

User Guide

Eaton PRO Management Pack For Microsoft® System Center Virtual Machine Manager

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1. Introduction

The purpose of the document is to guide the system administrator to integrate Eaton PRO Management pack in Microsoft System Center Virtual Machine Manager 2008 with Microsoft System Center Operations Manager 2007.

Features:

The Eaton PRO Management Pack for Microsoft System Center Virtual Machine Manager 2008:

- Monitors all Hyper-V Servers present in System Center Virtual Machine Manager console.
- It allows user to utilize Performance and Resource Optimization feature for saving the Hyper-V hosts and its virtual machines triggered by power failure events from UPS .
- Provides enter /exit Maintenance Mode for hosts as a result of PRO Tip.
- Provides enter/exit Maintenance Mode for hosts in absence of administrator/user.

This document first explains about enabling the PRO feature by integrating SCVMM and SCOM and then it explains about how to use PRO feature to include Eaton's IPM software.

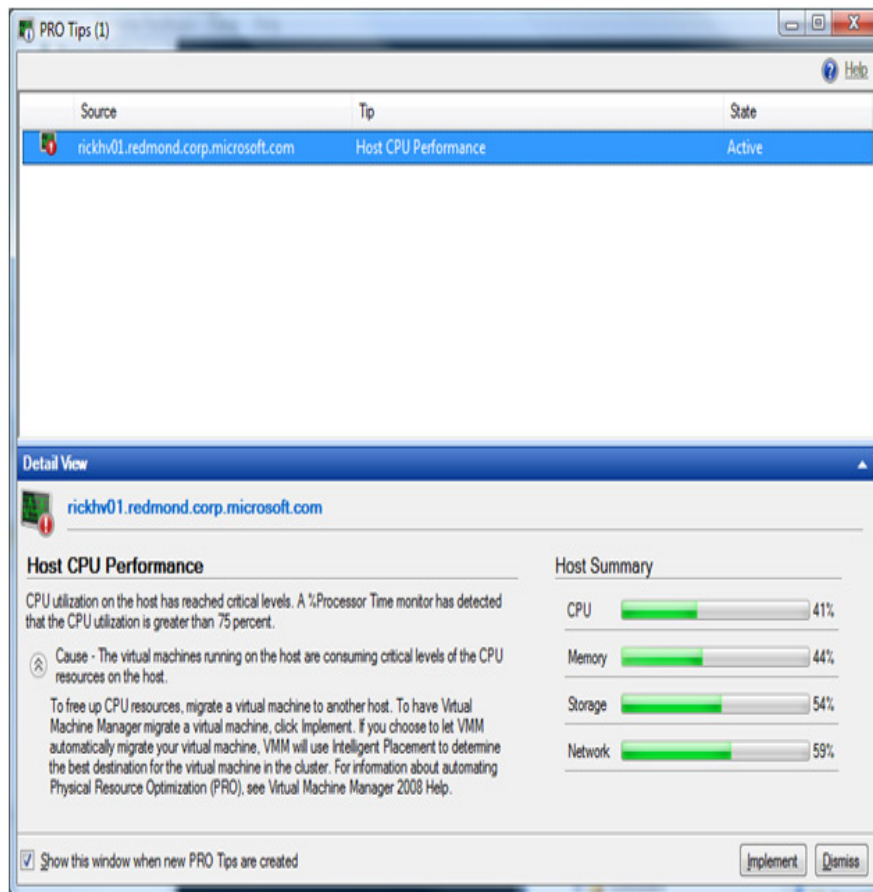
Acronyms :

- IPM - Eaton's Intelligent Power Manager
- SCVMM - System Center Virtual Machine Manager 2008 or 2008 R2.
- SCOM - System Center Operations Manager 2007.
- PRO - Performance and Resource Optimization.

1.1 Microsoft SCVMM PRO

A new feature in Microsoft SCVMM that leverages the monitoring and alerting capabilities of SCOM to surface Tips or recommendations within VMM. This helps administrators ensure a high performance and efficient virtualized environment.

As a result, the integration of SCVMM and SCOM is a powerful and valuable feature. It ensures that the resources are effectively utilized through the generation of PRO Tips in SCVMM console. A screenshot of PRO Tips for host CPU Performance is shown in the figure below. CPU Stress test can be used to simulate a high CPU Utilization. With this utility, processor can be stressed to 100% utilization which will generate a PRO Tip as shown below.

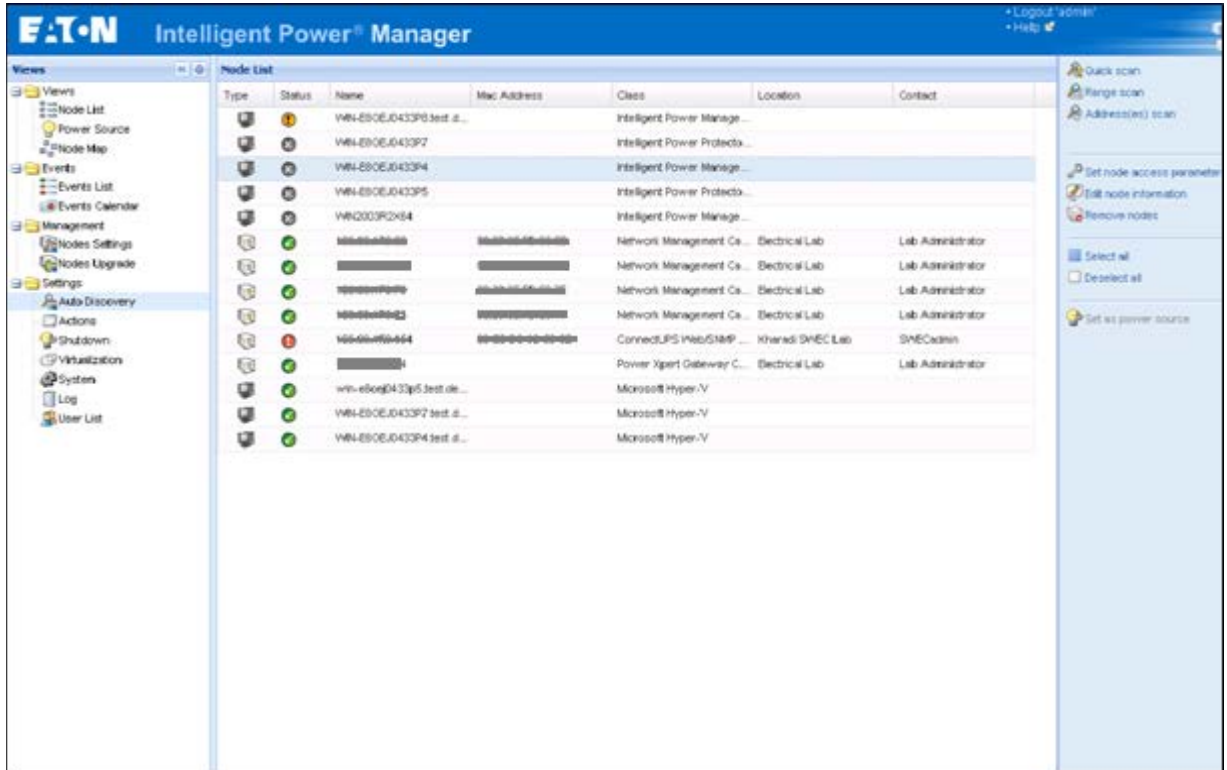


1.2 Eaton 's Intelligent Power Manager

IPM discovers and supervises Eaton UPSs, ePDUs and supervises non-Eaton branded power devices connected to the network (either by means of a card or a proxy).

IPM will also provide local computer graceful shutdown to the system hosting IPM.

A snapshot of IPM web interface shown below.

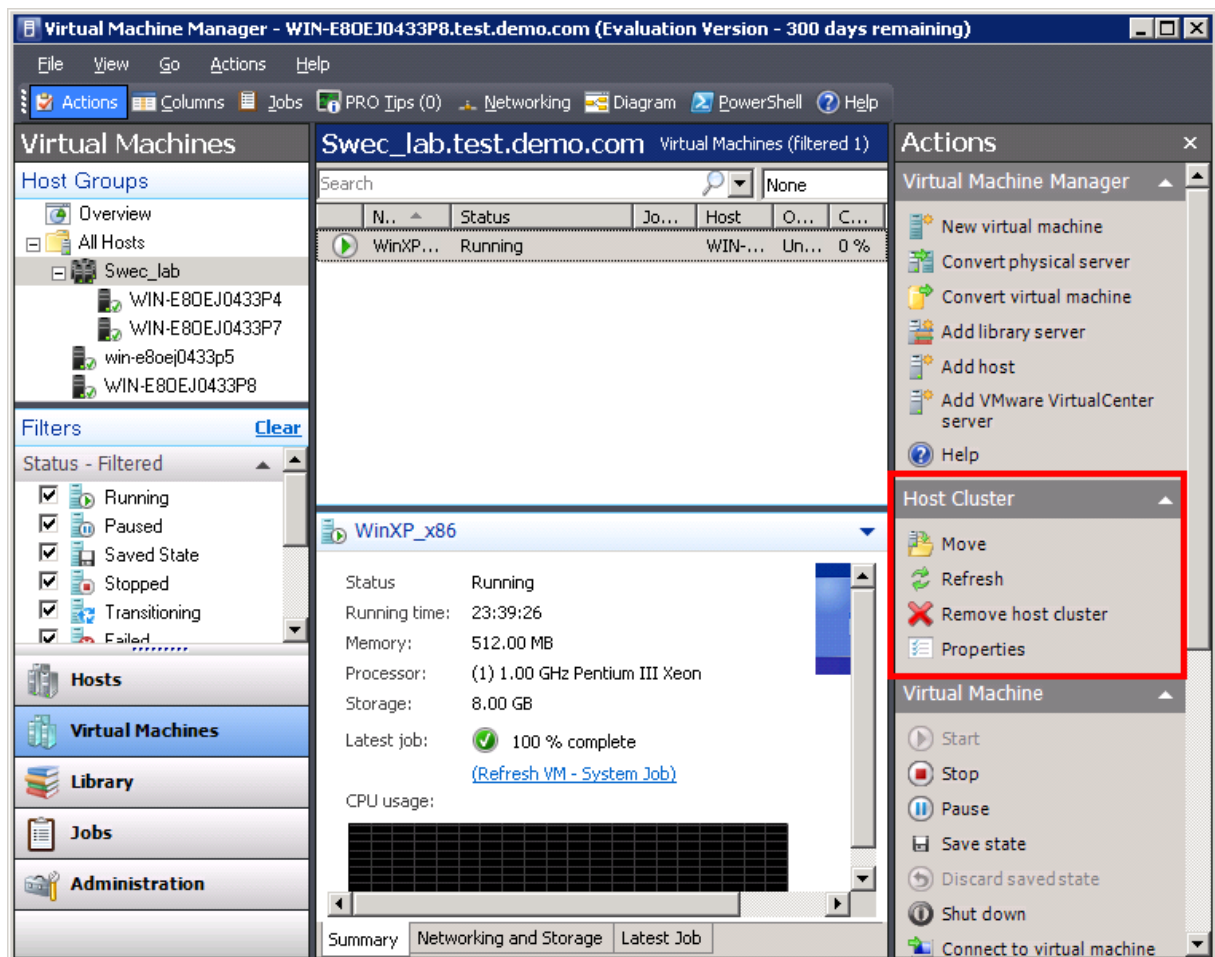


2. Enabling PRO IN SCVMM

Performance and Resource Optimization (PRO) is implemented through PRO-Tips. PRO-Tips recommend remedial actions that can return a host, a virtual machine, or other software or hardware in a virtualized environment to a healthy state. This is based on health conditions reported by Operations manager in Health explorer or in PRO-enabled management packs for Operations Manager.

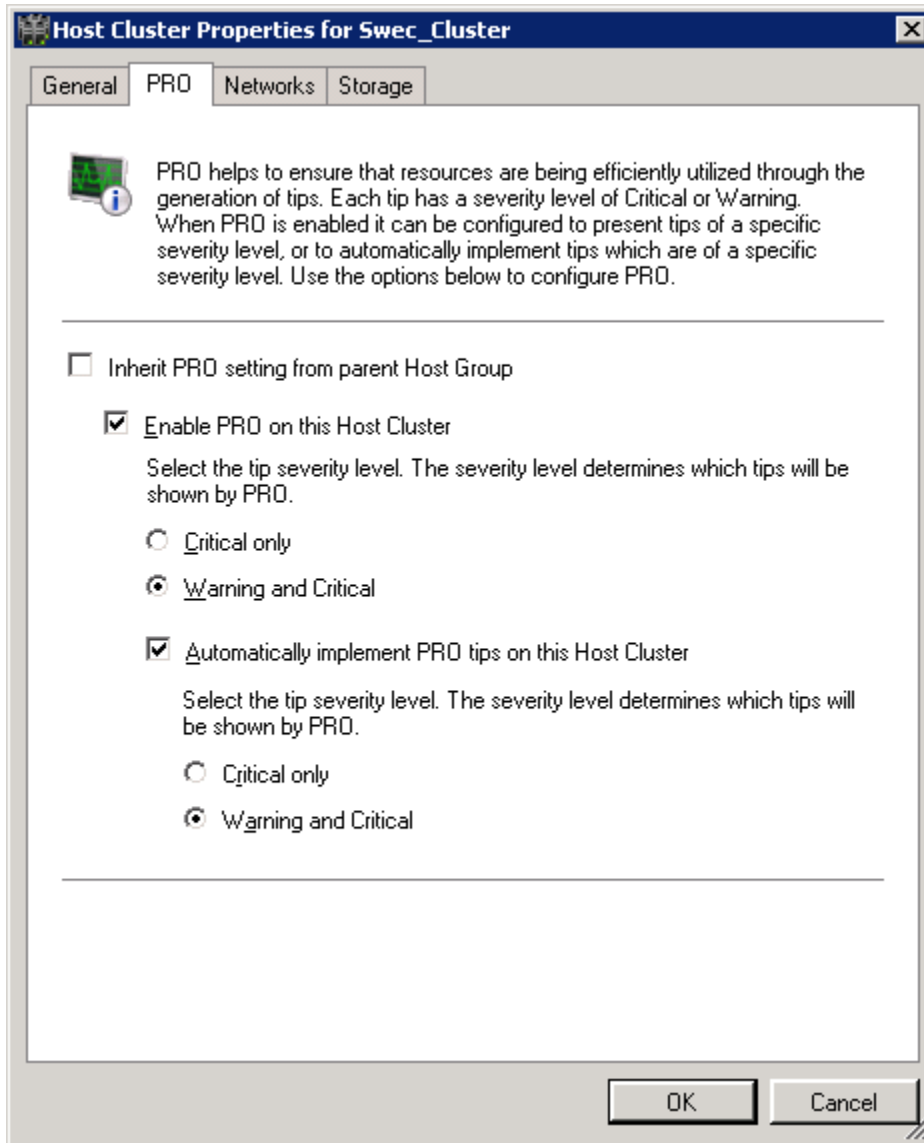
2.1 Prerequisites

- Microsoft SCVMM and Hyper-V must be integrated. For more information about integration, refer Appendix A.
- Microsoft SCVMM and SCOM must be integrated for enabling PRO. For more information about integration, refer Appendix B.
- User should have a basic knowledge of SCVMM, SCOM and IPM.



2.2 Configure PRO for a host cluster

- In SCVMM console, in Hosts view, in the navigation pane, select the host cluster node.
- In the Actions pane, under **Host Cluster**, click **Properties**.
- In the Host Cluster Properties dialog box, click the **PRO** tab. See the below snapshot.



- To use the PRO settings for the host cluster's parent host group, select the **Inherit PRO settings from parent host group** check box. If user chooses not to use the parent host group's PRO settings, complete the remaining steps to determine which PRO tips are received and which are automatically implemented for the cluster.
- Select the **Enable PRO on this host cluster** check box.
- To determine which PRO Tips will be received for this cluster, select the severity level: **Critical only** or **Warning and Critical**.
- If user wants to automatically implement PRO Tips for the cluster:
 - Select the Automatically implement PRO Tips on this host cluster check box.
 - Select the severity of PRO tips that user wants to automatically implement for the cluster: Critical Only or Warning and Critical.
- User can also disable automatic implementation of PRO Tips if he wants to manually implement PRO Tips.

3. Eaton PRO Management Pack with IPM

Eaton PRO Management Pack

Eaton PRO management pack is created to put the Hyper-V hosts into maintenance mode after UPS power failure and then will exit the host from maintenance mode after UPS Power Restore.

3.1 Pre-requisites:

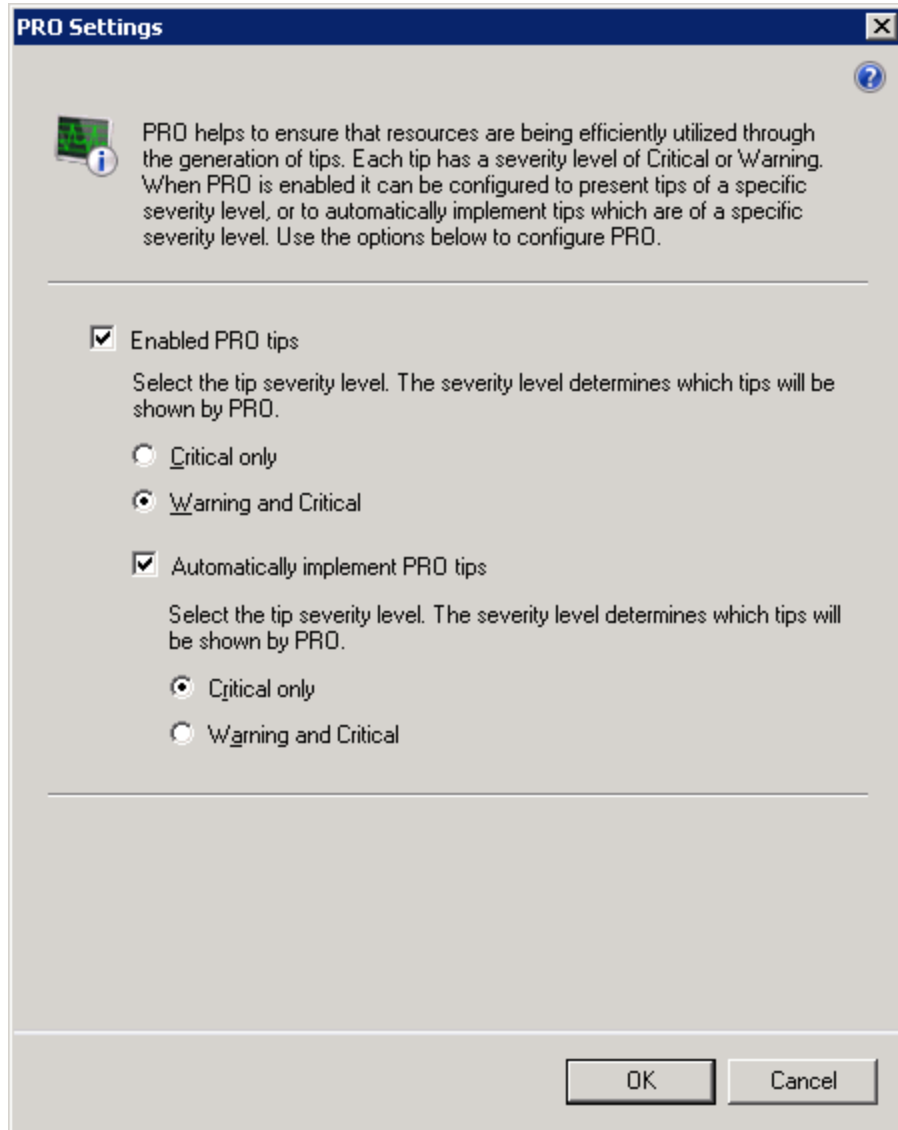
Eaton PRO Management Pack requires :

- Hyper-V role must be enabled on all hyper-v hosts and at least one virtual machine is installed on it. It is mandatory to make all virtual machines highly available in order to support live migration.
- SCVMM and SCOM servers are integrated and PRO is enabled.
- Latest version of IPM is installed on SCVMM server.
- Download Eaton PRO Management Pack from <http://pqsoftware.eaton.com>

3.2 Integration of PRO Management Pack with IPM:

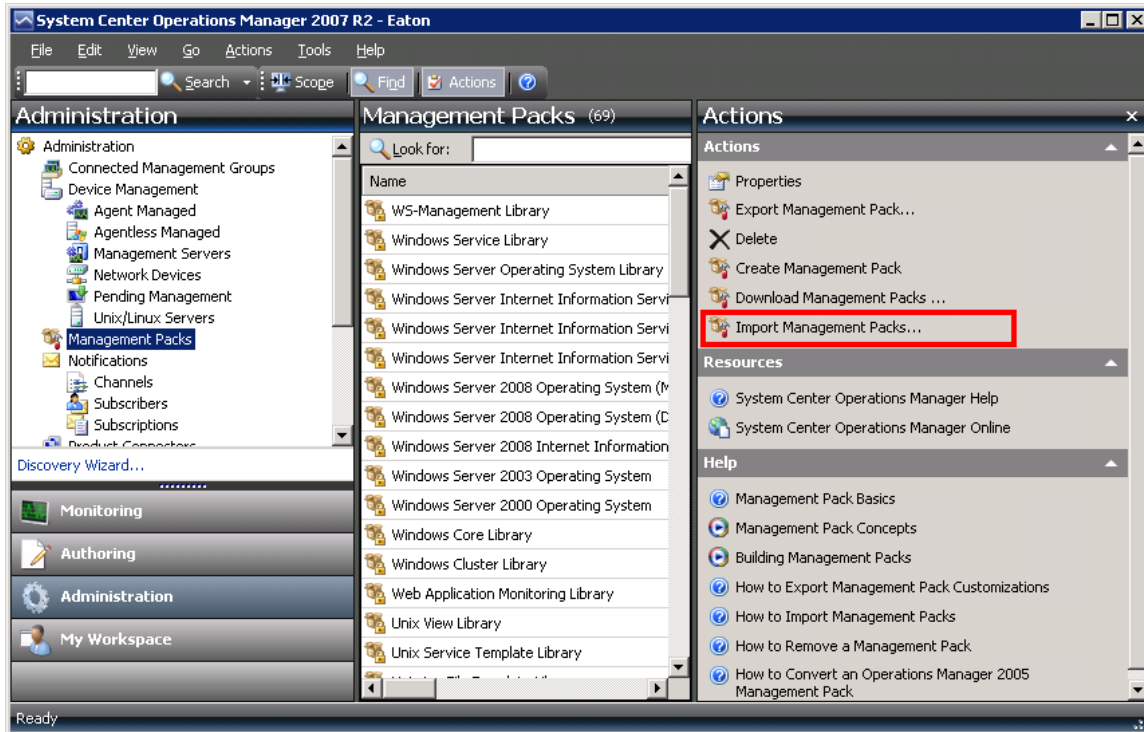
3.2.1 Enable PRO in SCVMM

Please refer section 2 of this document to enable PRO in SCVMM. In this case, enable the auto-implement PRO Tips option for critical only. For warning alerts, Eaton PRO Management pack contains the recovery scripts which will be manually implemented by user on clicking implement button in PRO Tip window and for critical alerts, recovery scripts will be automatically implemented.

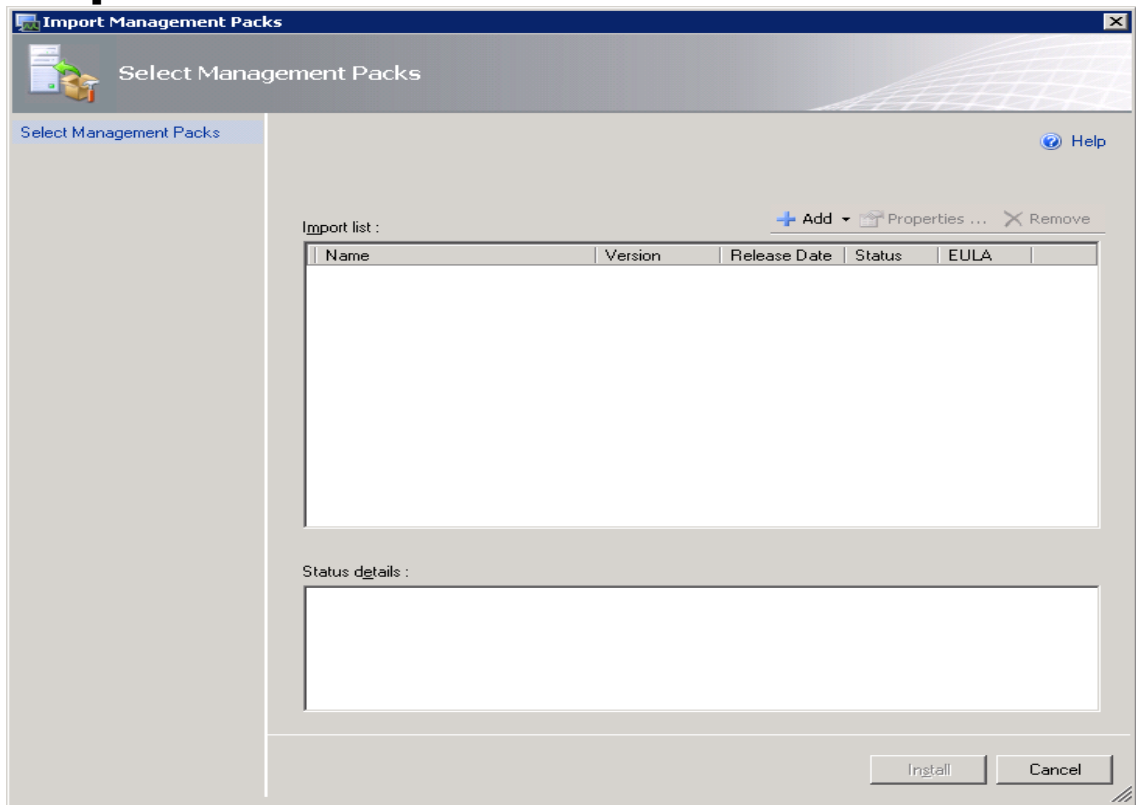


3.2.2 Import Eaton PRO management pack

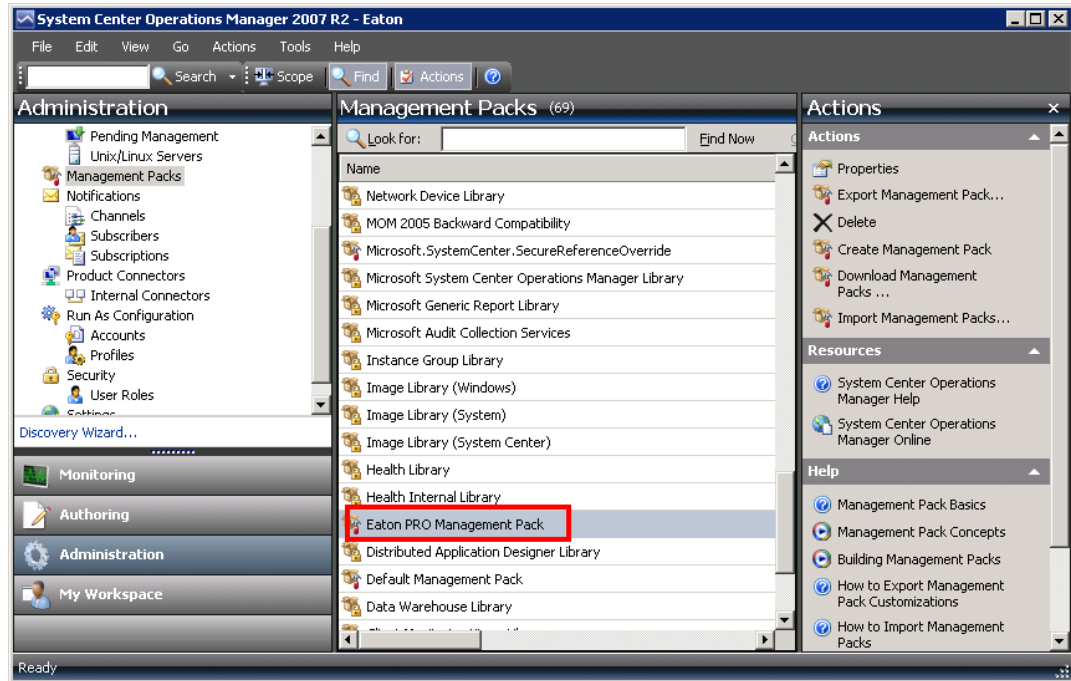
- In Operations Manager console, go to Administration pane. Click on Management pack tab where already imported management packs are shown. See the snapshot below.



- On the right side, click on Import Management Packs. The following window will be displayed.



- Click on Add, then select **add from disk** and then click on “Import”, it will import Eaton PRO management pack into Operation Manager console.

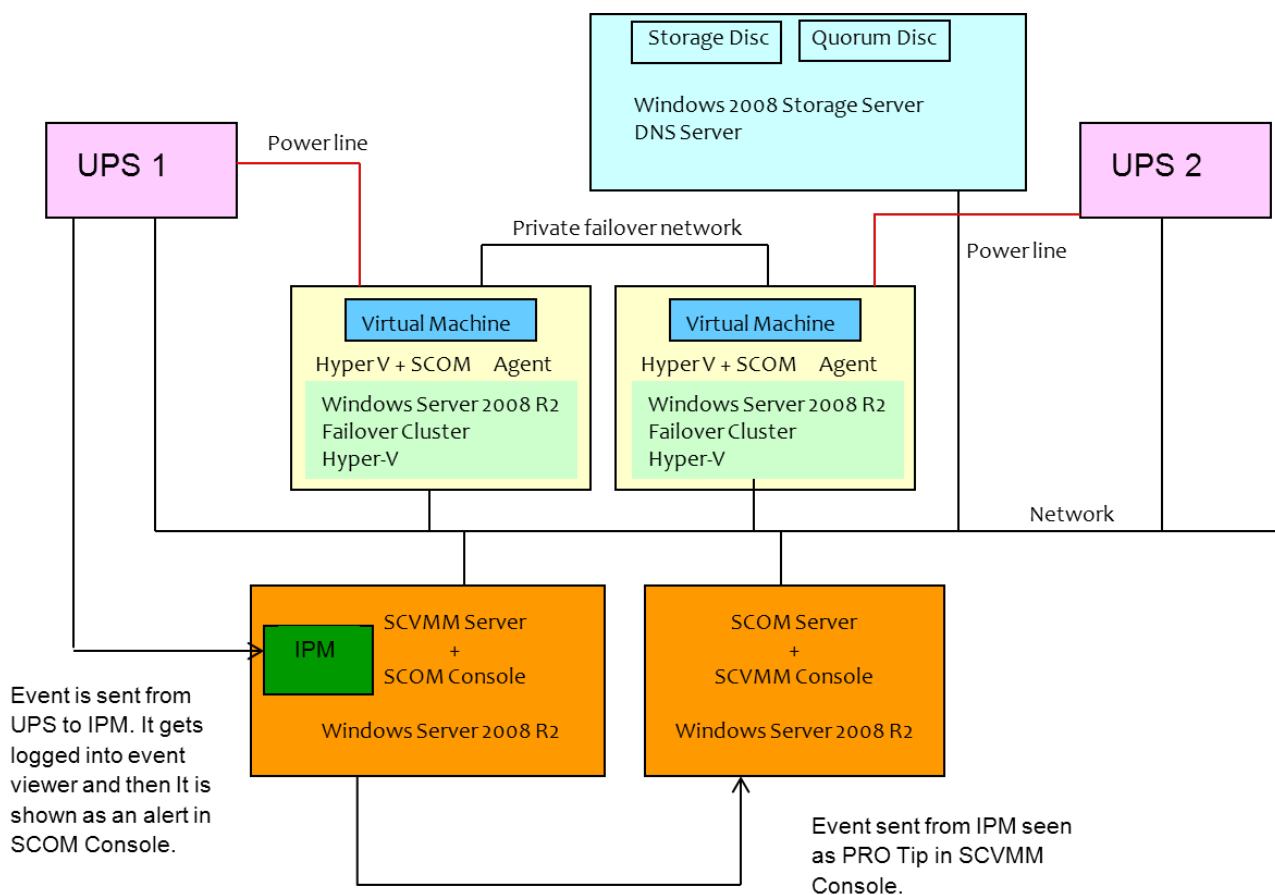


3.2.3 Download the Eaton PRO Package

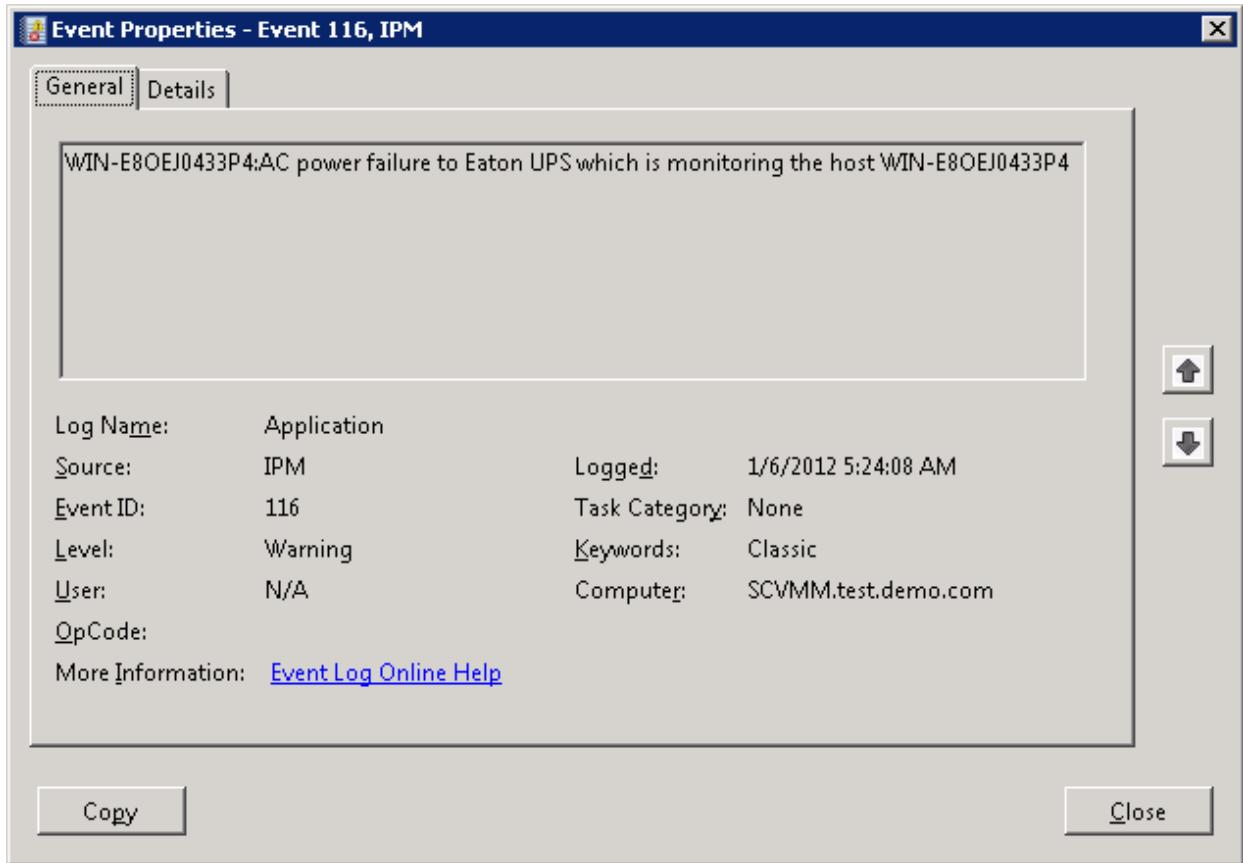
- Download the Eaton PRO package and extract it on SCVMM server.
- Copy the maintenancemode_scvm.ps1 script and place it in root folder of IPM. e.g. C:\Program Files\EATON\IntelligentPowerManager.
- Copy the maintenancemode.js script and place it in "C:\Program Files\Eaton\IntelligentPowerManager\configs\scripts". For more information, refer appendix C.
- Copy Eaton PRO Management Pack and import it in Operations Console as mentioned in section 3.2.2.

3.2.4 Integration

Now the Management pack and IPM are ready to be integrated. The figure below illustrates the architecture of IPM and PRO integration.



When one of the UPSs goes on battery, after the specified time interval (Time specified in IPM), power failure event gets logged into an windows event viewer. This event will be seen as warning event in event viewer. See below snapshot for an illustration.




After the event is logged,IPM will generate a power failure alert in the SCOM console. See below for an illustration.

Active Alerts (1)





Look for: Find Now Clear X

Source Name

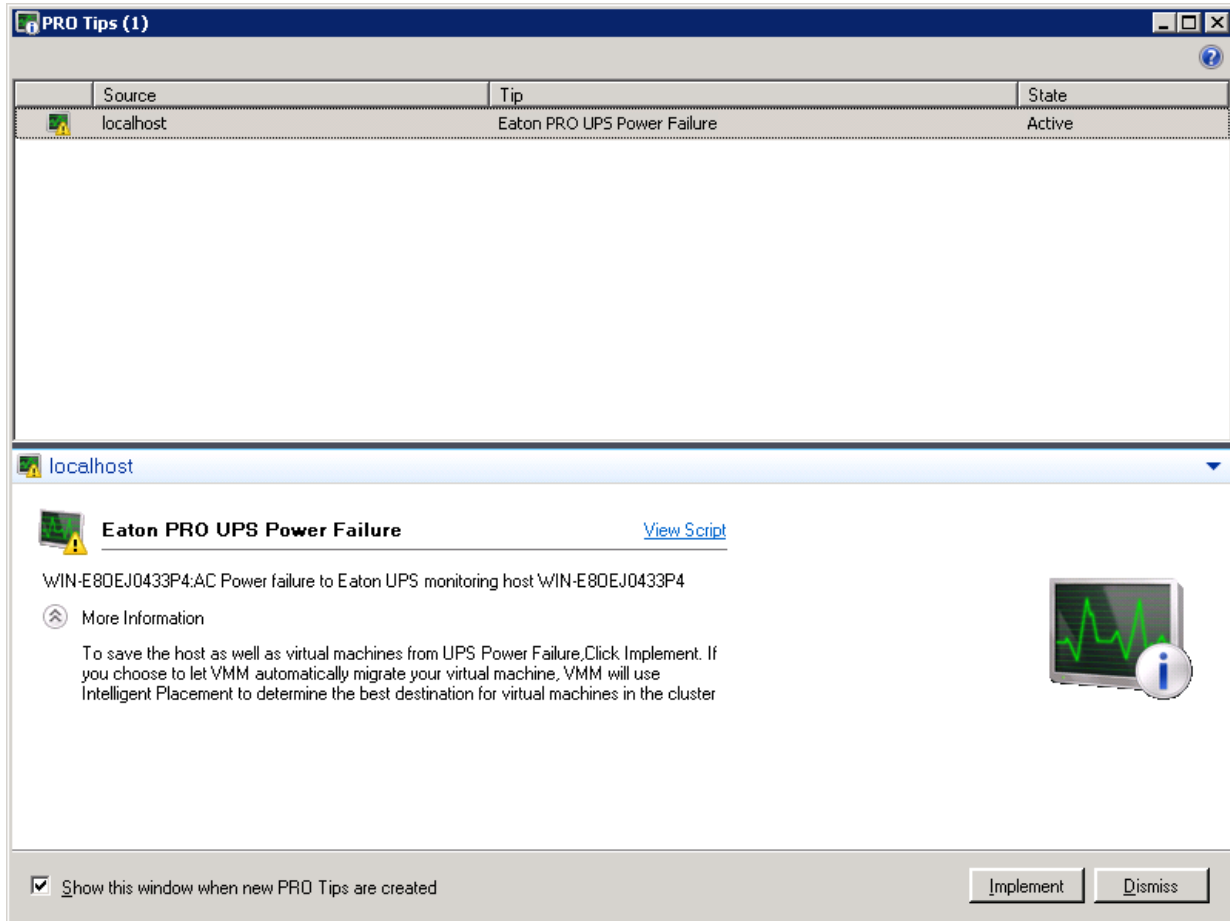
Severity: Warning (1)

 SCVMM.test.demo.com	Eaton PRO UPS Power Failure
---	-----------------------------

Alert Details

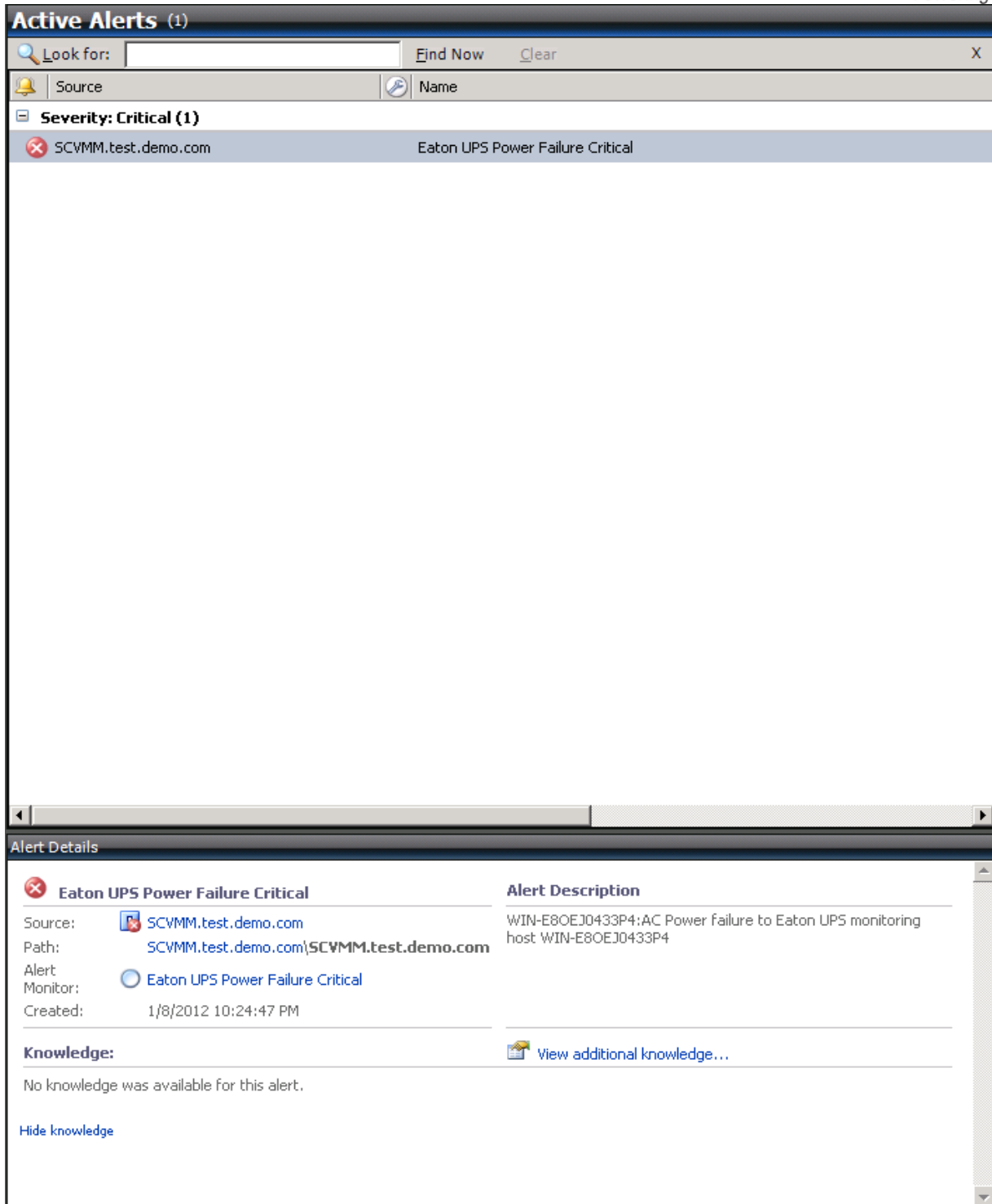
 Eaton PRO UPS Power Failure	Alert Description
Source:  SCVMM.test.demo.com	WIN-E80EJ0433P4:AC Power failure to Eaton UPS monitoring host WIN-E80EJ0433P4
Path: SCVMM.test.demo.com\SCVMM.test.demo.com	
Alert Monitor:  Eaton PRO UPS Power Failure	
Created: 1/8/2012 10:11:58 PM	
Knowledge:	 View additional knowledge...
No knowledge was available for this alert.	
Hide knowledge	

The power failure alert will be populated as a PRO Tip in the SCVMM console. This PRO Tip gives the details of the problem caused and recovery action. The administrator will choose to either implement or dismiss the PRO Tip. See below for an illustration.



If user chooses to implement, then the host which is configured with UPS will be put into maintenance mode and all its virtual machines will be 'live migrated' to another host in the same cluster. For live migration, SCVMM uses a canned optimal placement method to determine the best destination for virtual machines in the cluster.

If administrator/user is not available to implement PRO Tip for warning alert, after a specified time interval, critical power failure event gets logged into an windows event viewer. This event will be seen as an error event in event viewer. IPM will generate a critical power failure alert in the SCOM console for automatically placing the host into maintenance mode. This time can be customized as per the user/administrator requirement. User can change 'timetowait' parameter in javascript file. This time needs to be specified in minutes. See below for an illustration.



The screenshot shows a web-based interface for monitoring alerts. At the top, there is a search bar with the text "Look for:" and buttons for "Find Now" and "Clear". Below the search bar is a table with columns for "Source" and "Name". A single alert is listed with a severity of "Critical".

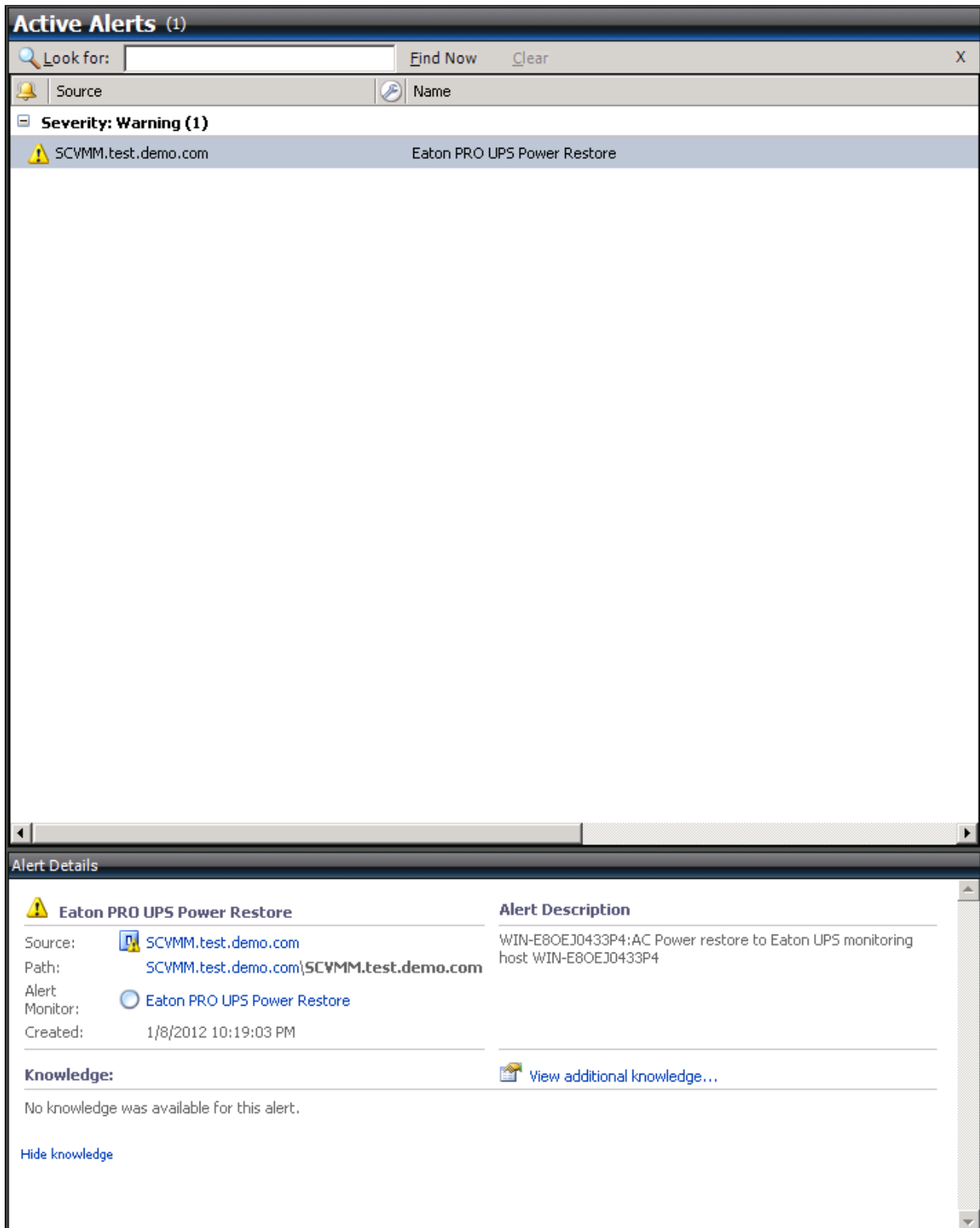
Source	Name
SCVMM.test.demo.com	Eaton UPS Power Failure Critical

Below the table, the "Alert Details" section is expanded for the selected alert. It shows the following information:



- Alert Name:** Eaton UPS Power Failure Critical
- Source:** SCVMM.test.demo.com
- Path:** SCVMM.test.demo.com\SCVMM.test.demo.com
- Alert Monitor:** Eaton UPS Power Failure Critical
- Created:** 1/8/2012 10:24:47 PM
- Alert Description:** WIN-E80EJ0433P4:AC Power Failure to Eaton UPS monitoring host WIN-E80EJ0433P4
- Knowledge:** No knowledge was available for this alert. (Link: View additional knowledge...)
- Actions:** Hide knowledge

Note - In case of continuous power failure, user/administrator it is recommended to configure host to gracefully shutdown through IPM. For more information about configuration, please refer user guide of IPM.

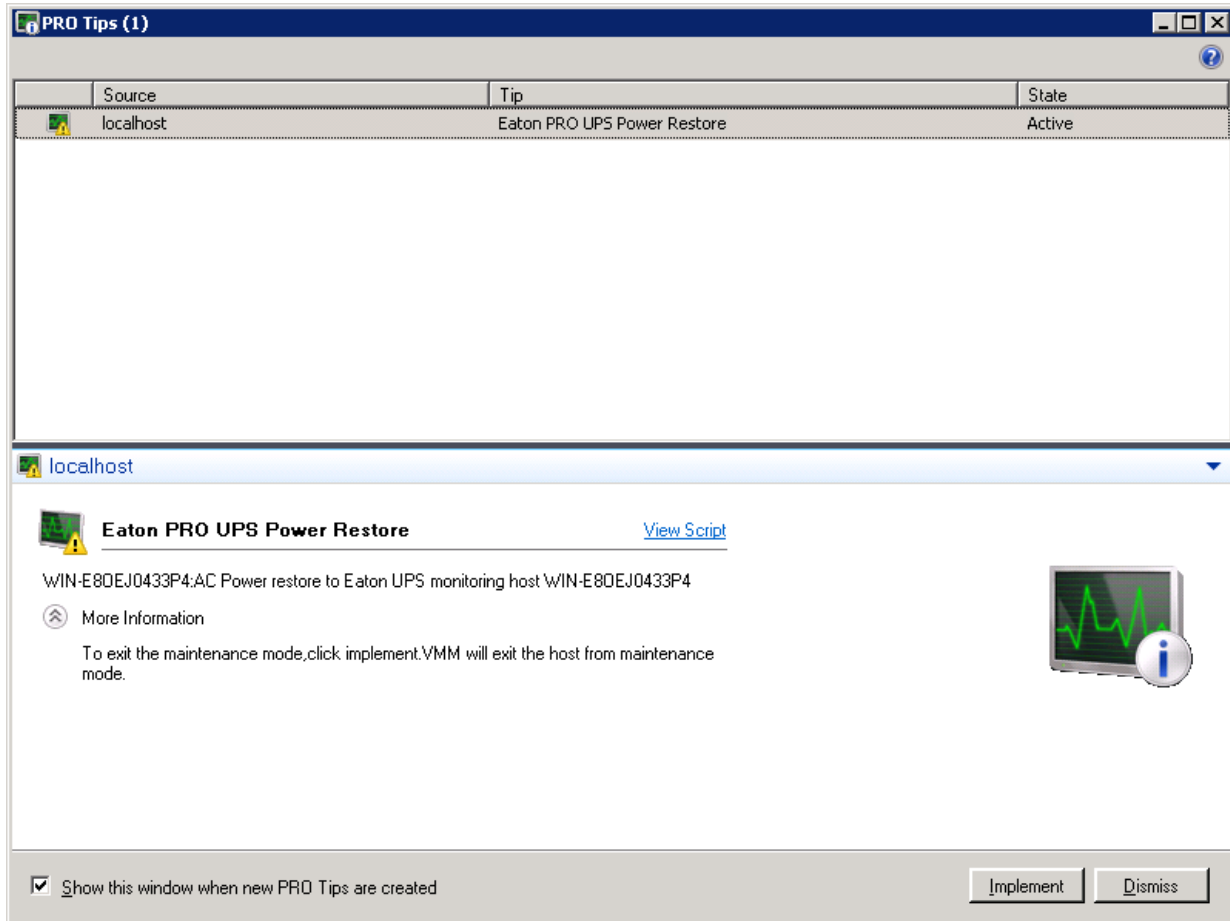
After power is restored, power restore gets logged into an windows event viewer. This event will be seen as warning event in event viewer. IPM will generate a power restore alert in the SCOM console. See below for an illustration.



The screenshot shows the 'Active Alerts' window in a management console. At the top, there is a search bar with 'Look for:' and buttons for 'Find Now' and 'Clear'. Below the search bar, there are columns for 'Source' and 'Name'. A single alert is listed with a yellow warning icon, source 'SCVMM.test.demo.com', and name 'Eaton PRO UPS Power Restore'. The 'Alert Details' pane at the bottom provides more information:

Alert Details	
Eaton PRO UPS Power Restore	Alert Description
Source:  SCVMM.test.demo.com	WIN-E80EJ0433P4:AC Power restore to Eaton UPS monitoring host WIN-E80EJ0433P4
Path: SCVMM.test.demo.com\SCVMM.test.demo.com	
Alert Monitor: <input type="radio"/> Eaton PRO UPS Power Restore	
Created: 1/8/2012 10:19:03 PM	
Knowledge:	 View additional knowledge...
No knowledge was available for this alert.	
Hide knowledge	

Power restore alert will be populated as a PRO Tip in the SCVMM console. This PRO Tip gives the details of the problem caused and recovery action. As shown with power restore PRO Tip, the administrator again chooses to implement or dismiss the PRO Tip. See below for an illustration.



If user chooses to implement the PRO-Tip the host will exit from maintenance mode. If he chooses to dismiss the PRO-Tip then no recovery action will be performed by PRO Tip.


If administrator/user is not available to implement PRO Tip for warning alert , after a specified time interval, critical power restore event gets logged into an windows event viewer. This event will be seen as an error event in event viewer. IPM will generate a critical power restore alert in the SCOM console for automatically exiting the host from maintenance mode. This time can be customized as per the user/administrator requirement. User can change 'timetowait' parameter in javascript file. This time needs to be specified in minutes. See below for an illustration.

Active Alerts (1)





Look for: Find Now Clear X

Source Name

Severity: Critical (1)

 SCVMM.test.demo.com	Eaton UPS Power Restore Critical
---	----------------------------------

Alert Details

 Eaton UPS Power Restore Critical	Alert Description
Source:  SCVMM.test.demo.com	WIN-E80EJ0433P4:AC Power restore to Eaton UPS monitoring host WIN-E80EJ0433P4
Path: SCVMM.test.demo.com\SCVMM.test.demo.com	
Alert Monitor:  Eaton UPS Power Restore Critical	
Created: 1/8/2012 10:29:22 PM	
Knowledge:	 View additional knowledge...
No knowledge was available for this alert.	
Hide knowledge	

After generating critical power restore alert, the host which is configured with UPS will be automatically exited from maintenance mode.

3.2.5 Troubleshooting

1. Remote registry service failed.

Before creating failover cluster, registry service must be running on both the nodes. If it is not getting started (The system cannot find the file specified) then perform following steps.

- Open Regedit
- Locate HKLM\System\CurrentControlSet\Services\RemoteRegistry\Parameters.
- Check for ServiceDll attribute. Here the file path for regsvc.dll should be specified.

2. Forcefully remove failover cluster feature by modifying registry.

- Open Regedit
- Locate HKLM\CurrentControlSet\Services\ClusDisk & ClusSvc
- Delete these keys

3. Error 13805 : cannot contact cluster connection to <cluster name>

- While adding failover cluster to SCVMM, make sure that the virtual network on the nodes in cluster is not created.
- After the cluster is added into SCVMM, create a virtual network as mentioned above.

4. References

Eaton and Virtualization

Please visit <http://www.eaton.com/virtualization>

Intelligent Power Manager (Eaton Power Supervisor)

Please visit <http://pqsoftware.eaton.com> for more information about download and installation of IPM.

SCVMM and hyper-v Integration

<http://blog.frankovic.net/2010/04/creating-hyper-v-failover-cluster-part-1/>

<http://blog.frankovic.net/2010/04/creating-hyper-v-failover-cluster-part-2/>

SCVMM and SCOM Integration

<http://blogs.technet.com/b/rakeshm/archive/2008/08/22/configuring-scvmm-2008-s-pro-feature-with-ops-manager.aspx>

Books

Creating a PRO Management Pack

Mastering Virtual Machine Manager 2008 R2

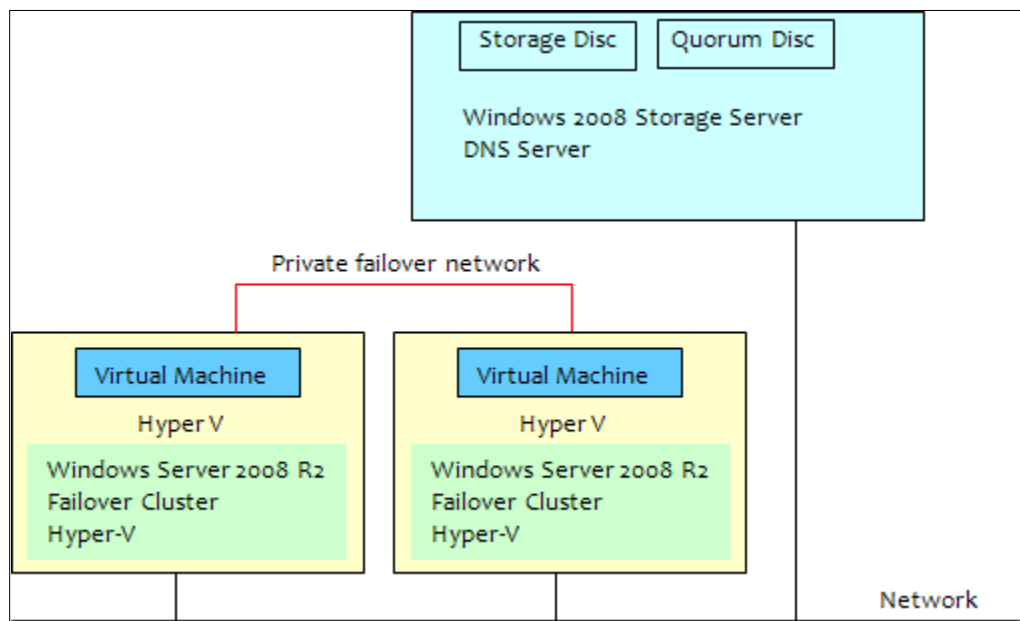
5. Appendix A

Microsoft SCVMM and Hyper-V Integration

5.1 Pre-requisites:

The Microsoft SCVMM / hyper-V system operation requires three physical machines (one machine is Windows 2008 storage server and other two machines are with windows server 2008 R2 installed) each with 2 network cards. See illustration below.

SAN (Windows 2008 Storage Server)	NODE1 (Windows Server 2008 R2 Enterprise)	NODE2 (Windows Server 2008 R2 Enterprise)
IP: 192.168.14.206 (Public and Storage LAN)	IP: 192.168.14.24 (Public and Storage LAN) IP: 10.10.0.1 (Cluster LAN)	IP: 192.168.14.4 (Public and Storage LAN) IP: 10.10.0.2 (Cluster LAN)



5.2 Steps to integrate SCVMM and Hyper-V

Configuring Windows Server 2008 Storage Server for iSCSI.

- Install Windows 2008 Storage Server x64 and install Microsoft iSCSI software target x64 on it. Click Start-> Administrative tools ->Microsoft iSCSI Software target.
- Right click on iSCSI target and create a new iSCSI target. Give iSCSI target name as Storage. On iSCSI initiators Identifiers window, click advanced and add IP addresses of the two nodes that will be accessing this target.
- Repeat the above step and create a target, name it Quorum.
- Next, to create disk for the iSCSI target, right click on the Storage iSCSI target and select the Create Virtual Disk for iSCSI target option. On File option enter location of vhd file (eg. C:\storage.vhd).Enter size of the disk (min. 30 GB).If the disk is already created, right click on the Storage iSCSI target and select the add existing virtual disk to iSCSI target option.
- Repeat the above step for Quorum iSCSI target (eg. C:\quorum.vhd, min 512 MB)

Adding disc resources to node1 and node 2

- Install Windows Server 2008 R2 Enterprise on the two remaining computers (NODE1 and NODE2).Register these two nodes with DNS server (Add the IP addresses of these nodes in DNS Server).Install Hyper-V role and Failover Cluster feature on both nodes through server manager. Now Shutdown NODE2 (IMPORTANT).
- On NODE1 start iSCSI initiator from Administrative tools
 - Select Yes to start automatically if asked.
 - Select Discovery. Click Discover Portal. Enter IP Address of Storage server and click OK.
 - Select Targets Here targets Storage and Quorum should be seen. Select each target and click Connect. Select Volumes and Devices. Click Auto Configure. Click OK.
- Now in Server manager Console, open Disk Management. Scroll down until two new disks (storage and Quorum) are seen.
- Right click on each disk and bring Online, Initialize and format it with NTFS.
- For smaller disk (Quorum) select Q as drive letter and for larger disk (Storage) select J as drive letter. Shutdown NODE1.Startup NODE2.
- Repeat the above steps on NODE2 (There is no need to format disks again, drive letters must be same as on NODE1)
- Startup NODE1

Creating Failover Cluster and highly available virtual machines

- Before creating failover cluster, create a new virtual network(external) that is connected to one of the physical network adapters. The steps to create a virtual network are mentioned in subsequent section.
- On NODE1,in server manager console, click Features->Failover Cluster Manager. Right click and select Validate a Configuration option.
 - Add all nodes that will be part of a cluster
 - Run all tests
 - All result should be green (ignore errors about updates)
- Select option Create Cluster.
- Add all nodes and enter cluster name.
- When cluster is created, right click on Storage and add both disks to it (cluster will automatically configure smaller disk, Quorum, as witness and larger disk, Storage, as storage disk).
- Select cluster name in the left pane and In the middle pane select Cluster Core Resources and verify that they are all online.

Steps to create highly available virtual machines

- Now minimize Failover Cluster Manager Console on NODE1 and open Server Manager or Hyper-V console. Copy Windows Server 2008 ISO file to J disk on NODE1 (J disk is iSCSI disk).

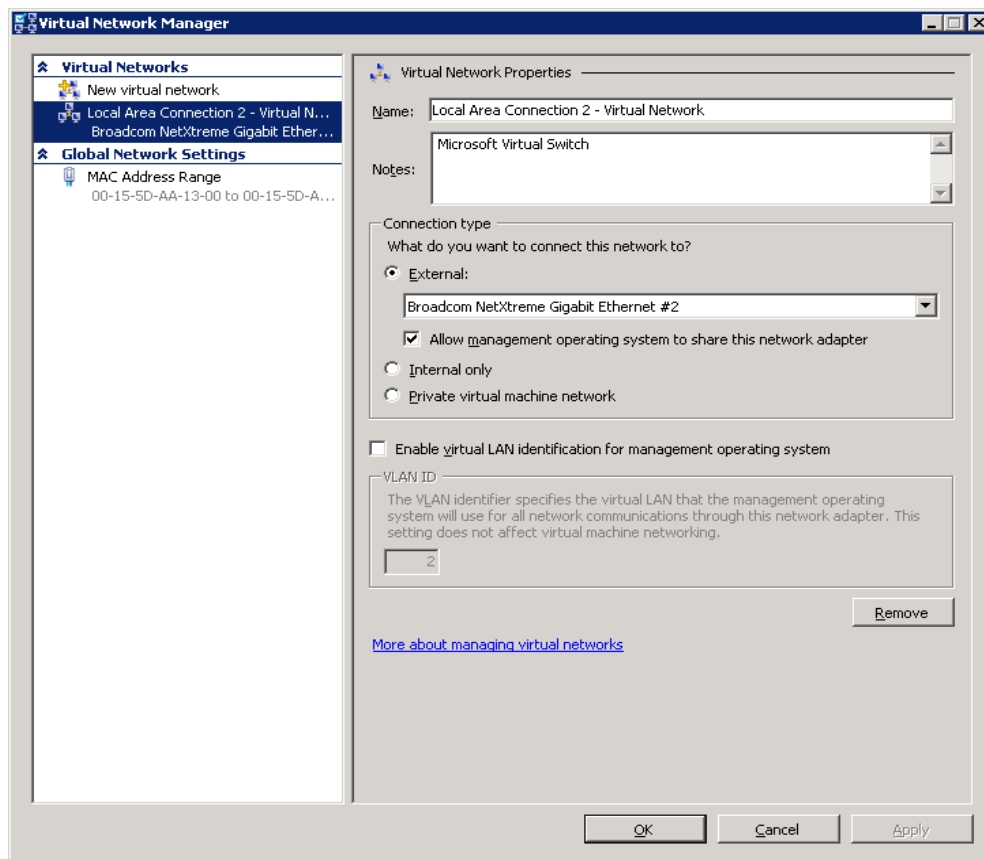
- Open Hyper-V console, right click on NODE1 and create a new virtual machine.
 - Store it on J disk (IMPORTANT)
 - Give it sufficient amount of RAM
 - Connect it to previously created network
 - Create new virtual disk, size 20 GB on J disk (IMPORTANT)
 - On installation options select second bullet and select ISO image that is copied on J disk
 - Click Finish
 - Right click on newly created Virtual machine and select Settings
 - On the lower left side select Automatic Start action and select Nothing
 - Click OK

Adding nodes to SCVMM.

- Make sure that cluster IP address is valid and that it is registered in DNS.
- Open SCVMM Administrator Console
- On the Action pane, click Add host and enter administrator password.
- In the host name field, enter name of one of the nodes that will get added.
- Do not select “Skip AD validation” (If this option is selected then only one node will be added and not complete cluster).
- Click ADD (Dialog box will pop up saying that node is part of a cluster and it will ask do you want to add all cluster nodes in SCVMM)
- Click Yes
- Now after a couple of minutes, SCVMM adds and configures cluster and virtual machines into console.

Creating a virtual network

- After adding Hyper-V role in both nodes, go to Hyper-V Manager tab in Server Manager. Right click on host-name and select Virtual Network Manager.
- In Virtual Network Manager, Click on New Virtual network and select **External**. Then as shown in figure below, go to Virtual network properties, name the virtual network and select Connection type as External. After this click ok. This will create a virtual network between 2 nodes



6. Appendix B

Microsoft SCVMM and SCOM Integration

Integration of SCVMM and SCOM must be completed in order to enable PRO.

6.1 Pre-requisites

- System center operations console.
- Virtual machine manager administrative console.
- 2 nodes (Windows 2008 R2) for installing VMM server and SCOM. (One node is also sufficient which will have Both SCOM server and SCVMM server installed).
- Virtual Machine Manager Server 2008 installed. (Refer <http://technet.microsoft.com/en-us/library/cc764327.aspx> to install VMM server).

- System Center Operations manager 2007 installed (management server).(refer <http://technet.microsoft.com/en-us/library/bb418758.aspx> to install SCOM)

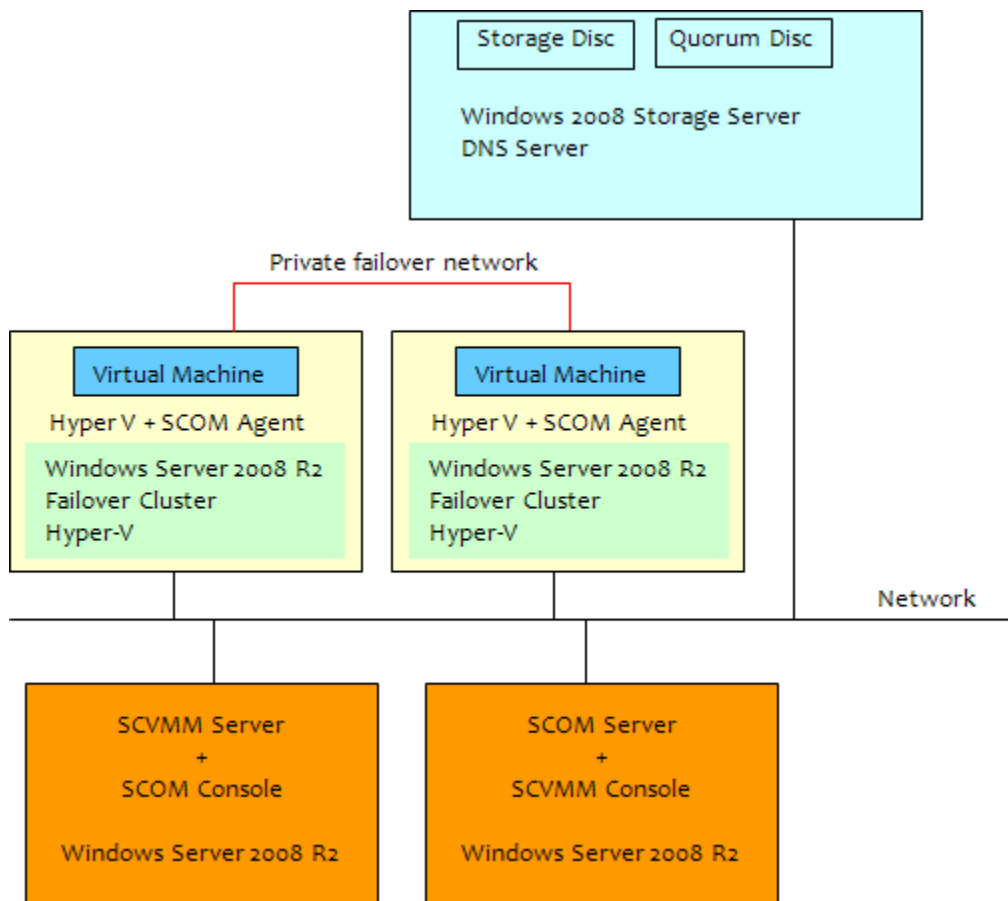
6.2 Steps to integrate SCVMM and SCOM to enable PRO

- Install root management server on node2. (Create Active Directory group (e.g. SCOM group) on storage server which will be asked while installing Operations manager server).
- Install Virtual machine manager 2008 server for example node1.
- Note: if VMM server and SCOM server are installed on same machine then skip next step.
- Install VMM console on node1.
- Install operations manager console on node1.
- Open the operations manager console and install following management packs if they are not already imported.
 - Internet Information Service MP.
 - SQL Server 2000 MP.
 - Windows Server Base OS System Center Operations Manager 2007 MP.
 - Virtualization MP.
- On root management server, run the setup from VMM 2008 CD and select **Configure Operations Manager**
 - Import VMM management packs, including all MPs required for PRO.
 - Grant run as account of your VMM server the necessary rights to
 - Install the VMM Console

- Open the VMM console and connect to VMM server. Open the **Administration** tab and select **System Center** from the tree view in the upper left of the console.

- Open the **Operations Manager server** tab and enter the name of root management server.
- At this point VMM and Operations Manager are integrated, and you can see all of the data from your VMM installation discovered into your Operations Manager installation by opening your Operations Manager Console and navigating to the **Monitoring** tab. There will be a newly created folder called **Virtual Machine Manager 2008 Views**. Inside that folder there should be a new view with the name of VMM server
- After integrating SCVMM and SCOM, install SCOM agents on all the nodes which will be monitored through operations manager. After the agents are installed, go to Administration tab in Operations Manager console. In Administration-> Device Management->Agent Managed and check if all agents are registered with Operations Manager.
- To allow the manual installed agents ,go to Administration->Settings->Security, select automatically approve new manually installed agents.

Below Figure shows the complete integration of SCVMM, hyper-v and SCOM.



7. Appendix C

7.1 Java script for Maintenance Mode

```
UserScript =
{
  name: "MaintenanceMode",
  enabled: true,

  onEvent: true, // Set this property to true to enable the script
  delay: 0,

  // This property can be used to delay first execution of the script
  interval: 10000, // and every 10s from that

  action: function () // Script action definition
  {
    //IP or Name of SCVMM Server
    var VMMServer = "<<ip address of SCVMM server>>";

    //From here provide the information about hyper-v Host that needs to be
    //put in Maintenance mode along with UPS information
    // Here we can configure N number of SCVMM hosts and UPS
    // Following hyper-v host must be present in SCVMM console.

    //-----START SETUP 1 -----
    //-----HOST1/UPS 1 -----
    //Information about hyper-v host and its corrosponding UPS
    var host1 = "<<hostname of hyper-v server>>"; // the name of the hyper-v host (IP or Name)

    //The UPS1 link to the Host1
    var statusUPS1 = UserFunctions.getNodeData("<<ip address of node in IPM>>"); //Name of the Node i

    //time in minutes for automatic implementation in absence of user
    var timetowait = 2;

    //if the status of the UPS1 is on Battery, the Host1 enter in maintenance mode
    if (statusUPS1 && statusUPS1["UPS.PowerSummary.PresentStatus.ACPresent"] != 1)
    {
      UserFunctions.exec("powershell Set-ExecutionPolicy UnRestricted");
      var cmd_mm = "powershell ./maintenancemode_scvmm.ps1 -VMMServerName " + VMMServer + " -VMHost
      UserFunctions.exec("bin/executeapp " + cmd_mm);
    }

    //if the status of the UPS1 is on the sector, the Host1 exit the maintenance mode
    else if (statusUPS1["UPS.PowerSummary.PresentStatus.ACPresent"] == 1)
    {
      UserFunctions.exec("powershell Set-ExecutionPolicy UnRestricted");
      var cmd_mm = "powershell ./maintenancemode_scvmm.ps1 -VMMServerName " + VMMServer + " -VMHost
      UserFunctions.exec("bin/executeapp " + cmd_mm);
    }
  }
}
```

The parameters used in this java script are as follows:

- VMMServer – IP address /hostname of SCVMM server.
- Host – IP address/hostname of hyper-v host configured with UPS.
- statusUPS1 – IP address of node in IPM with which host is configured.
- Timetowait – Time interval to automatically implement the PRO Tip in absence of user/administrator.