath information when performing troubleshooting procedures.
- Using VMware Infrastructure (VI) Client. Use VI Client option when you are performing system maintenance.

## Using the ESX command line to obtain multipathing information

## ESX 3.x

To obtain LUN multipathing information from the ESX host command line:

1. Log in to the ESX host console.
2. Type `esxcfg-mpath -l` and press Enter.

The output appears similar to the following:

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

```
Disk vmhba2:1:1 /dev/sde (61440MB) has 2 paths and policy of Most Recently Used
```

```
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:1 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:1 Standby
```

In this example, two LUNs are presented.

The following is an analysis of the first LUN:

- Canonical name

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

This is the canonical device name the ESX host used to refer to the LUN.

**Note :** When there are multiple paths to a LUN, the canonical name is the first path that was detected for this LUN.

`vmhba2:1:4` is one of the Host Bus Adapters (HBAs).

`vmhba2:1:4` is the second storage target (numbering starts at 0) that was detected by this HBA.

`vmhba2:1:4` is the number of the LUN on this storage target. For multipathing to work properly, each LUN must present the same LUN number to all ESX hosts.

**Note:** If the `vmhba` number for the HBA is a single digit number, it is a physical adapter. If the address is `vmhba40` or `vmhba32`, it is a software iSCSI device for ESX 3.0 and ESX 3.5 respectively.

- Linux device name

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

This is the associated Linux device handle for the LUN. You must use this reference when using utilities like `fdisk`.

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KB Article: **1003973**Updated: **Jun 3, 2010**

## Products:

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VMware ESXi  
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## Product Versions:

VMware ESX 3.0.x  
VMware ESX 3.5.x  
VMware ESX 4.0.x  
VMware ESXi 4.0.x  
Embedded  
VMware ESXi 4.0.x  
Installable  
VMware vCenter Server  
4.0.x

- LUN capacity

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

The disk capacity of the LUN. In the example, the LUN capacity is 30GB.

- Failover policy

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

This is the policy the ESX host uses when it determines which path to use in the event of a failover.

The choices are:

- **Most Recently Used:** The path used by a LUN is not be altered unless an event (user, ESX host, or array initiated) instructs the path to change. If the path changed because of a service interruption along the original path, the path does not fail-back when service is restored. This policy is used for Active/Passive arrays and many pseudo active/active arrays.
- **Fixed:** The path used by a LUN is always the one marked as preferred, unless that path is unavailable. As soon as the path becomes available again, the preferred becomes the active path again. This policy is used for Active/Active arrays. An Active/Passive array should never be set to Fixed unless specifically instructed to do so. This can lead to path thrashing, performance degradations and crashes.
- **Round Robin:** This is experimentally supported in ESX 3.x. It is fully supported in ESX 4.x

**Note:** See the additional information section for references to the arrays and the policy they are using.

- LUN disk type

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

There are three possible values for LUN disk type:

- **FC:** This LUN is presented through a fibre channel device.
- **iScsi:** This LUN is presented through an iSCSI device.
- **Local:** This LUN is a local disk.

- PCI slot identifier

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

PCI slot identifier indicates the physical bus location this HBA is plugged in to.

- HBA World Wide Port Numbers (WWPN)

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

These numbers are the hardware addresses (much like the MAC address on a network adapter) of the HBAs.

- Storage processor port World Wide Port Numbers (WWPN)

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

These numbers are the hardware addresses of the ports on the storage processors of the array.

- True path address

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

This is the true name for this path. In this example, there are two possible paths to the LUN (vmhba2:1:4 and vmhba2:3:4).

- Path status

```
Disk vmhba2:1:4 /dev/sdh (30720MB) has 2 paths and policy of Most Recently Used
FC 10:3.0 210000e08b89a99b<->5006016130221fdd vmhba2:1:4 On active preferred
FC 10:3.0 210000e08b89a99b<->5006016930221fdd vmhba2:3:4 Standby
```

Path status contains the status of the path.

There are six attributes that comprise the status:

- **On:** This path is active and able process I/O. When queried, it returns a status of READY.

- Off: The path has been disabled by the administrator.
- Dead: This path is no longer available for processing I/O. This can be caused by physical medium error, switch, or array misconfiguration.
- Standby: This path is inactive and cannot process I/O. When queried, it returns a status of NOT\_READY.
- Active: This path is processing I/O for the ESX Server host.
- Preferred: This is the path that is preferred to be active. This attribute is ignored when the policy is set to Most Recently Used (mru).

## Using VI Client to obtain multipathing information

To obtain multipathing information from VI Client:

1. Click on an ESX host.



2. Click the **Configuration** tab.



3. Click **Storage**.



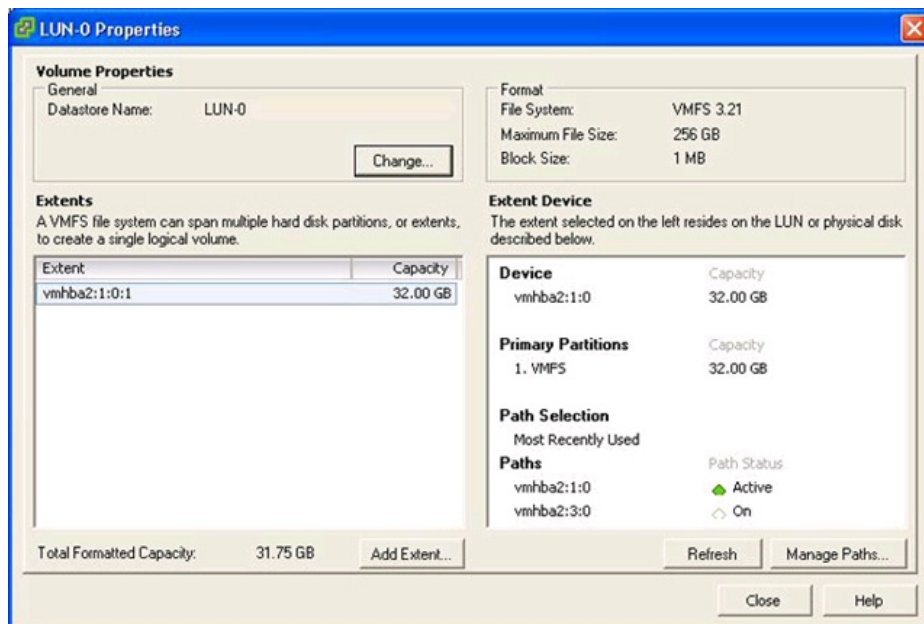
4. Click the VMFS-3 datastore you are interested in.

Identification	Device	Capacity	Free	Type
LUN-0	vmhba2:1:0:1	31.75 GB	1.29 GB	vmfs3
openfiler-nfs	10.21.48.10:/mnt...	73.12 GB	14.90 GB	NFS
openfiler-iscsi	vmhba1:1:0:1	39.25 GB	5.98 GB	vmfs3
LOCAL006	vmhba0:0:0:6	119.00 GB	16.08 GB	vmfs3
NetApp iSCSI - sh...	vmhba1:0:0:1	124.75 GB	31.54 GB	vmfs3
4794c6ab-5bca17...	vmhba0:0:0:10	2.75 GB	2.14 GB	vmfs3
LUN-1	vmhba2:1:1:1	59.75 GB	7.07 GB	vmfs3

5. Click **Properties**.

LUN-0		31.75 GB	Capacity
Location: /vmfs/volumes/4612b48e-b...		30.46 GB	Used
		1.29 GB	Free
<div> <div></div> </div>			
<b>Path Selection</b> Most Recently Used		<b>Properties</b> Volume Label: LUN-0 Datastore Name: LUN-0	
<b>Paths</b> Total: 2 Broken: 0 Disabled: 0		<b>Extents</b> vmhba2:1:0:1 32.00 GB Total Formatted Capacity 31.75 GB	
<b>Formatting</b> File System: VMFS 3.21 Block Size: 1 MB			

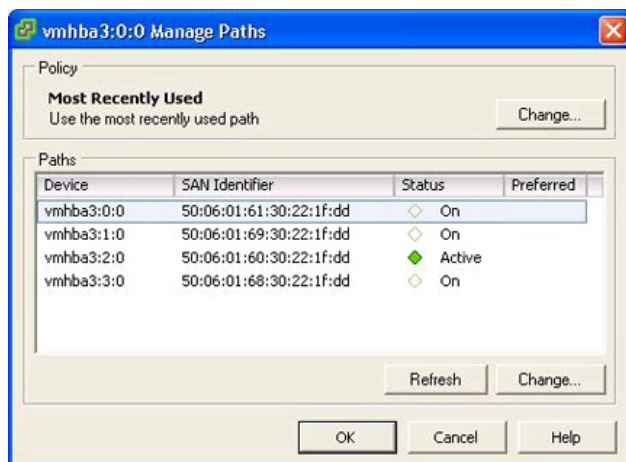
The following dialog appears:



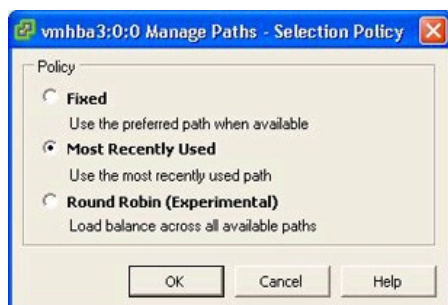
From this example, you can see that the canonical name is `vmhba2:1:0` and the true paths are `vmhba2:1:0` and `vmhba2:3:0`.

The active path is `vmhba2:1:0` and the policy is Most Recently Used.

- Click **Manage Paths**. The Manage Paths dialog appears:



- To change the policy, click **Change** in the Policy section. The Manage Paths - Selection Policy dialog appears.



- Click **OK** to return to the Manage Paths dialog.
- To enable or disable a path, select it and click **Change**.



As the policy for this LUN is Most Recently Used, the **Preferred** option is unavailable. If you disable the currently active path, it forces a path failover.

10. Click **OK** to return to the Manage Paths dialog.

## ESX 4.x

To obtain LUN multipathing information from the ESX host command line:

1. Log in to the ESX host console.
2. Type `esxcfg-mpath -l` and press Enter.

The output appears similar to:

```
Runtime Name: vmhbal:C0:T0:L0
Device: naa.6006016095101200d2ca9f57c8c2de11
Device Display Name: DGC Fibre Channel Disk (naa.6006016095101200d2ca9f57c8c2de11)
Adapter: vmhbal Channel: 0 Target: 0 LUN: 0
Adapter Identifier: fc.2000001b32865b73:2100001b32865b73
Target Identifier: fc.50060160b020f2d9:500601603020f2d9
Plugin: NMP
State: active
Transport: fc
Adapter Transport Details: WWNN: 20:00:00:1b:32:86:5b:73 WWPN: 21:00:00:1b:32:86:5b:73
Target Transport Details: WWNN: 50:06:01:60:b0:20:f2:d9 WWPN: 50:06:01:60:30:20:f2:d9
```

## Configuring multipath settings for your storage in vSphere Client

To configure multipath settings for your storage in vSphere Client:

1. Click **Storage**.
2. Select a datastore or mapped LUN.
3. Click **Properties**.
4. In the Properties dialog, select the desired extent, if necessary.
5. Click **Extent Device > Manage Paths** and configure the paths in the Manage Path dialog.

For information on multipathing options, see [Multipathing policies in ESX 4 \(1011340\)](#).

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### Additional Information

For more information, see the [documentation](#) for your version of ESX and consult the [Storage/SAN Compatibility Guide](#).

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### Update History

06/03/2010 - Added ESX/ESXi 4.x and provided the esxcfg-mpath details for ESX 4.x

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