



# Emulex PRO Pack

*Version 1*

*User Manual*

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## Introduction

The Emulex PRO Pack, the PRO-enabled management pack, provides support for Emulex adapters by interfacing with Microsoft's SCOM (System Center Operations Manager) 2007 and SCVMM (System Center Virtual Machine Manager) 2008 in virtualized environments.

PRO (Performance Resource Optimization) is a Microsoft feature that enables dynamic management for virtualized infrastructures. PRO Pack enables you to extend the management capabilities of the SCOM management packs.

The PRO Pack enabled MP (Management Pack) monitors resource thresholds of Emulex adapters in virtualized environments. If the adapter resource thresholds have been exceeded, monitors defined in the MP signal an alert that is generated in SCOM 2007. If the PRO Tips feature is enabled from within SCVMM, SCVMM imports the alert as a PRO tip and recommends fixes.

The MP uses Microsoft's HBAAPI interface in WMI (Windows Management Instrumentation) to retrieve monitoring data. The HBAAPI interface is included with Windows 2008. The MP includes the following monitors: High I/O Bandwidth (TX) and High I/O Bandwidth (RX).

All the monitors in the MP target the Microsoft Windows Hyper V Server.

## Prerequisites

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### Microsoft Software Requirements

- Windows 2008 server:
  - Hyper-V Role installed
  - Multi-Path Input/Output (MPIO) feature installed
  - Microsoft VDS provider installed
  - HBAAPI WMI provider installed (This is installed by default.)
- System Center Virtual Machine Manager 2008 Management Pack for System Center Operations Manager 2007, version 2.0.3451.0 or greater. Specifically, this includes:
  - Microsoft.SystemCenter.VirtualMachineManager.2008 – version 2.0.3451.0 or greater
  - Microsoft.SystemCenter.VirtualMachineManager.Pro.2008.Library - version 2.0.3451.0 or greater
- System Center Operations Manager 2007:
  - Integration between SCVMM 2008 and SCOM 2007 configured properly. Specifically, the SCVMM PRO libraries and/or management packs must be properly imported into SCOM.
- System Center Virtual Machine Manager 2008:
  - PowerShell (1.0 or later) feature installed (This is installed by default.)
    - Microsoft.SystemCenter. VirtualMachineManager PowerShell Cmdlet installed (This is installed by default.)
- A supported version of SQL Server (See Microsoft's SCVMM requirements.)

## Emulex Requirements

- Hardware
  - Any Emulex 4Gb/s adapters with firmware level 2.70a5 or later; or Emulex 8Gb/s adapters with firmware 1.00a9 or later. These adapters support NPIV.
- Software
  - Storport Miniport drivers version 2.10 and higher

## Known Behavior

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If the VMM managed host has a single VM on an HBA port that is utilizing bandwidth outside the accepted range, the PRO Tip will not migrate the VM to prevent possible migration cycles between hosts. In this case, you are instructed to inspect and remediate the VM manually.

## Known Issues

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- If the Emulex Management Pack has been imported and there are VMM managed hosts present, the monitors:
  - a) May consume resources even when there are no adapters present.
  - b) Show a healthy adapter status even when there are no adapters present.
- If the Emulex Management Pack has been imported and there are non-Windows VMM managed hosts present, the script may fail to run on the non-Windows VMM managed host.

# Installing PRO Pack

To install PRO Pack:

1. Ensure the "Prerequisites" on page 1 and 2 are met.
2. Download the "EmulexProMP.zip" zip file from the Emulex Web site. The zip file contains the Emulex.Pro.mp files.
3. Unzip the file to a temporary location. For example, unzip the file to c:\temp\EmulexProMP\ .
4. Open the Microsoft System Center Operations Manager.

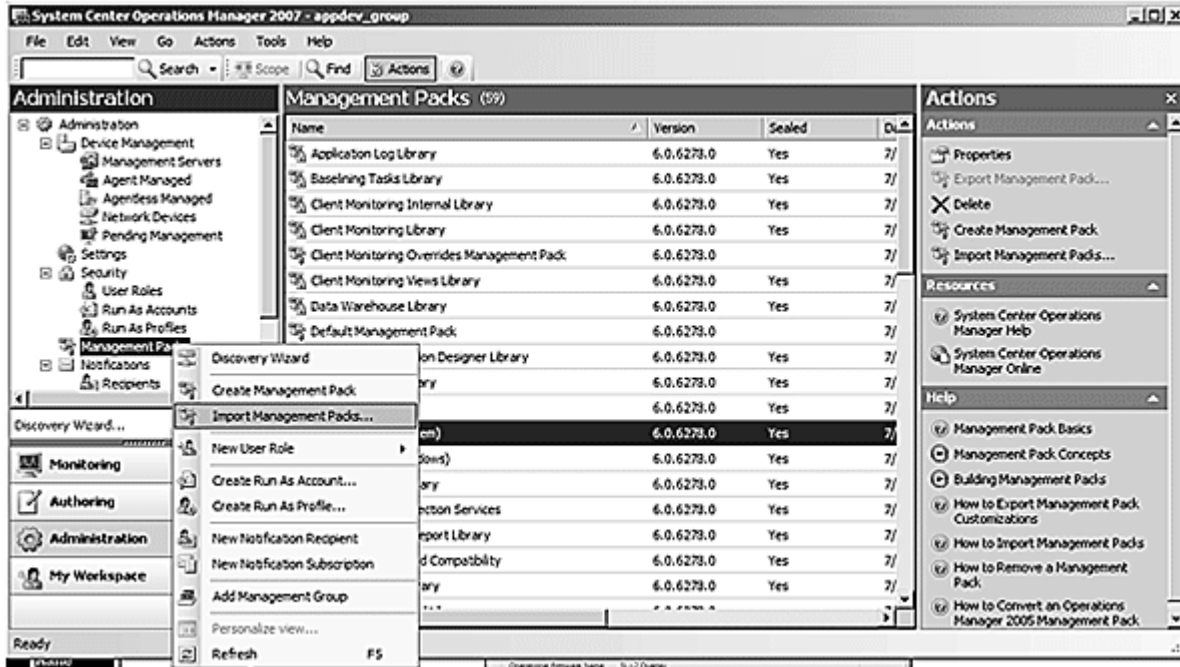


Figure 1: Importing the MP using Microsoft System Center Operations Manager

5. From the Administration tab, right-click **Management Packs** and select **Import Management Packs**. The Import Management dialog box appears.
6. Select the **Emulex.Pro.mp** file and click **Import**. A warning dialog box appears notifying you of the security risks associated with this management pack running rules directly on the management server.
7. Click **OK**.

## Uninstalling PRO Pack

To uninstall PRO Pack:

1. Open the Microsoft System Center Operations Manager.
2. From the Administration tab, select **Management Packs**.



Figure 2: Deleting the MP using Microsoft System Center Operations Manager

3. From the Management Packs pane, right-click **Emulex PRO Management Pack** and select **Delete**.

## Unit Monitoring

The Emulex PRO Pack provides two types of unit monitoring: High I/O Bandwidth (TX) and High I/O Bandwidth (RX).

### Unit Monitor 1. High I/O Bandwidth (TX)

Unit Monitor 1 monitors the Output/TX lines on the adapter's physical port for high bandwidth utilization. This monitor is targeted at Windows 2008 Hyper-V servers that are hosting at least one VM (Virtual Machine). Each VM must be located on a LUN that is accessed through a Virtual Port using NPIV technology. The monitor determines the bandwidth utilized by measuring the number of bytes (both data and non-data) being sent by the port over a period of time. The monitor then calculates the percentage of the bandwidth utilized relative to the overall bandwidth available on the port.

The monitor compares the bandwidth utilization percentage to a maximum threshold value. This threshold value is set to a default value of 80 percent, but that is configurable. (See "Creating Overrides" on page 6 for more information.) If the bandwidth percentage is equal or greater than the threshold value, the monitor will signal for a PRO tip alert in SCVMM indicating this condition.

If an alert is triggered, SCVMM enables you to migrate a VM to reduce I/O traffic load. The remediation task is in the form of a PRO Tip. The PRO Tip implementation will:

1. Determine the VM with the highest Output/TX utilization.
2. Determine a host for the placement of the VM. The host which has the highest placement rating based on the DiskPriority weight will be selected as the target for VM migration.
3. Migrate the VM to the host. The VM will be placed in the Virtual Machine placement default path on the host.

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**Note:** See “Troubleshooting” on page 7 for cases where the VM migration will fail.

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## **Unit Monitor 2. High I/O Bandwidth (RX)**

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Unit Monitor 2 monitors the Input/RX lines on the adapter's physical port for high bandwidth utilization. This monitor is targeted at Windows 2008 Hyper-V servers that are hosting at least one VM. Each VM must be located on a LUN that is accessed through a Virtual Port using NPIV technology. The monitor determines the bandwidth utilized by measuring the number of bytes (both data and non-data) being received by the port over a period of time. The monitor then calculates the percentage of the bandwidth utilized relative to the overall bandwidth available on the port.

The monitor compares the bandwidth utilization percentage to a maximum threshold value. This threshold value is set to a default value of 80 percent, but that is configurable. (See “Creating Overrides” on page 6 for more information.) If the bandwidth percentage is equal or greater than the threshold value, the monitor will signal for a PRO tip alert in SCVMM indicating this condition.

If an alert is triggered, SCVMM enables you to migrate a VM to reduce I/O traffic load. The remediation task is in the form of a PRO Tip. The PRO Tip implementation will:

1. Determine the VM with the highest Input/RX utilization.
2. Determine a host for the placement of the VM. The host which has the highest placement rating based on the DiskPriority weight will be selected as the target for VM migration.
3. Migrate the VM to the host. The VM will be placed in the Virtual Machine placement default path on the host.

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**Note:** See “Troubleshooting” on page 7 for cases where the VM migration will fail.

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## Creating Overrides

By creating overrides you can set the following three parameters to custom values:

- Threshold
- IntervalSeconds
- MaxNumPorts

To create an override:

1. Select the **Overrides** tab.

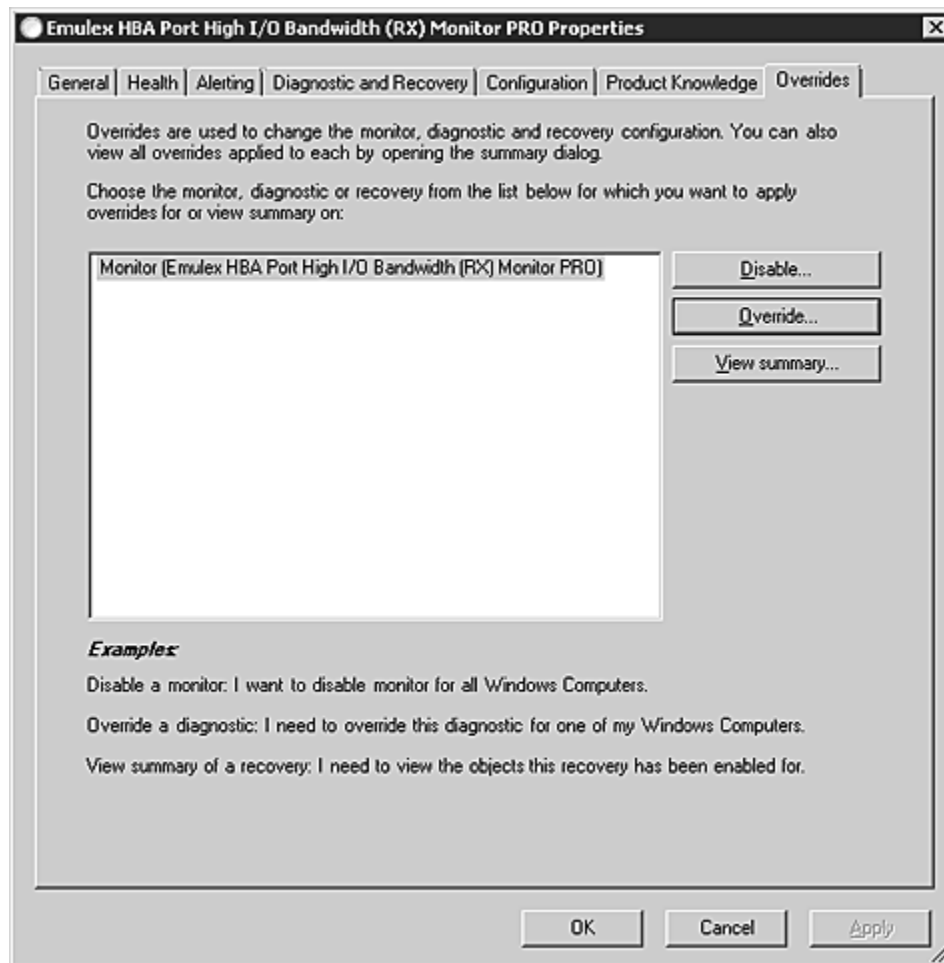


Figure 3: The Overrides tab

2. Select the scope of the override, which should be the monitor target.
3. Check the desired configuration parameters and change the values accordingly.
4. Choose **Enforce** to enforce the override.

## Troubleshooting

The following scenarios will cause a VM to fail to migrate to a host:

- The source and target hosts have incompatible processors.
- The source and target hosts have incompatible versions of the virtualization software (such as Hyper-V, SCVMM 2008, etc.)
- The VM configuration files and the virtual hard disk (.vhd) file are not located on the same VPort mounted LUN.

If the monitors are not running on the VMM managed host system, verify the following:

1. Emulex Storport Miniport drivers, version 2.10 or higher are properly installed on the VMM managed host system.
2. If HBAnyware is installed on the VMM managed host system, verify that HBAnyware displays the adapter ports, targets and LUNs correctly.
3. PRO (Performance and Resource Optimization) is properly configured on the management server by checking that:
  - System Center Virtual Machine Manager 2008 Management Pack version 3451 or greater was imported into System Center Operations Manager 2007.
  - System Center Operations Manager 2007 root management server was specified in Virtual Machine Manager 2008.
  - Enable PRO checkbox is checked in the Host Group properties tab, Host Clusters properties tab or General Node in Virtual Machine Manager 2008.
4. Emulex PRO Pack was properly imported into System Center Operations Manager 2007.
5. NPIV LUNs exist on the VMM managed host system.
6. VMs are on the NPIV LUNs.
7. VMs are in a "running" state.

### To check processor compatibility:

1. Select a VM in SCVMM.
2. Click **Migrate**. The Select Host (first) page of the Migrate Virtual Machine Wizard appears.
3. On the Select Host page, click the **Rating Explanation** tab. If the VM cannot be migrated due to incompatible processors, an error message similar to the following is displayed:

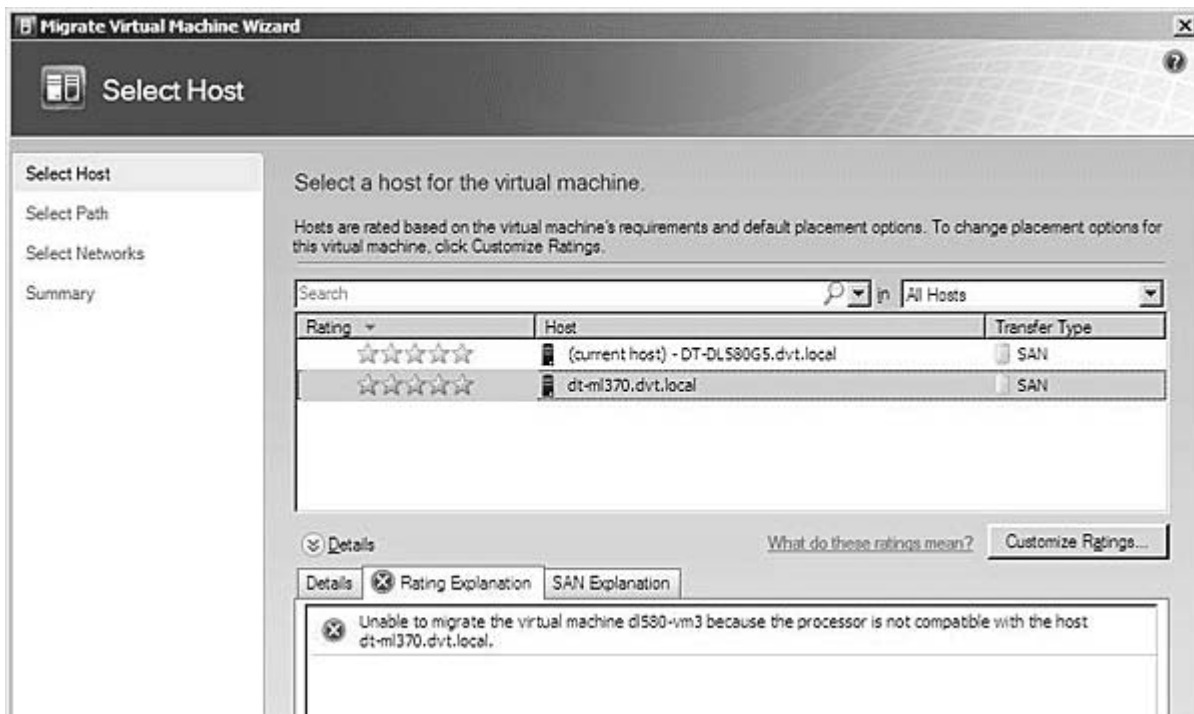


Figure 4: Incompatible processor error message

#### To check virtualization software compatibility:

1. Select a VM in SCVMM.
2. Click **Migrate**. The Select Host (first) page of the Migrate Virtual Machine Wizard appears.
3. On the Select Host page, click the **Rating Explanation** tab. If the VM cannot be migrated due to incompatible software, an error message similar to the following is displayed:

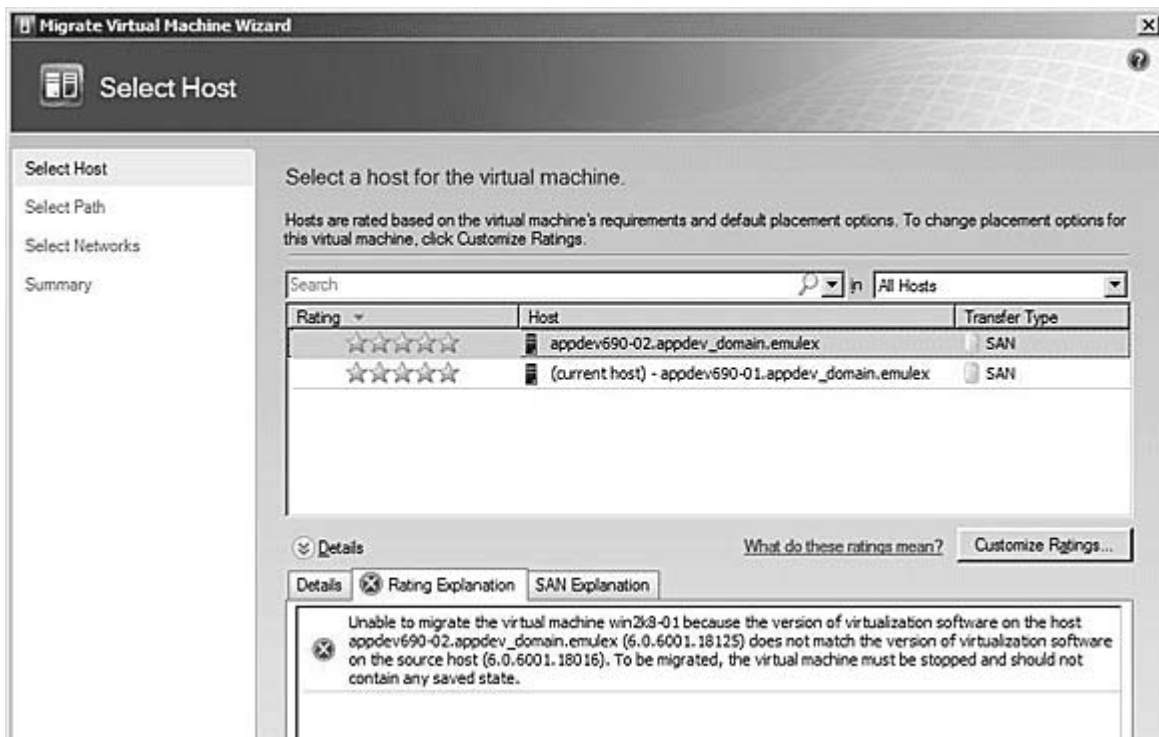


Figure 5: Incompatible software error message

**The VM configuration files and the virtual hard disk (.vhd) file are not located on the same VPort mounted LUN:**

1. If the VM configuration files and the virtual hard disk (.vhd) file are not located on the same VPort mounted LUN you will see the following error message:

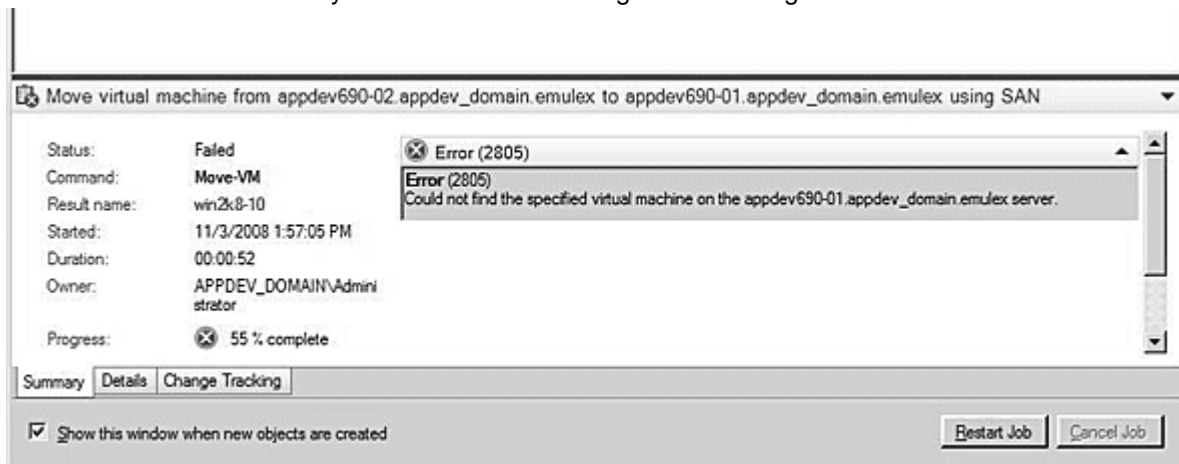


Figure 6: Could not find the virtual machine error message