



# **QLogic Fibre Channel Adapter System Center Operations Manager 2007 PRO- Enabled Management Pack**

## **ReadMe**

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# QLogic Fibre Channel Adapter System Center Operations Manager 2007 PRO-Enabled Management Pack

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Microsoft® System Center Operations Manager 2007 (Operations Manager) is a software solution to meet the need for end-to-end service monitoring in the enterprise IT environment. Operations Manager provides an easy-to-use monitoring environment that monitors thousands of servers, applications, and clients to provide a comprehensive view of the health of an organization's IT environment. This view of service health is key to a rapid, agile response to events that may impact the normal running of business and ultimately cost an enterprise money.

The QLogic® Fibre Channel Adapter PRO-Enabled Management Pack (Management Pack) works with System Center Operations Manager 2007. The Management Pack is designed to help you monitor the "health" of your QLogic and QLogic-branded Fibre Channel (FC) adapters. QLogic-branded adapters include those distributed under the names HP, Dell, IBM, and others. If your system is set up for e-mail, the Management Pack can also send alerts about the adapter status.

## Document Version

This document was written based on the 1.0.0.11 version of the Management Pack.

### Revision History

Release Date	Changes
September 2009	Original release of this document (revision A)
October 2009	Second release of this document (revision B)
January 2010	Third release of this document (revision C). Updated MP version number throughout, "What's New" section, "Inventory Display" section, and Port Level View screen shot.

## Introduction to the Management Pack

The Management Pack for QLogic Fibre Channel adapters will monitor hosts to help administrators keep their SAN operating in an optimal configuration.

The Management Pack supports the following:

- Management Pack enables you to view the hierarchical structure of the Fibre Channel storage area network (SAN) from System → Adapter → Port → Virtual Machine (VM).
- Recommendations are provided in the form of PRO Tip notifications in System Center Virtual Machine Manager (VMM).

## Getting the Latest Management Pack and Documentation

You can find the Management Pack in the [System Center Operations Manager 2007 Catalog](http://go.microsoft.com/fwlink/?LinkId=82105) (<http://go.microsoft.com/fwlink/?LinkId=82105>).

## What's New

The following features are new in this release of the Management Pack:

- Deprecated the following properties in inventory displays for the HBA Port object: InputRequest, OutputRequests, ControlRequests, InputMegabytes, OutputMegabytes.

## Supported Configurations

The Management Pack supports only the following configurations:

- Windows Server 2008 Hyper-V™ enabled systems
- Clustered support:
  - When using physical ports, LUN mask all physical ports to the LUN.
  - When using virtual ports, LUN mask only the virtual port.

### Recommended Configuration:

- System Center Operations Manager 2007
- System Center Virtual Machine Manager 2008
- SQL Server® 2005 Standard or later

## Getting Started

This section describes the actions you should take before you import the Management Pack, any steps you should take after you import the Management Pack, and information about customizations.

## Before You Import the Management Pack

Before you import the Management Pack into Operations Manager 2007, note the following Management Pack limitations:

- Does not support Microsoft Operations Manager (MOM) 2005.

- Supports only agent-managed hosts.
- Supports Hyper-V only systems organized into similar OS host groups within VMM.
- Requires the proper VMM and Operations Manager integration.
- Supports only SAN-based migration when performing a VMM migration.

For a list of required software, see the “Other Requirements” section.

## Files in This Management Pack

To monitor the Management Pack, you must first download the QLogic Fibre Channel Adapter System Center Operations Manager 2007 Management Pack from the [Management Pack Catalog](http://go.microsoft.com/fwlink/?LinkId=82105), located at <http://go.microsoft.com/fwlink/?LinkId=82105>. The Management Pack includes the following files:

- `QLogic.Config.FC.PRO.xml`
- `QLogic.FC.PRO.mp`
- `README.doc`
- `ReleaseNotes.doc`

## Other Requirements

Each Windows-based host must have the following components installed:

- QLogic Fibre Channel Adapter driver 9.1.8.17 or later
- QLogic SANsurfer 5.0.1b55 or later
- Microsoft Windows PowerShell 1.0 or later (PowerShell execution policy must be set to RemoteSigned)
- Windows Management Instrumentation (WMI) (must be running and accessible to the local system)

## How to Import the Management Pack

For instructions about importing a management pack, see [How to Import a Management Pack in Operations Manager 2007](http://go.microsoft.com/fwlink/?LinkId=142351) (<http://go.microsoft.com/fwlink/?LinkId=142351>).

## Requirements and Installation

This section provides the system requirements needed for the Management Pack, and procedures for installing and uninstalling this plug-in.

### System Requirements

This section lists the hardware and software needed on your system before you can install the Management Pack.

## Hardware

### Adapters

Your system setup must include one of the following QLogic or QLogic-branded adapters that support N\_Port ID virtualization (NPIV):

- 4Gb Fibre Channel adapters (QLE246x, QLA246x)
- 8Gb Fibre Channel adapters (QLE256x)

### Platforms

The Management Pack runs on the following hardware platforms:

- x86
- x64
- IA64

## Software

No additional Microsoft software is required.

### QLogic Windows Drivers and OS Versions

STOR Miniport driver version 9.1.8.17 or later for the following:

- Windows® Server 2003 SP2
- Windows Server 2003 R2 SP2
- Windows Server 2008

## Optional Configuration

The QLogic Configuration Management Pack (`QLogic.Config.FC.PRO`) allows you to configure all of the user-defined parameters for discovery and monitors contained within the `QLogic.FC.MP`. Because all monitors are disabled by default, the system administrator must enable the monitors to check MP objects for health status.

## Security Considerations

You may need to customize your management pack. Certain accounts cannot be run in a low-privilege environment or must have minimum permissions.

## Run As Profiles

In Run As Profiles, note the following security considerations:

- The **Default Action Account** must have enough privileges to access WMI.
- The **Privileged Monitoring Account** must be able to locally and remotely execute PowerShell scripts, and has sufficient privileges to trigger a Virtual Machine migration in either PowerShell or Virtual Machine Manager.
- The **Execution Policy** is set to remote signed.



# Understanding Management Pack Operations

This section provides a brief overview of the highlights of the management pack monitoring capabilities.

## Objects the Management Pack Discovers

The Management Pack discovers the object types described in the following table. Not all of the objects are automatically discovered. Use overrides to discover those that are not discovered automatically. For information about discovering objects, see the "[Object Discoveries in Operations Manager 2007](http://go.microsoft.com/fwlink/?LinkId=108505)" topic in Operations Manager 2007 Help (<http://go.microsoft.com/fwlink/?LinkId=108505>).

The Management Pack discovers the following objects:

- **QLogic.FC.PRO.Adapter**: Representation of a physical board/adapter.
- **QLogic.FC.PRO.Port**: Representation of a Fibre Channel port (physical or virtual).
- **QLogic.FC.PRO.VM**: Representation of a virtual machine.

## Discovery Interval and Timeout

### Discovery Interval

Discover QLogic Fibre Channel Adapters on managed hosts. The discovery creates associations between physical boards/adapters to Fibre Channel adapter ports to targets and LUNs owned on those Fibre Channel adapter ports.

### Timeout

Timeout is the execution time for the discovery. When the specified time is exceeded, the discovery is aborted.

## Inventory Display

The inventory displays the following properties for the **QLogic.FC.PRO.Adapter**:

- SerialNumber
- Manufacturer
- Model

The inventory displays the following properties for the **QLogic.FC.PRO.Port**:

- InstanceName
- PortWWN (world wide name)
- NodeWWN
- DriverName
- DriverVersion
- FirmwareVersion
- OptionROMVersion
- SerialNumber

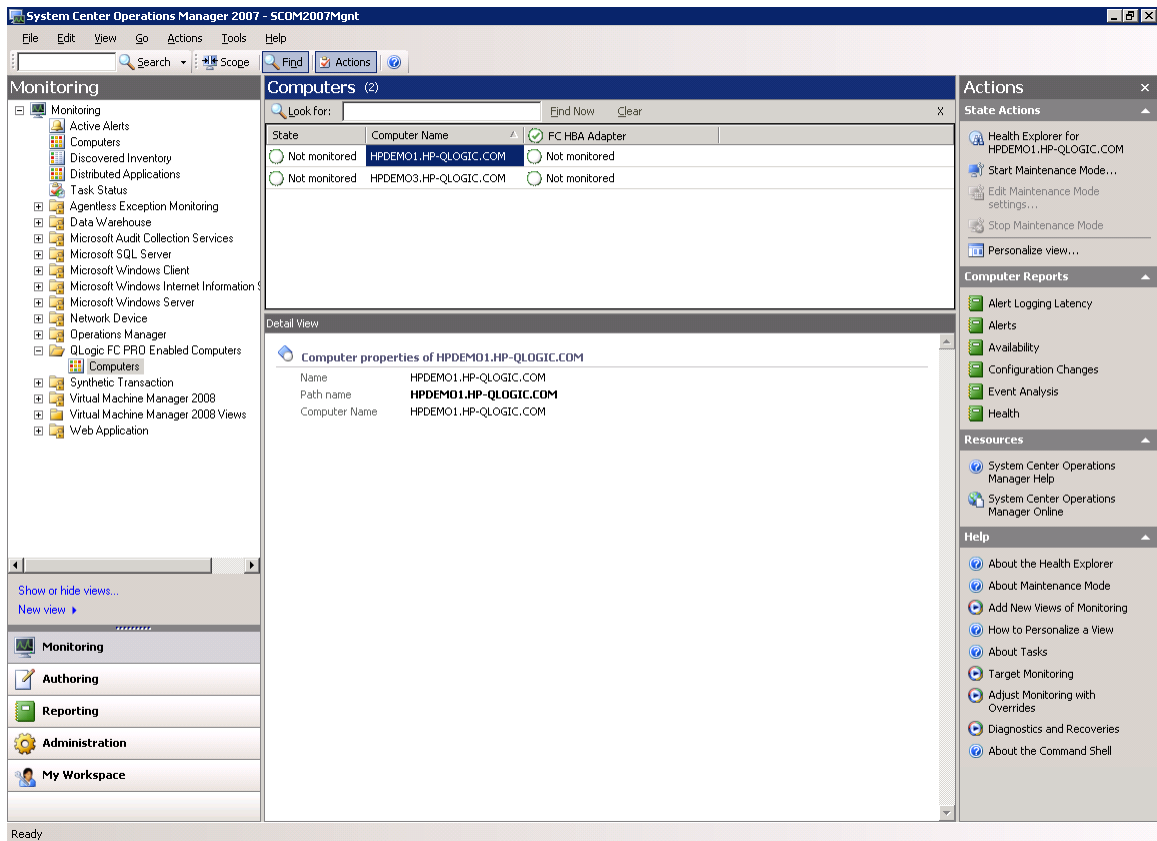
- PortType
- PortState
- PortSupportedSpeed
- PortSpeed
- PhysicalPort

The inventory displays the following properties for the **QLogic.FC.PRO.VM**:

- InstanceName
- VMName
- BaseboardSerial
- BIOSerial
- SystemName
- PortWWN

## Viewing the Management Pack Levels

The following screen shots show examples of the various Management Pack views.



## System Level View

The screenshot shows the 'State' console window. At the top, there is a menu bar with 'File', 'Edit', 'View', 'Actions', and 'Help'. Below the menu bar, the main area is titled 'State (1)' and contains a table with the following data:

Name	State	Serial Number	FC HBA Port
QLE2562	Not monitored	AFC0746P02842	Not monitored

Below the table is a 'Detail View' section titled 'FC HBA Adapter properties of QLE2562'. It lists the following properties:

- Name: QLE2562
- Path name: QLE2562
- Manufacturer: QLogic Corporation
- Model: QLE2562
- Serial Number: AFC0746P02842
- Computer Name: HPDEMO1.HP-QLOGIC.COM

On the right side of the console, there is a sidebar with several sections:

- Actions:** Health Explorer for QLE2562, Start Maintenance Mode..., Edit Maintenance Mode settings..., Stop Maintenance Mode, Personalize view...
- FC HBA Adapter Reports:** Alert Logging Latency, Alerts, Availability, Configuration Changes, Event Analysis, Health
- Resources:** System Center Operations Manager Help, System Center Operations Manager Online
- Help:** About the Health Explorer, About Maintenance Mode, Add New Views of Monitoring, How to Personalize a View, About Tasks, Target Monitoring, Adjust Monitoring with Overrides, Diagnostics and Recoveries, About the Command Shell

The status bar at the bottom left of the window shows 'Ready'.

## Adapter Level View

State

File Edit View Actions Help

State (2)

Name	Serial Number	State	Virtual Machines
21:00:00:1B:32:16:7A:EE	AFC0746P02842	<input checked="" type="radio"/> Not monitored	<input checked="" type="checkbox"/> Not monitored...
21:01:00:1B:32:16:7A:EE	AFC0746P02842	<input type="radio"/> Not monitored	

Detail View

FC HBA Port properties of 21:00:00:1B:32:16:7A:EE

Name	21:00:00:1B:32:16:7A:EE
Path name	<b>21:00:00:1B:32:16:7A:EE</b>
Instance Name	PCI\VEN_1077&DEV_2532&SUBSYS_015D1077&REV_02\6&4F7089B&0800080010_0
Port WWN	21:00:00:1B:32:16:7A:EE
Node WWN	20:00:00:1B:32:16:7A:EE
Driver	ql2300.sys
Driver Version	9.1.8.15 Alpha 33
Firmware Version	150.06.01
Option ROM Version	2.00
Serial Number	AFC0746P02842
Port Type	N-Port
Port State	Online
Port Support Speed	2, 4, 8 Gbps
Port Speed	8 Gbps
Physical Port	Yes
Computer Name	HPDEMO1.HP-QLOGIC.COM

Ready

Actions

State Actions

- Health Explorer for 21:00:00:1B:32:16:7A:EE
- Start Maintenance Mode...
- Edit Maintenance Mode settings...
- Stop Maintenance Mode
- Personalize view...

FC HBA Port Reports

- Alert Logging Latency
- Alerts
- Availability
- Configuration Changes
- Event Analysis
- Health

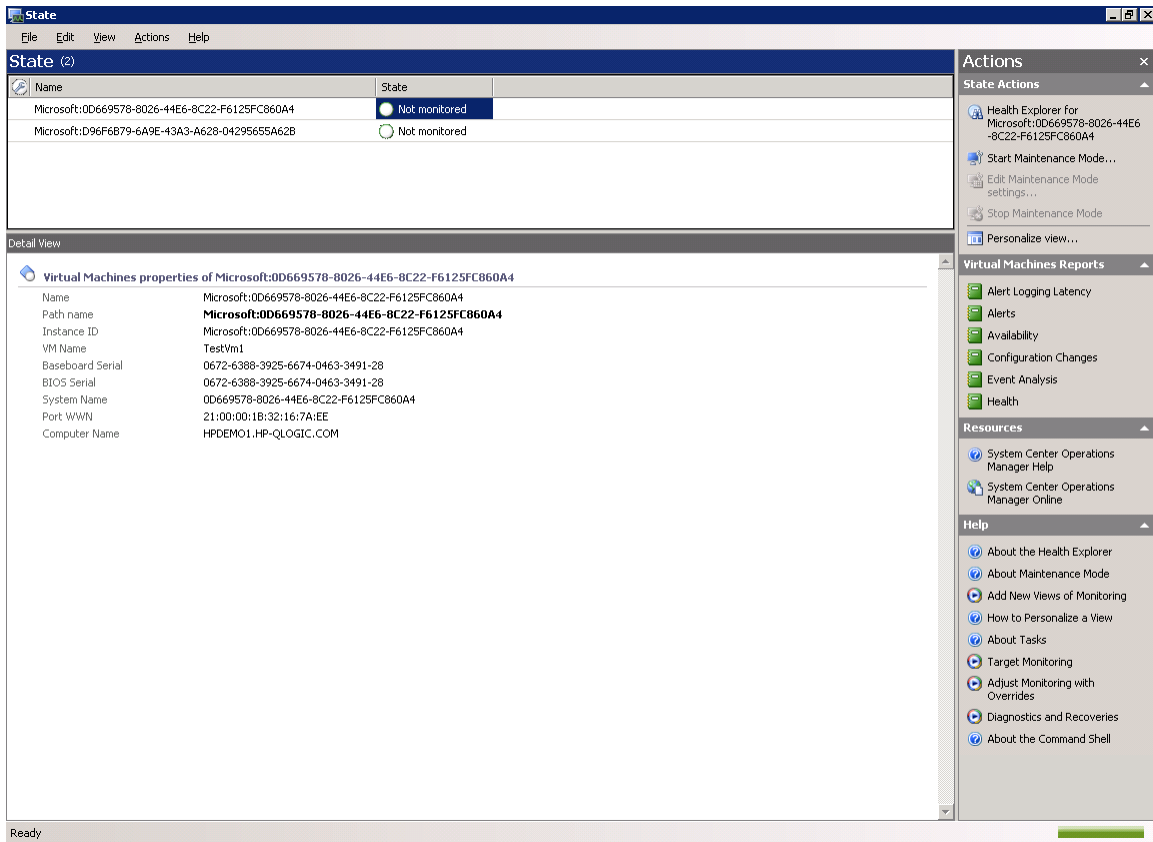
Resources

- System Center Operations Manager Help
- System Center Operations Manager Online

Help

- About the Health Explorer
- About Maintenance Mode
- Add New Views of Monitoring
- How to Personalize a View
- About Tasks
- Target Monitoring
- Adjust Monitoring with Overrides
- Diagnostics and Recoveries
- About the Command Shell

## Port Level View

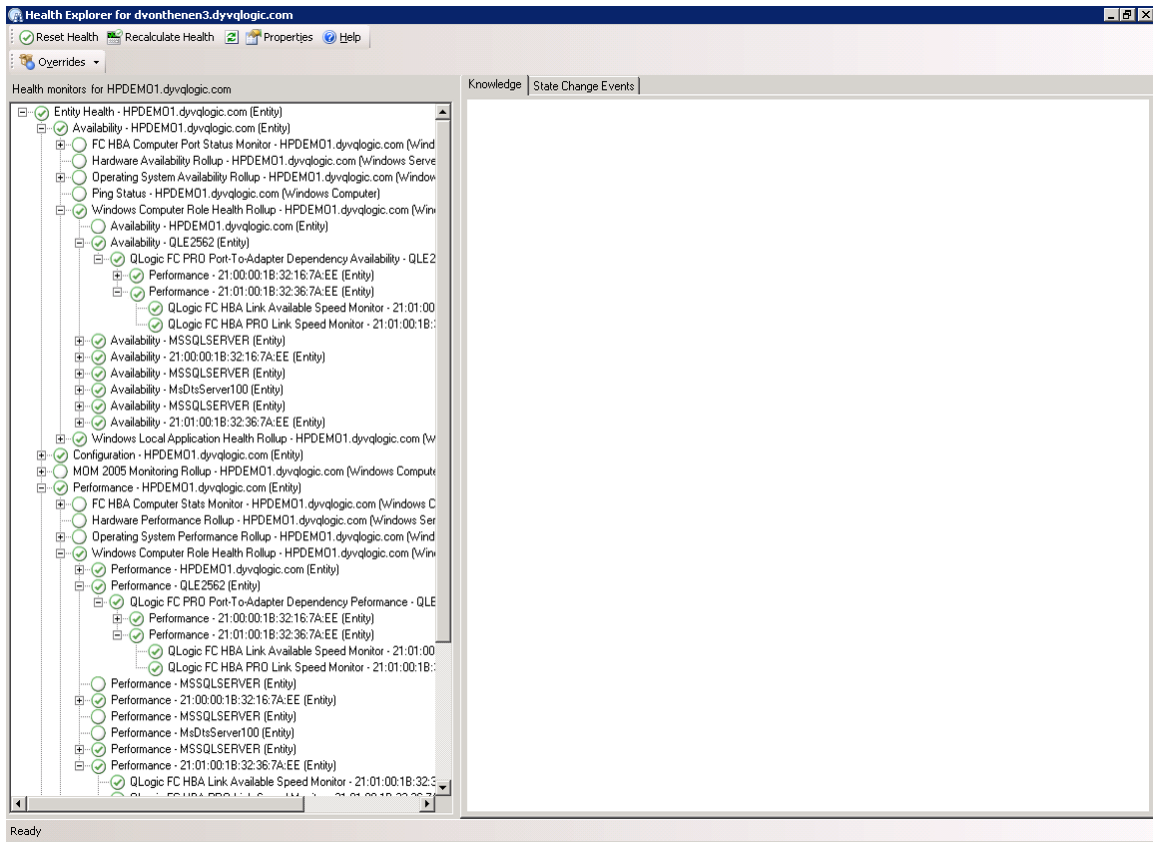


## Virtual Machine Level View

# How Health Rolls Up

Health states of components roll up in this Management Pack as follows:

VM → Port → Adapter → System



## Tree View of System Monitors (How Health Rolls Up)

## Key Monitoring Scenarios

The Management Pack includes a number of key monitoring scenarios that are configurable. Monitors are packaged as a pair of items, in which each pair consists of one *monitor* (to check health) and one *rule* (to perform PRO Tip recovery).

The Management Pack monitor pairs include the following:

- Port Statistics monitor pair
- Link Status monitor pair
- Link Speed monitor pair
- Link Available Speed monitor pair

The following sections provide the details of each monitor pair.

### Port Statistics Monitor Pair

The **QLogic FC HBA PRO Port Stats Monitor (QLogic.Config.FC.PRO.PortStatsMonitor)** monitors the Rx/Tx in either data rate or IOPS for a specified Fibre Channel adapter port. The

port is placed in the Critical state when either the Rx or Tx exceeds the configured threshold.

Configurable parameters for this monitor include the following:

- Detection Method—Default value is 1 (monitor based on IOPS). 0 is to monitor based on Data Rate.
- Threshold Rx/Tx Values—Default is 0.80 (80% of link capacity)
- Monitor Interval—Default is 120 seconds
- Monitor Timeout—300 seconds
- Minimum VMs For Migration—2 (QLogic recommends that you do not change this value)

#### The **Threshold Event Log Rule for Recovery**

**(QLogic.Config.FC.PRO.ThresholdEventLogRule)** reacts to a specified threshold monitor event. This rule initiates the Virtual Machine analysis, and, if needed, performs a Virtual Machine migration.

Configurable parameters for Virtual Machine migration are:

- CPUPriority—Value from 1 to 10 on the importance of this performance counter (Default: 5)
- MemoryPriority—Value from 1 to 10 on the importance of this performance counter (Default: 5)
- NetworkPriority—Value from 1 to 10 on the importance of this performance counter (Default: 5)
- DiskPriority—Value from 1 to 10 on the importance of this performance counter (Default: 10)
- All Host VMs Eligible for Migration—1 is enabled, which corresponds to a multi-port adapter in a load-balanced or single-port configuration; 0 is disabled, which corresponds to a multi-port adapter in a failover configuration (Default: 1 or Enabled).
- Allow LAN Migrations—1 is enabled; 0 is disabled. QLogic highly recommends that you set this option to the disabled state (Default: 0 or Disabled).

The following screen shots show an alert followed by a VM Migration.

PRO Tips (1)

Source	Tip	State
hpdemo1.HP-QLOGIC.COM	QLogic FC HBA Threshold Monitor	Active

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hpdemo1.HP-QLOGIC.COM

**QLogic FC HBA Threshold Monitor**

The bandwidth threshold for QLogic HBA Ports has been reached. A virtual machine migration will be initiated if a suitable Virtual Machine has been elected.

**Host Summary**

Name: [hpdemo1.HP-QLOGIC.COM](#)

Host group: All Hosts

CPU:  5 %

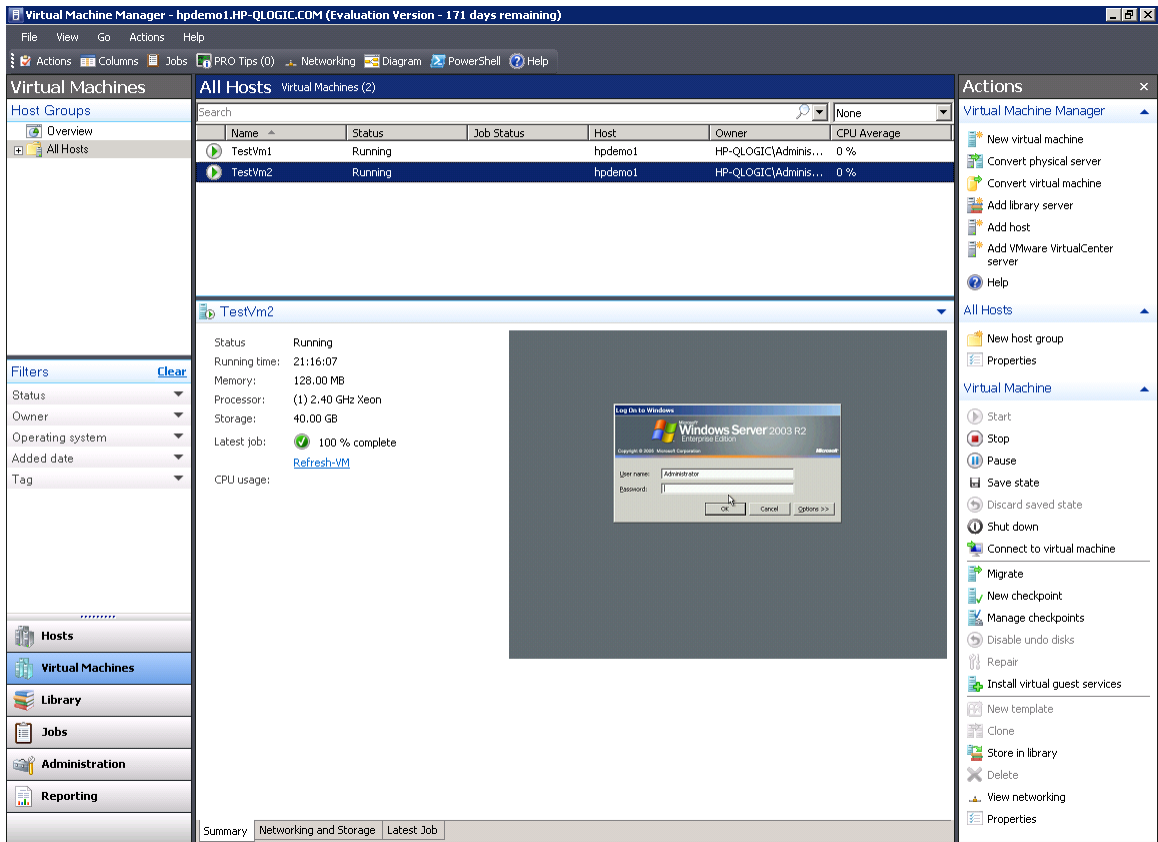
Memory:  69 %

Storage:  18 %

Show this window when new PRO Tips are created

PRO Tip Alert





Before Migration

**Jobs**

Name	Status	Start Time	Result Name	Owner
Move virtual machine from hpdemo1.HP-QLOGIC.COM to hpdemo3.hp-qlogic.com ...	53 %	4/10/2009 11:26:40 AM	TestVm2	HP-QLOGIC\Administra...

**Move virtual machine from hpdemo1.HP-QLOGIC.COM to hpdemo3.hp-qlogic.com using SAN**

Status: Running  
 Command: Move-VM  
 Result name: TestVm2  
 Started: 4/10/2009 11:26:40 AM  
 Duration: 00:00:13  
 Owner: HP-QLOGIC\Administrator  
 Progress: 53 %  
 Current step: Deploy file (using SAN transfer)

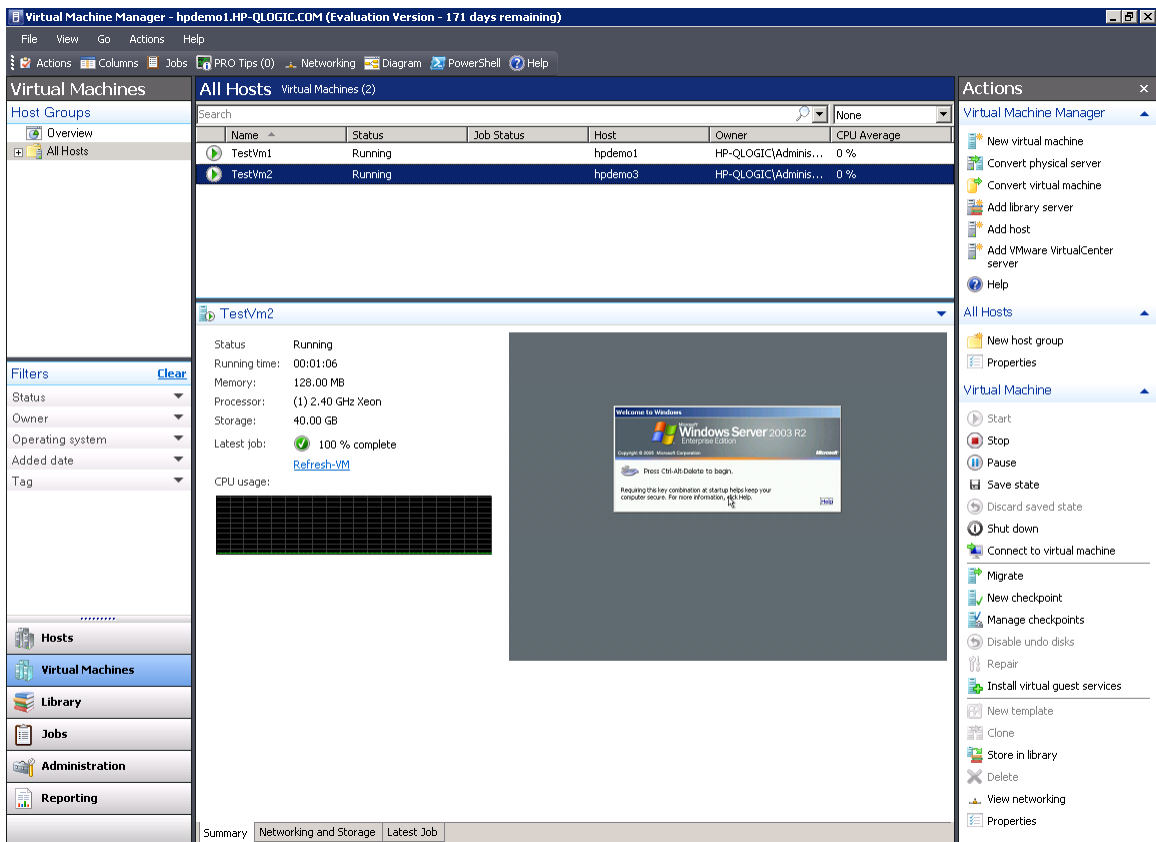
Step	Name	Status	Start Time	End Time
1	Move virtual machine from h...	53 %	4/10/2009 11:26:40 AM	
1.1	Run pre checks for transfer	100 %	4/10/2009 11:26:40 AM	4/10/2009 11:26:43 AM
1.2	Change virtual machine status	100 %	4/10/2009 11:26:44 AM	4/10/2009 11:26:44 AM
1.3	Export Hyper-V virtual machine	100 %	4/10/2009 11:26:44 AM	4/10/2009 11:26:45 AM
1.4	Deploy file (using LAN)	100 %	4/10/2009 11:26:45 AM	4/10/2009 11:26:51 AM
1.5	Deploy file (using SAN transfer)	25 %	4/10/2009 11:26:51 AM	
1.6	Import Hyper-V virtual machine	0 %		
1.6.1	Refresh virtual machine	0 %		
1.7	Remove virtual machine	0 %		
1.8	Change properties of networ...	0 %		

Summary | Details | Change Tracking

Show this window when new objects are created

Restart Job | Cancel Job

During Migration



After Migration

## Link Status Monitor Pair

### QLogic FC HBA PRO Link Status Monitor (QLogic.Config.FC.PRO.LinkStatusMonitor)

monitors the link status for a specified adapter port. The port is placed in the Critical state when the Fibre Channel link is in a state other than *Online*.

The configurable parameters for this monitor are: Monitor Interval and Timeout.

Common issues leading to Fibre Channel link being placed into a critical state are:

- One end of the Fibre Channel cabling is disconnected.
- Fibre Channel cable is physically damaged.
- One of the two ends on the Fibre Channel link is having issues (that is, the switch port has failed).
- Fibre Channel port is placed into a diagnostic mode.

Typical resolutions include the following:

- Make sure both ends of the Fibre Channel link are in an operational state.
- Replace the Fibre Channel cablings.

- Ensure optics are working correctly.

**QLogic FC HBA PRO Link Status Log Event (QLogic.Config.FC.PRO.StatusEventLogRule)** reacts to a specific link status event. No configuration is required.

## Link Speed Monitor Pair

**QLogic FC HBA PRO Link Speed Monitor (QLogic.Config.FC.PRO.LinkSpeedMonitor)** monitors the current adapter link speed. The port is placed in the Warning state when the Fibre Channel link auto-negotiates to a speed other than the maximum capable speed of the adapter port.

The configurable parameters for this monitor are: Monitor Interval and Timeout.

Common issues leading to Fibre Channel link being placed into a Warning state are:

- Fibre Channel switch that the port is connected is only capable at operating at that speed.
- Incorrect optics are used on either end of the link.
- Either end of the link was manually placed at a lower link speed.
- Auto-negotiating failed to link at the highest possible speed.

Typical resolutions include the following:

- Connect the Fibre Channel port only to a switch capable of equivalent speed.
- Ensure that the correct optics are being used.
- Ensure that all settings on both ends of the link are correct.
- Disconnect and then reconnect either end of the cable to attempt to renegotiate the link speed.

**Speed Event Log Rule for Recovery (QLogic.Config.FC.PRO.SpeedEventLogRule)** reacts to a specific link speed monitor event. No configuration is required.

## Link Available Speed Monitor Pair

**QLogic FC HBA PRO Link Available Speed Monitor (QLogic.Config.FC.PRO.LinkAvailableMonitor)** monitors the available adapter port speed. The port is placed in the Warning state when the Fibre Channel link does not support the maximum capable speed provided by the vendor.

The configurable parameters for this monitor are: Monitor Interval and Timeout.

This monitor triggers a warning recommending that you upgrade the adapter because a higher speed or performance adapter is available. To resolve the warning, either replace the adapter or dismiss the PRO Tip.

**Available Event Log Rule for Recovery (QLogic.Config.FC.PRO.AvailableEventLogRule)** reacts to a specified availability monitor event. No configuration is required.