Lenovo Hardware Management Pack for Microsoft System Center Operations Manager Installation and User's Guide

Version 6.0

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Note
Before using this information and the product it supports, read the information in "Notices" on page 123.

Edition Notice

This edition applies to the Lenovo® Hardware Management Pack for Microsoft(tm) System Center Operations Manager, v6.0 and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

Figures

Tables

About this publication

This book provides instructions for installing Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 into Microsoft System Center Operations Manager and using it's integrated features to manage systems in your environment.

Conventions and terminology

Paragraphs that start with a bold **Note**, **Important**, or **Attention** are notices with specific meanings that highlight key information.

Note: These notices provide important tips, guidance, or advice.

Important: These notices provide information or advice that might help you avoid inconvenient or difficult situations.

Attention: These notices indicate possible damage to programs, devices, or data. An attention notice appears before an instruction or situation in which damage can occur.

Information resources

You can find additional information about Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 in the product documentation and on the World Wide Web.

PDF files

You have the option to view or print documentation that is available in Portable Document Format (PDF).

Downloading Adobe Acrobat Reader

You need Adobe Acrobat Reader to view or print PDF files. You can download a copy from the Adobe Reader website.

Viewing and printing PDF files

You can view or print any of the PDF files located on the web. The most current version of each document is available on the product download page. Click this link to locate the individual product pages for each publication: Lenovo XClarity Integrator for Microsoft System Center.

World Wide Web resources

The following websites provide resources for understanding, using, and troubleshooting BladeCenters, Flex Systems, System x® and systems-management tools.

Lenovo XClarity Integrator for Microsoft System Center website

This website provides an overview of Lenovo XClarity Integrator for Microsoft System Center and current product offerings available for download:

Lenovo XClarity Integrator for Microsoft System Center

Technical support portal

This website can assist you in locating support for hardware and software:

Lenovo Systems Technical Support

IBM Systems Director downloads website

This website provides an overview and the current product releases available for downloading IBM Systems Director systems-management software:

IBM Systems Director Downloads

System Management with Lenovo XClarity Solution website

This website provides an overview of the Lenovo XClarity Solution which integrates into System x M5 and M6, as well as Flex System to provide system management capability:

System Management with Lenovo XClarity Solution

ServerProven® websites

The following websites provide an overview of hardware compatibility for BladeCenter®, Flex System™, System x and xSeries® servers, and IBM IntelliStation® hardware:

- Lenovo ServerProven: Compatibility for hardware, applications, and middleware
- Lenovo ServerProven: Compatibility for BladeCenter products

Microsoft System Center Operations Manager website

This website provides an overview of Microsoft System Center Operations Manager:

TechNet Library: Systems Center Operations Manager

Chapter 1. Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0

Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 enables you to use the enhanced features of Microsoft System Center Operations Manager for managing the health state of System x servers, Blades, BladeCenter Chassis, Compute Nodes, and Flex System Chassis.

Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 has a new feature, Health Monitoring IMM-based servers using agentless mode. Health Monitoring IMM-based servers using agentless mode grants user abilities for monitoring the hardware components' status in agentless mode, including power modules, cooling devices, memory, processor, PCI devices

Key features

The key features of Lenovo Hardware Management Pack are listed below.

- Rich monitoring of system health using Simple Network Management Protocol (SNMP) for: BladeCenter Chassis, Flex System Chassis and modules
- Extensive monitoring of IMM-based servers using agentless mode.
- Extensive monitoring of hardware component health for System x servers, BladeCenter x86/x64 blades, and Flex System x86/x64 compute nodes on Windows systems
- Comprehensive monitoring of the software stack health for managing hardware
- Easy determination of overall system health by the aggregation of hardware health monitors
- Automatic migration of virtual machines from a server host, where hardware failures are detected, to other server hosts

Premium features

Lenovo XClarity Integrator for Microsoft System Center has several premium features which require an activation license.

The following additional, premium features are fee-based and require the purchase of an activation license on a per managed endpoint basis. Activation licenses can be purchased by contacting either your Lenovo representative or a Lenovo Business Partner. These features offer the ability to:

- Establish out-of-band - in-band (OOB-IB) communication using reflection to synchronize the information obtained out-of-band (using SNMP) and in-band (using OS).
- Launch a Flex System Chassis Management Module (CMM) Web Console from the Operations Manager Console.
- Discover a Flex System Manager (FSM) device and launch an FSM Console in the Operations Manager Console.
- Monitor Flex System Chassis and modules using both SNMPv1 and SNMPv3. This feature requires the installation of the 4.0 license tool; the activation version is 255.0.

- Launch a Windows Integrated Management Module (IMM) Web Console server from the Operations Manager Console. This feature requires the installation of the 4.0 license tool; the activation version is 255.0.
- Utilize Active Power Management and Monitoring on uEFI and IMM System x servers and blades running Windows 2008 and Windows 2008 R2 with IBM Systems Director Agent Platform Agent v6.2.1 or later. You can monitor and manage the overall system power usage and generate alerts when power consumption rises above predefined consumption thresholds.
- Customize and set power consumption thresholds for power monitoring alerts.
- Set and enable power capping thresholds to manage maximum power consumption wattage.
- Monitor the power data of client System x systems by viewing the System x Power Data Chart.
- Reflect the health of the BladeCenter x86/x64 modules to the BladeCenter x86/x64 blade servers affected by those modules. BladeCenter and Blade hardware health correlation and event propagation provides BladeCenter specific hardware health condition monitoring under the Windows Health Explorer view.
- Enable the Hardware Management Software Configuration Advisor for Lenovo Systems (SW Configuration Advisor) program, which analyzes software dependencies of the Lenovo Hardware Management Pack on a managed Microsoft Windows system. The program is run from the Operations Manager management server. SW Configuration Advisor detects the presence of the Lenovo Hardware Management Pack software dependencies and makes appropriate configuration recommendations.
- Provides the ability to remotely power on and off blade servers using the Operations Manager Console.
- Discover the Integrated Management Module (IMM) and correlate it with the host.
- Monitor hardware components for IMM-based servers using agentless mode.

Note: All of the features listed above are available when the licensed feature level is at least 3.0, unless version 5.0 is noted for a particular licensed feature level.

Trial license support

A trial license is automatically activated, when you are installing this product for the first time, if a product license is not activated. After the trial license has been activated, the trial period is 90 days. During the trial period, the premium features are enabled.

Important: Before allowing the trial license to become activated, you need to verify that your system time is correct.

After the trial license expires, the premium features are disabled unless a product license is activated. You can obtain a product license from: Passport Advantage and Passport Advantage Express.

To view the license information for each managed server, click **Monitoring** > **Lenovo Hardware** > **Lenovo Licensed System Group**. The license information for each server is displayed in the **Lenovo HW Management Licensed System** column.

Chapter 2. Technical overview

The topics in this section describe how Microsoft System Center Operations Manager monitors the health of a management target, performs hardware failure management, authors management packs, and performs administrative operations.

A management target in Microsoft System Center Operations Manager can be a computer system, an operating system instance, an application, a network adapter, or a subcomponent within a management target. Lenovo Hardware Management Pack provides management innovation for its management targets. This scope of management classifies Operations Manager as a systems management software tool.

Upon discovering a Windows system, Microsoft System Center Operations Manager management server pushes the Microsoft System Center Operations Manager agent onto the system, along with scripts inside Lenovo Hardware Management Pack that provide policies for monitoring health and collecting events.

Lenovo Hardware Management Pack discovers and monitors the health of the BladeCenter Chassis and chassis components and discovers the Integrated Management Modules (IMMs) and correlates them with the host.

Lenovo Hardware Management Pack enhances the management of systems in Operations Manager along with the Reliability, Availability, Serviceability (RAS) of hardware server products.

With Microsoft System Center Operations Manager, you can create custom groups of objects to manage a holistic health aggregation based on your business needs. You can define different types of monitoring and aggregation rules for various groups.

For example, A provides hosting an application might have a per-client holistic health view of all the hardware, operating systems, applications, and other objects for that client. The hosting provider might also have a per-application view or multiple views available at the same time.

Microsoft System Center Operations Manager maintains operations databases for tracking all of the events being reported. Expert analysis of the operations databases can show deep cause and effect relationships in the historical data that can reveal the root cause of a sophisticated problem.

Operations Manager reports cooling fan availability based on the fan presence sensor reading and fan performance according to the fan tachometer reading. Lenovo Hardware Management Pack establishes relationships for hosting and aggregating, and also establishes health dependency among the management targets. Operations Manager provides health roll-ups and drill-downs to give you a holistic view of objects, and to allow you to quickly identify a specific problem.

How Lenovo Hardware Management Pack supports enhanced system features

With Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0, you can use the enhanced features of Microsoft System Center Operations Manager to communicate with Flex System and BladeCenter management modules, System x systems, and x86/x64 Blade servers that are installed with IBM Director Core Services or Platform Agent.

You can use Microsoft System Center Operations Manager to discover and holistically monitor all Flex chassis, BladeCenter chassis, IMM-based servers, and Windows-based servers because Lenovo Hardware Management Pack communicates with the following systems and components:

- BladeCenter Chassis and components
- Flex System Chassis and components
- Flex System Chassis x86/x64 Compute Nodes
- Integrated Management Module
- System x systems and BladeCenter x86/x64 blade servers

Lenovo Hardware Management Pack communicates with Flex System and BladeCenter Chassis and chassis components through the management module using Simple Network Management Protocol (SNMP) over a LAN.

Lenovo Hardware Management Pack communicates with individual servers, including BladeCenter Blade servers that are running Windows operating system and have a supported version of IBM Director Core Services or Platform Agent installed.

Lenovo Hardware Management Pack communicates with IMM-based servers using Service Location Protocol (SLP) and Common Information Model (CIM) over a LAN.

Notes: Lenovo Hardware Management Pack communicates with IMM-based servers using the network port **9500**. Ensure that this port is not blocked by the firewall. You can follow these steps to create a rule to pass the firewall:

1. Expand **Control Panel** > **System and Security** > **Windows Firewall** > **Advanced setting**.
2. To create an inbound rule:
   a. Right click **Inbound Rules** to invoke **New Rule**.
   b. Click **Port** and click **Next**.
   c. Click **TCP**.
   d. Set the value of **Specific local ports** to **9500** and click **Next**.
   e. Enter the rule name.
   f. Click **Finish**.

Management concepts

This topic describes management concepts as they apply to a BladeCenter being managed by Microsoft System Center Operations Manager.

After Microsoft System Center Operations Manager selects a server to manage, it pushes its Operations Manager Agent onto the managed system with Lenovo

Hardware Management Pack, if the target is a System x or BladeCenter x86/x64 Blade server. The Operations Manager Agent and Lenovo Hardware Management Pack communicate with the Director Agent and other software for hardware management on the system and across the network to the Operations Manager server.

Note: These management functions are supported on BladeCenter Chassis, Flex System Chassis, Flex System, and on System x x86/x64 Blade servers and compute nodes running Windows operating system. These functions are not supported on System i®, System p, and System z.

Chapter 3. Supported configurations

Lenovo Hardware Management Pack has specific requirements for hardware and software. The topics in this section provide detailed information about configurations, hardware, and software that is supported by this release of Lenovo Hardware Management Pack.

Supported servers

Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 supports a wide range of BladeCenter, Flex System, and System x servers.

For more information about supported Lenovo x 86 servers, refer to Lenovo Hardware Management Pack for Microsoft System Center Operations Manager - Lenovo x86 servers.

Note: Fee-based Power Monitoring support is available for the systems denoted with an "*" on the Supported systems list, if the system has the latest firmware. Power Monitoring requires that the system is running Windows 2008 or Windows 2008 R2 and the Director Agent v6.2.1 or later. For more information, see "Supported configurations of managed systems with Power Monitoring" on page 13.

For a description of the compatibility of a specific system with the Windows operating system and other hardware components, see "World Wide Web resources" on page xi and the respective ServerProven page for that system.

Supported BladeCenter Chassis

Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 supports a wide range of BladeCenter Chassis.

Table 1. Supported BladeCenter Chassis

Machine Name	Machine Type
Lenovo BladeCenter	7967
Lenovo BladeCenter E	8677
Lenovo BladeCenter H	8852, 7989
Lenovo BladeCenter S	8886, 7779
Lenovo BladeCenter T	8720, 8730
Lenovo BladeCenter HT	8740, 8750

Supported Flex System Chassis

Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 supports Flex System Chassis.

Table 2. Supported Flex System Chassis

Machine Name	Machine Type
IBM Flex System Chassis	7893, 8721, 8724

Supported configurations of management servers

Use the topics in this section to determine whether a system can be supported by Lenovo Hardware Management Pack as a management server. A management server is supported if it meets the requirements for Systems Center Operations Manager and is a supported hardware configuration.

Supported versions of Microsoft System Center Operations Manager for management servers

The following versions of Microsoft System Center Operations Manager for management servers are supported:

- Microsoft System Center Operations Manager 2012
- Microsoft System Center Operations Manager 2012 R2
- Microsoft System Center Operations Manager 2012 SP1
- Microsoft System Center Operations Manager 2007
- Microsoft System Center Operations Manager 2007 R2

Prerequisites for Hardware Failure Management

Verify each of the requirements:.

- Microsoft System Center Operations Manager (SCOM) and Microsoft System Center Virtual Machine Manager (SCVMM) are installed.
- The managed nodes (Lenovo hardware servers) are in clusters and managed by SCVMM and SCOM.
- The Integrated Management Module (IMM) for the Lenovo hardware servers is correctly set, including the IP address, CIM, SLP, and user accounts.

Supported operating systems for management servers

This topic provides a list of supported operating systems for management servers and links to additional information.

Microsoft System Center Operations Manager 2012
TechNet Library: System Requirements: System Center 2012 - Operations Manager

Microsoft System Center Operations Manager 2012 R2
TechNet Library: Preparing your environment for System Center 2012 R2 Operations Manager

Microsoft System Center Operations Manager 2012 SP1
TechNet Library: System Requirements: System Center 2012 SP1 - Operations Manager

Microsoft System Center Operations Manager 2007 SP1
Operations Manager 2007 SP1 Supported Configurations for the supported operating systems: Refer to the "Management server or root management server" row.

Microsoft System Center Operations Manager 2007 R2
Operations Manager 2007 R2 Supported Configurations for the supported operating systems: Refer to the "Management server or root management server" row.

Note: Microsoft System Center Operations Manager 2007 SP1 is supported on Windows Server 2008 and Windows Server 2008 SP1/R2 but requires that you apply a set of hot fixes.

For more information, see:

- Support for running Microsoft System Center Operations Manager Service Pack 1 and System Center Essentials 2007 Service Pack 1 on a Windows Server 2008-based computer
- Microsoft System Center Operations Manager 2007 SP1 Update Rollup

Additional configuration requirements for management servers

All Operations Manager management servers within the same management group, require the same version of Lenovo Hardware Management Pack is installed. Therefore, a mixed version of management packs is not supported.

- Management servers managing a BladeCenter require one of the following versions of Lenovo Hardware Management Pack is installed and imported to Operations Manager:
  - `Lenovo.HardwareMgmtPack.BladeCenter.mp`
  - `Lenovo.HardwareMgmtPack.BladeCenter.v2.mp`
- Management servers managing Flex System Chassis require one of the following versions of Lenovo Hardware Management Pack is installed and imported to Operations Manager:
  - `Lenovo.HardwareMgmtPack.FlexSystem.mp`
  - `Lenovo.HardwareMgmtPack.FlexSystem.v2.mp`

Supported configurations and requirements for a managed system

The topics in section describe supported configurations and requirements for a managed system.

A properly configured managed system has the following requirements:

- It is managed in an Operations Manager management group by a management server with a supported configuration.
- It is installed on a supported server. For more information, see “Supported servers” on page 7.
- It is running a supported version of Windows operating system.
- It is running the required software for hardware management.

Supported operating systems for managed systems

This topic provides a list of supported operating systems for managed systems and links to additional information.

Microsoft System Center Operations Manager 2012
TechNet Library: System Requirements: System Center 2012 - Operations Manager

Microsoft System Center Operations Manager 2012 R2
TechNet Library: Preparing your environment for System Center 2012 R2 Operations Manager

Microsoft System Center Operations Manager 2012 SP1
TechNet Library: System Requirements: System Center 2012 SP1 - Operations Manager

Microsoft System Center Operations Manager 2007 R2
TechNet Library: Operations Manager 2007 R2 Supported Configurations

Refer to the "Agent" row.

Microsoft System Center Operations Manager 2007 SP1
TechNet Library: Operations Manager 2007 SP1 Supported Configurations

Refer to the "Agent" row.

Supported versions of IBM Systems Director Agent

A managed Windows system requires that a supported version of IBM Systems Director Agent is installed and running.

The following table provides a list of IBM Systems Director Agent versions and indicates whether the version is supported for a managed Windows system.

Table 3. IBM® Systems Director Agent

IBM Systems Director Agent version	Supported by Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0	Notes
6.3, 6.3.1, 6.3.2, 6.3.3	Supported	Platform Agent and Common Agent are supported.
6.2.0, 6.2.1	Supported	Platform Agent and Common Agent are supported.
6.1.1, 6.1.2	Supported	Platform Agent and Common Agent are supported.
5.20, 5.20.1, 5.20.2, 5.20.3x	Supported	IBM Director Core Services (also called Level-1 Agent) or Level-2 Agent

Supported configurations of IBM Systems Director Agent

The following table provides a list of information resources for the hardware and software supported by each version of IBM Systems Director Agent.

Table 4. Supported configurations of IBM Systems Director Agent

IBM Systems Director Agent version	Supported hardware and software resources
6.3, 6.3.1, 6.3.2, 6.3.3	To view the most current Lenovo systems, products, and operating systems for v6.3.x, refer to: IBM Systems Director V6.3.3 and select the applicable 6.3.x version.
6.2.0, 6.2.1	• To view a list of supported Lenovo systems and products for v6.2.x, refer to: IBM Knowledge Center: Supported IBM systems and products for IBM Systems Director 6.2.1. • To view a list of supported Windows operating systems for v6.2.x, refer to: IBM Knowledge Center: Supported operating systems for IBM Systems Director 6.2.1.
6.1.2	• To view a list of supported Lenovo systems and products for v6.1.x, refer to: Supported IBM systems and products. • To view a list of supported Windows operating systems for v6.1.x, refer to: Operating systems supported by IBM Systems Director 6.1.2.
5.20.x	• To view a list of supported systems and products for v5.20, refer to: Supported Hardware. • To view a list of supported Windows operating systems for v5.20, refer to: Operating systems supported by IBM Director 5.20.

Supported configurations of managed systems with BMC or IPMI

A managed Windows system, with a Baseboard Management Controller (BMC) or an Intelligent Platform Management Interface (IPMI), requires that a supported version of the IPMI driver stack is installed and running.

Windows Server 2000 and Windows Server 2003

For Windows Server 2000 or Windows Server 2003, both the OSA IPMI device driver and the IBM Mapping Layer for the OSA IPMI driver are required. The OSA IPMI device driver for a Windows system is available at: OSA IPMI device driver v2.2.1.2 for Microsoft Windows Server 2000 and 2003 - IBM BladeCenter and System x.

Windows Server 2003 R2

For Windows Server 2003 R2, the IPMI driver must be installed and running. By default, the Microsoft IPMI driver is not installed.

Windows Server 2008

For all versions of Windows Server 2008, the Microsoft IPMI driver is required. The Microsoft IPMI driver is automatically installed on servers that come with BMC or an IPMI. There is no need to install the IBM Mapping Layer for OSA IPMI driver with the Microsoft IPMI driver stack.

The IBM Mapping Layer for OSA IPMI for Windows is available at:

- IBM Mapping Layer for OSA IPMI for x86 version
- IBM Mapping Layer for OSA IPMI for x64 version

To acquire and apply the latest firmware for the Baseboard Management Controller or an Intelligent Platform Management Interface on a managed system, see the Lenovo Systems Technical Support.

Supported configurations of managed systems with Remote Supervisor Adapter II

A managed Windows system, with Remote Supervisor Adapter (RSA) II, requires the RSA-II daemon is installed and running.

The RSA-II daemon for a Windows system is available at:

- IBM Remote Supervisor Adapter II for x86 version
- IBM Remote Supervisor Adapter II for x64 version

For systems that come with a Baseboard Management Controller (BMC), which also have the RSA II installed, the RSA II daemon is optional, if a supported Intelligent Platform Management Interface (IPMI) driver stack is installed and running. However, the RSA II daemon adds additional in-band system management functions to the functionality that is offered through the IPMI driver stack with a BMC.

IBM Systems Director Agent 6.x supports systems that have both BMC RSA II. Use IBM Systems Director Agent 5.20.3x with the RSA II daemon for these systems.

To acquire and apply the latest firmware for RSA II for a managed system, see the Lenovo Systems Technical Support.

Supported configurations of managed systems with ServeRAID-MR or MegaRAID

This topic describes the supported configurations of managed systems with ServeRAID-MR or MegaRAID.

The following table lists the requirements of systems with ServeRAID-MR or MegaRAID.

Table 5. Requirements for ServeRAID-MR and MegaRAID

IBM Systems Director Agent	Additional software needed
6.3, 6.3.1, 6.3.2, 6.3.3	No additional software is needed. The IBM Power® CIM Provider is part of the Platform Agent.
6.2.0, 6.2.1	No additional software is needed. The IBM Power CIM Provider is part of the Platform Agent.
6.1.2	No additional software is needed. The IBM Power CIM Provider is part of the Platform Agent.
5.20.x	Download and install the LSI MegaRAID Provider for a Windows system from IBM Director 5.2 Downloads.

To download and install the latest firmware and device driver for the ServeRAID-MR or MegaRAID controller for a managed system, see the Lenovo Systems Technical Support.

Supported configurations of managed systems with ServeRAID-BR/IR or Integrated RAID

This topic describes the supported configurations of managed systems with ServeRAID-BR/IR or Integrated RAID.

The following table lists the requirements of systems with ServeRAID-BR/IR or Integrated RAID.

Table 6. Requirements for ServeRAID-BR/IR and Integrated RAID

IBM Systems Director Agent version	Additional software needed
6.3, 6.3.1, 6.3.2, 6.3.3	No additional software is needed. The IBM Power CIM Provider is part of the Platform Agent.
6.2.0, 6.2.1	No additional software is needed. The IBM Power CIM Provider is part of the Platform Agent.
6.1.2	No additional software is needed. The IBM Power CIM Provider is part of the Platform Agent.
5.20.x	Download and install the LSI MegaRAID for a Windows system from IBM Director 5.2 Downloads.

To download and install the latest firmware and device driver for the ServeRAID-BR/IR or Integrated RAID Controller for a managed system, see the Lenovo Systems Technical Support.

Supported configurations of managed systems with ServeRAID versions 8x/7x/6x

This topic describes the supported configurations of managed systems with ServeRAID versions 8x/7x/6x.

The following table lists the requirements of systems with ServeRAID controller versions 8x, 7x, and 6x:

Table 7. Requirements of ServeRAID versions 8x/7x/6x

IBM Systems Director Agent version	Additional software needed
6.3, 6.3.1, 6.3.2, 6.3.3	No additional software is needed. The IBM Power CIM Provider is part of the Platform Agent.
6.2.0, 6.2.1	No additional software is needed. The IBM Power CIM Provider is part of the Platform Agent.
6.1.2	Not supported.
5.20.x	Download and install the ServeRAID Manager 9.0 – Windows L1 Agent or ServeRAID Manager 9.0 – Windows L2 Agent from IBM Director 5.2 Downloads.

To download and install the latest firmware and device driver for the ServeRAID-8x/7x/6x controller for a managed system, see the Lenovo Systems Technical Support.

Supported configurations of managed systems with Power Monitoring

This topic describes supported configurations of managed systems with Power Monitoring.

The IBM Power CIM Provider has the following hardware and software requirements:

- The physical hardware requires the latest versions of IMM and uEFI. IMM supports power monitoring and/or power capping.

For additional setup information see “Supported configurations of managed systems with BMC or IPMI” on page 11.

- IBM Systems Director Agent 6.2.1 or later
- The following Windows operating system versions:
  - Windows Server 2008
  - Windows Server 2008 SP1/R2
  - Windows Server 2008 SP1/R2 with Service Pack 1
  - Windows Server 2012

Chapter 4. Installing Lenovo Hardware Management Pack and other components

The topics in this section describe how to install, upgrade, uninstall, and reinstall Lenovo Hardware Management Pack and other components.

Overview of the installation process

The installation process starts by first installing a supported version of Microsoft System Center Operations Manager 2007 or 2012 on the management server. After Microsoft System Center Operations Manager and Microsoft System Center Virtual Machine Manager have been installed, Lenovo Hardware Management Pack can be installed on the management server.

Use the Operations Manager Discovery Wizard to add a Windows system on a System x server or a BladeCenter Blade server that Operations Manager will manage.

When the Lenovo Hardware Management Pack installation is finished, the following Microsoft System Center Operations Manager views are enhanced for System x and BladeCenter x86 systems:

Health explorer view
Examines the health state of the Lenovo BladeCenter Chassis and components and individual servers at a component level in a hierarchical view of availability, configuration, performance, and security.

Diagram view
Shows organizational views of the BladeCenter Chassis, System x, BladeCenter, and Compute Node x86/x64.

Events view
Captures events that occur on specific or aggregate targets of the BladeCenter Chassis, System x, and System x x86/x64 systems.

Active alerts view
Lists all alert notifications for specific or aggregate targets of the BladeCenter Chassis, System x, and BladeCenter x86/x64 systems.

For more information and instructions for the installation process, select one of the following options:

- TechNet Library: Deploying System Center 2012 - Operations Manager
- TechNet Library: Deploying System Center 2012 - Virtual Machine Manager

Installation requirements for Lenovo Hardware Management Pack

This topic describes the installation requirements for Lenovo Hardware Management Pack.

The following list outlines the installation requirements.

- You need to have administrative privileges for the system where you are installing Lenovo Hardware Management Pack and also for the Operations Manager management group where you are importing the management packs.

- You need to install Lenovo Hardware Management Pack on a Lenovo system that is running as a Microsoft System Center Operations Manager management server. The server can be in the root management server of the Operations Manager management group or a non-root management server in the management group. See "Supported configurations of management servers" on page 8 for detailed requirements.
- If Lenovo Hardware Management Pack is being installed on a server with Microsoft System Center Operations Manager 2007, you should install Microsoft .NET Framework Version 4.0 first.

The versions of Lenovo Hardware Management Pack required for Microsoft System Center Operations Manager 2007 and Microsoft System Center Operations Manager 2012 are listed in the tables below. Lenovo Hardware Management Pack requires a minimum version as noted or a later, supported version.

Table 8. Lenovo Hardware Management Pack versions required for Microsoft System Center Operations Manager 2007

Management Pack name	Management Pack ID	Management Pack version
Health Library	System.Health.Library	6.0.5000.0
System Library	System.Library	6.0.5000.0
Performance Library	System.Performance.Library	6.0.5000.0
SNMP Library	System.Snmp.Library	6.0.6278.0
Data Warehouse Library	Microsoft.SystemCenter.Datawarehouse.Library	6.0.6278.0
System Center Core Library	Microsoft.SystemCenter.Library	6.0.5000.0
Network Device Library	Microsoft.SystemCenter.NetworkDevice.Libary	6.0.6278.0
Windows Core Library	Microsoft.Windows.Library	6.0.5000.0

Table 9. Lenovo Hardware Management Pack versions required for Microsoft System Center Operations Manager 2012

Management Pack name	Management Pack ID	Management Pack version
Health Library	System.Health.Library	6.0.5000.0
System Library	System.Library	6.0.5000.0
Performance Library	System.Performance.Library	6.0.5000.0
SNMP Library	System.Snmp.Library	6.0.6278.0
Data Warehouse Library	Microsoft.SystemCenter.Datawarehouse.Library	6.0.6278.0
System Center Core Library	Microsoft.SystemCenter.Library	6.0.5000.0
Network Device Library	System.NetworkManagement.Library	7.0.8107.0
Windows Core Library	Microsoft.Windows.Library	6.0.5000.0

Before you install Lenovo Hardware Management Pack

This topic provides additional information that will assist you with the installation of Lenovo Hardware Management Pack.

- For Microsoft System Center Operations Manager 2007, you can install the Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 on either a root management server or a non-root management server. A root management server is the first management server in a management group, where you install Operations Manager.
- For Microsoft System Center Operations Manager 2012, you can install Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 on a non-root management server.
- You must have a sufficient level of privilege and knowledge about the root management server and non-root management server before you can start the installation process.
- There is only one installation package for Lenovo Hardware Management Pack for both the Windows 32-bit and 64-bit operating systems. To start the installation, follow the instructions for locating and launching the correct installation package in "Installing Lenovo Hardware Management Pack."
- If you have an earlier version of Lenovo Hardware Management Pack installed on a management server or the management packs have already been imported to Operations Manager, see "Upgrading to Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0" on page 24.

  Note: You can install or uninstall Lenovo Hardware Management Pack by using the Lenovo XClarity Integrator for Microsoft System Center Installer. Refer to the *Lenovo XClarity Integrator for Microsoft System Center Installer User's Guide* at: Lenovo XClarity Integrator for Microsoft System Center for more information on how to perform this action.

Installing Lenovo Hardware Management Pack

The following procedure describes how to install Lenovo Hardware Management Pack.

Before you begin

If you are running Microsoft System Center Operations Manager 2007 Service Pack 1 (SP1) on Windows Server 2008, install the service packs for both Windows Server 2008 and Microsoft System Center Operations Manager 2007 SP1 before proceeding with the Hardware Management Pack installation.

For more information about how to install service packs, refer to: Microsoft Support: Support for running System Center Operations Manager 2007 Service Pack 1 and System Center Essentials 2007 Service Pack 1 on a Windows Server 2008-based computer.

Procedure

1. In the File Details section of the Lenovo Hardware Management Pack for Microsoft System Center Operations Manager - Lenovo x86 servers web page, locate the file named `lnvgy_sw_hwmp_x.x.x_windows_32-64.exe` and download Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0.
2. To start the installation process, double-click the downloaded installation executable file: `lnvgy_sw_hwmp_x.x.x_windows_32-64.exe`.

For more information about installing Microsoft System Center Operations Manager 2007, see: TechNet Library: Operations Manager 2007 R2 Quick Start Guide.

For more information about installing Microsoft System Center Operations Manager 2012, see: TechNet Library: Deploying System Center 2012 - Operations Manager.

The Welcome to the InstallShield Wizard for Lenovo Hardware Management Pack for Microsoft Operations Manager v6.0 page opens.

Note: If the installer cannot find Microsoft System Center Operations Manager on your system, the installation closes.

3. Click **Next**. The Software License Agreement page opens.

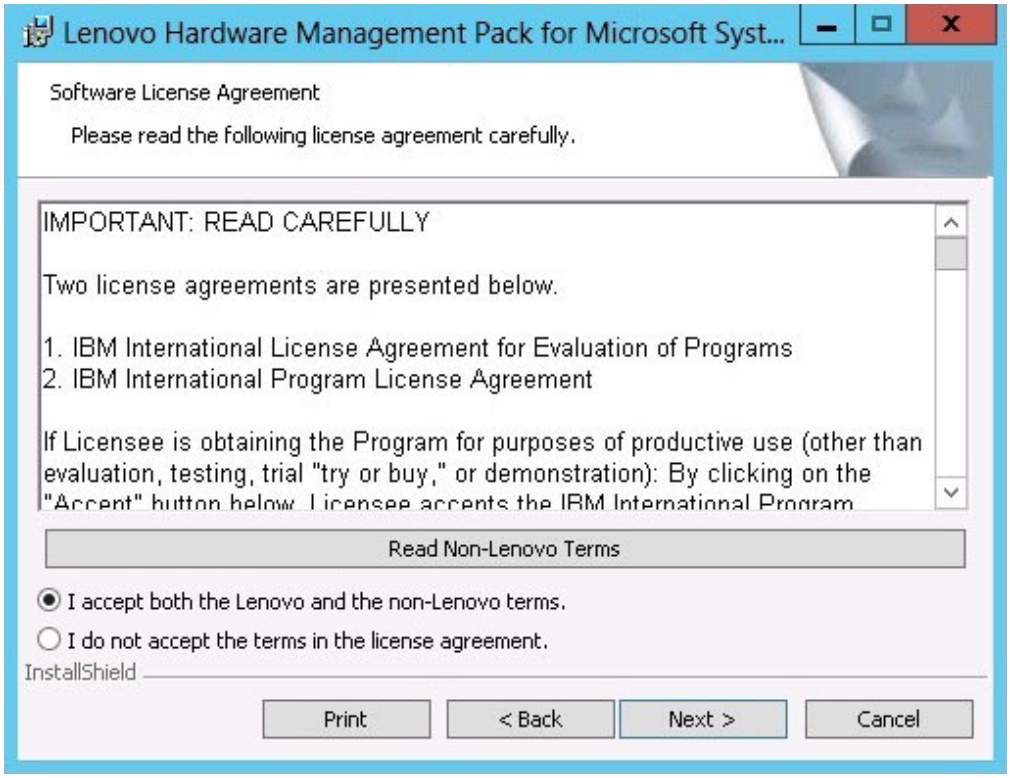

Figure 1. Software License Agreement

4. Read the Software License Agreement for Lenovo terms and then click **Read Non-Lenovo Terms** to read the Non-Lenovo Terms. If you agree and accept both the Lenovo and Non-Lenovo terms, select **I accept the Lenovo and the non-Lenovo terms** and click **Next**.

   Notes:

   - If this is the first installation of Lenovo Hardware Management Pack and no product license is activated, the Trial Version page opens. Complete step 5 on the Trial Version page.
   - If a product license is activated, complete step 6.

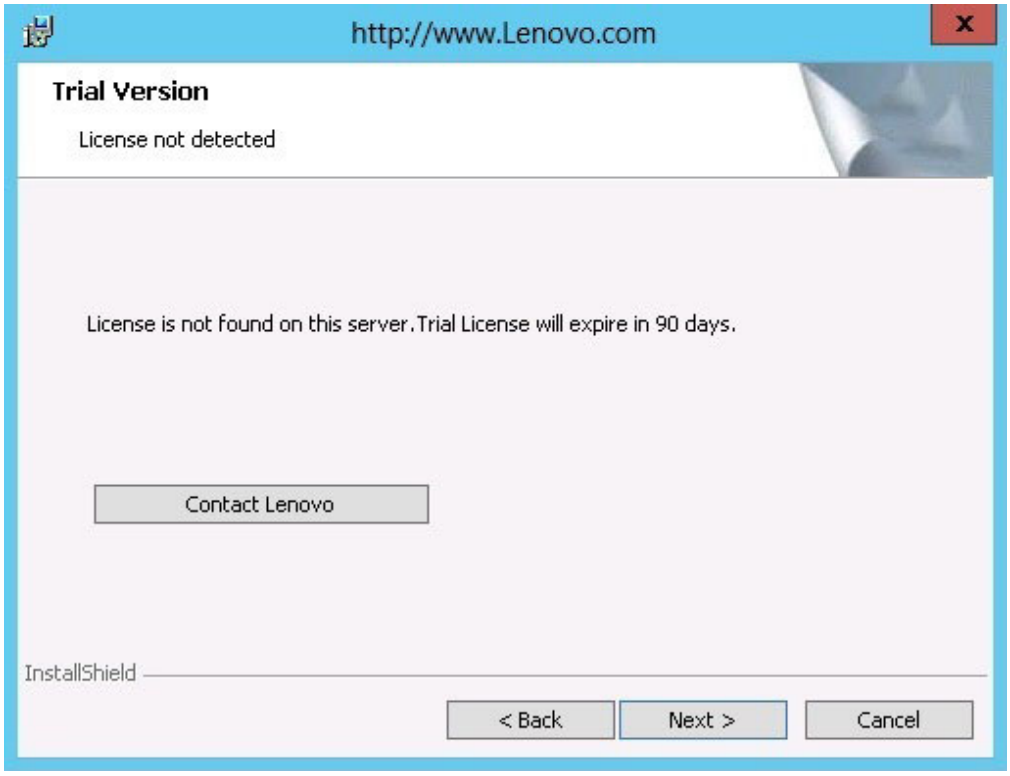

Figure 2. Trial Version

5. On the Trial Version page, select one of the following options:
   - **Contact Lenovo** to obtain a product license.
   - **Next** to proceed to the Destination Folder page.
6. On the Destination Folder page, verify whether the default target location is correct and click **Next**, or click **Change** to select a target folder for the installation software and then click **Next**.

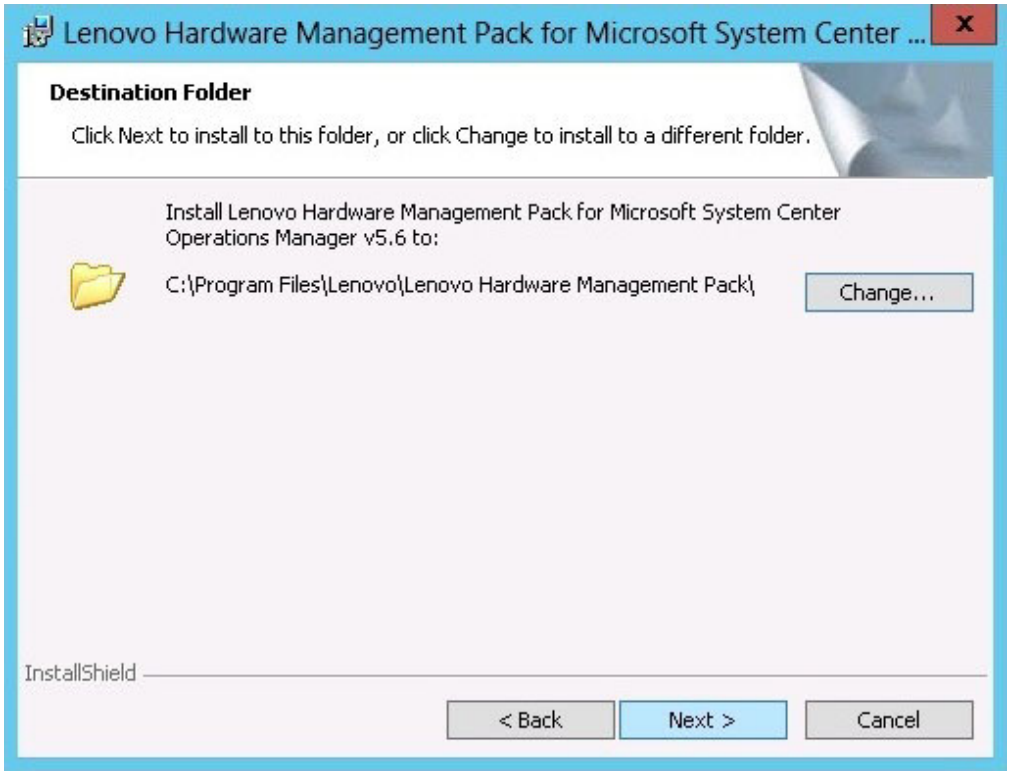

Figure 3. Destination folder

7. If your system had a previous installation of Lenovo Hardware Management Pack, the Program Maintenance page opens. Select one of the following options.

   Repair function:

   Reinstalls the code and registry entries on the local server.

   If the system already has version v6.0 installed, you can select to repair or remove the Lenovo Hardware Management Pack code.

   Verify the default target location. If necessary, select a target folder for the installation code. Refer to the knowledge articles that describe systems and components.

   Remove function:

   Uninstalls the Lenovo Hardware Management Pack package from the local system but does not delete the management packs from Operations Manager.

   Use the Operations Manager Console to delete the management packs from Operations Manager.

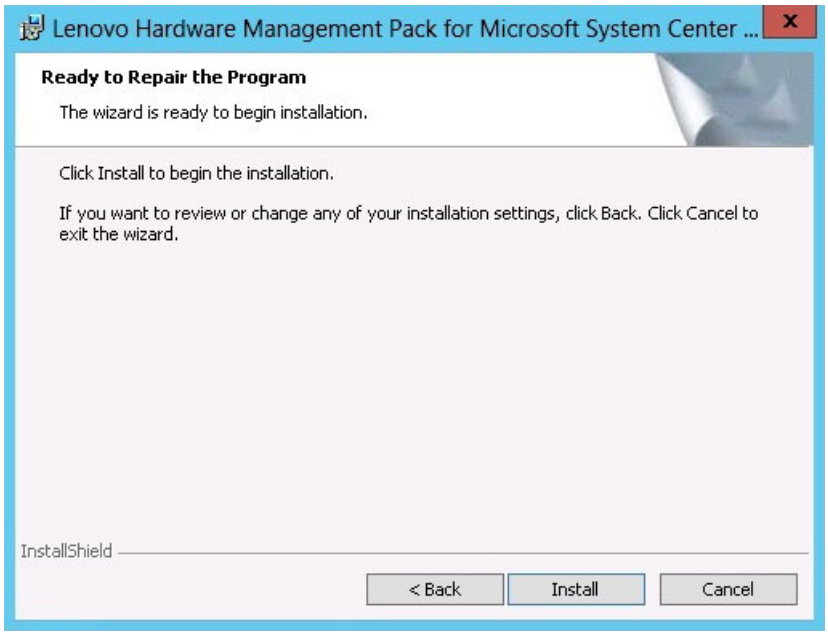

Figure 4. Ready to Repair Program

8. If you selected **Repair Function**, click **Install** to proceed with the repair. The Install/Repair/Remove Confirmation page opens.
9. Click **Next** to confirm the installation.

   If you are installing on a non-root management server, you need to manually configure the root management server name.
10. When the installation is finished, select **Read me** and **Import Management packs to the Operations Manager**, and then click **Finish**.

    Note: `Import management packs to Operations Manager` is displayed when the software dependency is satisfied. When this option is not displayed, you must import the management packs manually. The imported management packs may not be visible from Operations Manager Console until Operations Manager refreshes the management pack inventory data. If the `Import management packs to Operations Manager` is not displayed, perform the following steps to manually import the management packs.
11. Read the `PostSetupCheckList.rtf` file and take the suggested actions. The `PostSetupCheckList.rtf` file is installed in: `%Program Files%\Lenovo\Lenovo Hardware Management Pack\.`
12. Open the Operations Manager Console to import the Lenovo Hardware Management Pack management packs to Operations Manager.
13. Click the **Administration** button, right-click **Management Packs**, and then click **Import Management Packs**.
14. Follow the wizard directions to manually import the five Lenovo Hardware Management Pack management packs. By default, the management packs are installed in `%Program Files%\Lenovo\Lenovo Hardware Management Pack\Management Packs`.

Lenovo Hardware Management Packs

After the Lenovo Hardware Management Packs are successfully imported, the Lenovo Hardware Management Packs listed below are displayed in the Administration pane of the Operations Manager Console.

For Microsoft System Center Operations Manager 2012, the Lenovo Hardware Management Packs are:

Lenovo Hardware Management Pack - Common Library:
`Lenovo.HardwareMgmtPack.Common.mp`

Lenovo Hardware Management Pack for Lenovo System x and x86/x64 Blade Systems:
`Lenovo.HardwareMgmtPack.xSystems.mp`

Lenovo Hardware Management Pack for Lenovo BladeCenter Chassis and Modules:
`Lenovo.HardwareMgmtPack.BladeCenter.v2.mp`

Lenovo Hardware Management Pack – Hardware IDs Library:
`Lenovo.HardwareMgmtPack.HardwareIDs.mp`

Lenovo Hardware Management Pack - Relation Library:
`Lenovo.HardwareMgmtPack.Relation.v2.mp`

Lenovo Hardware Management Pack for Lenovo Flex System Chassis and Modules:
`Lenovo.HardwareMgmtPack.FlexSystem.v2.mp`

Lenovo Hardware Management Pack - Flex Relation Library:
`Lenovo.HardwareMgmtPack.RelationCMM.v2.mp`

Lenovo Hardware Management Pack for Lenovo Integrated Management Module:
`Lenovo.HardwareMgmtPack.IMM2.v2.mp`

For Microsoft System Center Operations Manager 2007, the Lenovo Hardware Management Packs are:

Lenovo Hardware Management Pack - Common Library:
`Lenovo.HardwareMgmtPack.Common.mp`

Lenovo Hardware Management Pack for Lenovo System x and x86/x64 Blade Systems:
`Lenovo.HardwareMgmtPack.xSystems.mp`

Lenovo Hardware Management Pack for Lenovo BladeCenter Chassis and Modules:
`Lenovo.HardwareMgmtPack.BladeCenter.mp`

Lenovo Hardware Management Pack – Hardware IDs Library:
`Lenovo.HardwareMgmtPack.HardwareIDs.mp`

Lenovo Hardware Management Pack - Relation Library:
`Lenovo.HardwareMgmtPack.Relation.mp`

Lenovo Hardware Management Pack for Lenovo Flex System Chassis and Modules:
`Lenovo.HardwareMgmtPack.FlexSystem.mp`

Lenovo Hardware Management Pack - Flex Relation Library:
`Lenovo.HardwareMgmtPack.RelationCMM.mp`

Lenovo Hardware Management Pack for Lenovo Integrated Management Module:
`Lenovo.HardwareMgmtPack.IMM2.mp`

Note: Sometimes management pack entries do not display immediately after the installation. Refresh the window by pressing **F5**, or wait a few minutes for the management pack entries to display.

Installing Lenovo Hardware Management Pack on more than one management server

The following procedure describes how to install Lenovo Hardware Management Pack on more than one management server.

Procedure

1. Install Lenovo Hardware Management Pack on all the required management servers for your system.
2. Import the management packs on one of the management servers to Operations Manager.

   Note: To manage more than one BladeCenter in disparate networks, install Lenovo Hardware Management Pack on more than one management server. This enables communication with the respective BladeCenters by using SNMP. A management server can manage more than one BladeCenter Chassis as long as the management server can use SNMP to communicate with the target chassis.

   For more detailed information about importing management packs, refer to the documentation for Microsoft System Center Operations Manager 2007 or Microsoft System Center Operations Manager 2012.

Installing IBM Power CIM Provider

Installation of the IBM Power CIM Provider premium feature is optional. This feature enables power management on power-capable target systems.

Before you begin

Power management is a premium feature that requires the purchase of an activation license. For details about obtaining an activation license, contact your Lenovo sales representative.

For a list of servers that provide power management capabilities, see "Supported servers" on page 7.

About this task

Unlike the Lenovo Hardware Management Pack installation, the IBM Power CIM Provider installation must be performed on every endpoint where power management functionality is desired.

Procedure

- Locate the IBM Power CIM Provider installation file, `IBMPowerCIMInstaller.msi`.

  By default, the installer file is in the toolbox directory: `%ProgramFiles%\Lenovo\Lenovo Hardware Management Pack\toolbox`.
- To run an automated silent installation of the IBM Power CIM Provider without user interface prompting, execute the following command: **msiexec /qn /i IBMPowerCIMInstaller.msi**.

When the installation is run in silent mode, the default folder location `C:\Program Files\IBM\IBM Power CIM Provider\` is used as the target for all installation files.

The user interface level of the installation program can be controlled with standard **msiexec** command-line parameters.

- Similarly, to run a silent uninstallation of the IBM Power CIM Provider, execute the following command: **msiexec /qn /x IBMPowerCIMInstaller.msi**.
- The IBM Power CIM Provider installer executes a customizable action-batch script during the installation process to register the provider with the Director Agent CIM server.

  If any errors occur while running this script, the details of the errors are logged to a file called `RegIBMPowerCIM.log` in the IBM Power CIM Provider installation directory. Consult this file for more detailed information about installation and uninstallation results.
- Do not run more than one instance of the Power CIM installer at a time. IBM Power CIM installer cannot detect multiple, simultaneous installation instances of itself.

The Lenovo License Tool and activating the premium features

To activate the premium features, the Microsoft System Center Operations Manager (SCOM) and Lenovo XClarity Integrator for Microsoft System Center requires that you activate the license on the SCOM server only. It is not necessary to activate the license on each management target (client).

The license token is automatically delivered to the client when it is managed by a licensed SCOM server. For more information about activating the premium features, refer to the *Lenovo XClarity Integrator for Microsoft System Center Installer Guide*.

Upgrading to Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0

If you start the installation process and discover that a prior version of Lenovo Hardware Management Pack is already installed, the installation program automatically performs an upgrade of Lenovo Hardware Management Pack.

To upgrade to version v6.0, on the Operations Manager Console, place the management server where you are installing Lenovo Hardware Management Pack, in maintenance mode. Keep the management server in maintenance mode until you finish importing the new management pack.

Note: When upgrading from v4.5, the `automatic import MP` function might not import the new management pack. The program cannot identify whether there was an upgrade or a failure in the previous installation. Since a new management pack is introduced in v5.0 and later versions, you need to manually import the management pack when upgrading from v4.5.

Upgrading Lenovo Hardware Management Pack on more than one management server

If you are upgrading Lenovo Hardware Management Pack on more than one management server, complete the following procedure.

Procedure

1. Finish installing Lenovo Hardware Management Pack on all of the management servers completely before importing the management packs.
2. When the installation is finished, take the management servers out of maintenance mode.

Uninstalling Lenovo Hardware Management Pack v6.0

The following procedure describes how to uninstall Lenovo Hardware Management Pack.

Procedure

1. Place the server from which you are uninstalling Lenovo Hardware Management Pack, into maintenance mode.
2. Remove the management pack entries from the Operations Manager Console. For more information, see "Deleting Lenovo Hardware Management Packs."
3. Use **Add or Remove Programs** to remove Lenovo Hardware Management Pack.

Deleting Lenovo Hardware Management Packs

To prevent errors caused by missing runtime support libraries, delete the management packs from Operations Manager first before removing the Lenovo Hardware Management Pack package. Errors can also occur if you uninstall Lenovo Hardware Management Pack from more than one management server.

Before you begin

If you plan to continue using Lenovo Hardware Management Pack, but only need to move the responsibility of one management server to another server, make sure that a new designated management server has taken over the responsibility successfully before you remove the installed Lenovo Hardware Management Pack package.

Procedure

1. In the Administration pane of the Operations Manager Console, select and delete the following management pack entries of Lenovo Hardware Management Pack from Operations Manager:
   - Lenovo Hardware Management Pack – Common Library
   - Lenovo Hardware Management Pack for System x and x86/x64 Blade Systems
   - Lenovo Hardware Management Pack for BladeCenter Chassis and Modules
   - Lenovo Hardware Management Pack – Hardware IDs Library
   - Lenovo Hardware Management Pack – Relation Library
   - Lenovo Hardware Management Pack for Flex System Chassis and Modules
   - Lenovo Hardware Management Pack – Flex Relation Library
   - Lenovo Hardware Management Pack for Lenovo Integrated Management Module
2. Remove the software package and files as described in "Uninstalling the software package" on page 26, by using the **Add/Remove Programs** option.

Removing the IBM Power CIM Provider

The following procedure describes how to remove the IBM Power CIM Provider.

About this task

To remove the IBM Power CIM Provider, perform step 1. Step 2 provides explains how to view uninstallation results and debug information.

Procedure

1. By using **Add/Remove Programs** on the managed server, select the IBM Power CIM Provider you want to remove, and click **uninstall**. The CIM Server, *wmicimserver* may take a few minutes to completely unload the IBM Power CIM Provider.
2. Check the IBM Power CIM Provider installation directory for a file called `RegIBMPowerCim.log`, which lists the output from the uninstallation process. This log file will indicate whether an error may have occurred during uninstallation.

   Notes:

   - To avoid unpredictable results, uninstall the IBM Power CIM Provider before uninstalling the Director Agent.
   - If you accidentally uninstall Director Agent first, and then try uninstalling IBM Power CIM Provider, the IBM Power CIM Provider may not get uninstalled.

     Complete the following steps.

     a. To uninstall IBM Power CIM Provider, reinstall Director Agent, and repair the IBM Power CIM Provider.

     b. Uninstall IBM Power CIM Provider, and then uninstall the Director Agent.

Uninstalling the software package

The following procedure describes how to uninstall Lenovo Hardware Management Pack.

Procedure

1. Remove the management pack entries as described in "Deleting Lenovo Hardware Management Packs" on page 25.
2. Uninstall the software package and files entirely by using **Add/Remove Programs** in the Windows Control panel, select **Remove the Lenovo Hardware Management Pack for Microsoft System Center Operations Manager 2007, v5.5**.

Downgrading to a previous version of Lenovo Hardware Management Pack

To downgrade Lenovo Hardware Management Pack to a previous version of Lenovo Hardware Management Pack, complete the following procedure.

Procedure

1. Uninstall the current version of Lenovo Hardware Management Pack.
2. Reinstall the prior version of Lenovo Hardware Management Pack.

Information about reinstalling Lenovo Hardware Management Pack v6.0

If you recently removed management packs from the Operations Manager Console, you need to wait for the settings to be propagated to the Operations Manager Console database before you can reinstall.

Important: If you do not wait for the removal of the management packs to register, reinstalling can result in managed clients not being listed in Operations Manager.

See Microsoft Support: Discovery information is missing after you delete and then reimport a management pack in Microsoft System Center Operations Manager 2007 for information about this known limitation for Microsoft System Center Operations Manager.

If you remove the management packs from the console, you detach Lenovo Hardware Management Pack from the Microsoft System Center Operations Manager server. You must then reinstall Lenovo Hardware Management Pack into Microsoft System Center Operations Manager and add the management packs back to the console view.

Configuring BladeCenter SNMP settings

BladeCenter Chassis that are correctly enabled for SNMP can be discovered automatically by Microsoft network device discovery. After installing Lenovo Hardware Management Pack, you can determine if the BladeCenter Chassis are discoverable by completing the following procedure.

Procedure

1. To view the Microsoft System Center Operations Manager consoles that discover BladeCenter Chassis, click **Lenovo Hardware** > **Lenovo BladeCenters and Modules** > **Windows Computers for managing Lenovo BladeCenters**.

   Use this view to identify the health of computers that have Lenovo Hardware Management Pack installed and are able to discover and manage BladeCenter Chassis and components.
2. To monitor BladeCenter Chassis and modules, click **Monitoring** > **Lenovo Hardware** > **Lenovo BladeCenter(s) and Modules**.

   Chassis units are displayed in the results pane followed by a view of their components and organized the same way management modules present components:
   - Lenovo BladeCenter Blades
   - Lenovo BladeCenter Chassis
   - Lenovo BladeCenter Cooling Modules
   - Lenovo BladeCenter I/O Modules
   - Lenovo BladeCenter Management Modules
   - Lenovo BladeCenter Media Modules
   - Lenovo BladeCenter Power Modules
   - Lenovo BladeCenter Storage Modules

   Each module type has a health state and the following properties:
   - A product name and a logical name for blades
   - A product name and a logical name for the module

- Physical location information

3. Log in to the Lenovo BladeCenter AMM web console.
4. To set ports for SNMP communication for a Lenovo BladeCenter Chassis that has not been discovered automatically, click **MM Control** > **Port Assignment** on the management module web console.

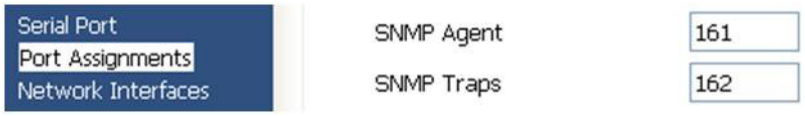

Figure 5. Default SNMP ports

Use the default SNMP ports of **161** for agent (queries/polling) and **162** for trapping. It is important for the SNMP port settings to be consistent. Otherwise, Operations Manager cannot discover the BladeCenter Chassis.

5. To change the SNMP settings, click **MM Control** > **Network Protocols** > **Simple Network Management Protocol SNMP** and complete the following steps.
   a. Select **Enabled for SNMP Traps, SNMP v1 agent**.

Table 10. SNMP settings

Community name	Access type	Fully qualified host name or IP address
Public	Set	yourOpsMgrServer.yoursite.yourcompany.com

   b. Enter the following information for each Operations Manager management server that manages the BladeCenter:
      - **Community name** is assigned to the BladeCenter through which SNMP communicates.
      - The **Fully qualified host name or the IP address**.
   c. From the **Access type** list, select **Set**. **Set** is the access type required for enabling the management tasks. A task example is remotely powering on or off a blade server through the Operations Manager Console.

      If you do not intend to allow this type of task through the Operations Manager Console, you can lower the access type to **Trap**. At a minimum, the **Trap** access type must be set for the Operations Manager server to perform SNMP queries and receive SNMP traps from the BladeCenter.

   To receive events from management modules, a network connection must exist between the management module and Operations Manager. You must also configure the management module to send events.
6. To enable alerts using SNMP over the LAN in firmware revision 46, click **MM Control** > **Alerts**. In the right pane, under **Remote Alert Recipients**, click the **not used** link to configure the alert recipient as illustrated in the next figure. This step might vary slightly depending on the firmware level.

Figure 6. Enabling alerts using SNMP

a. In the new Remote Alert Recipient window, change the status from **Disabled** to **Enabled**.

b. In the **Name** field, enter a descriptive name for the management server for Operations Manager that you will use for managing the BladeCenter. See "Discovering a BladeCenter in Microsoft System Center Operations Manager 2007" on page 30 for more about the **Management Server** setting.

c. From the **Notification method** list, select **SNMP over LAN** .

d. Click **Save**. The following figure is an example of a completed Remote Alert Recipient.

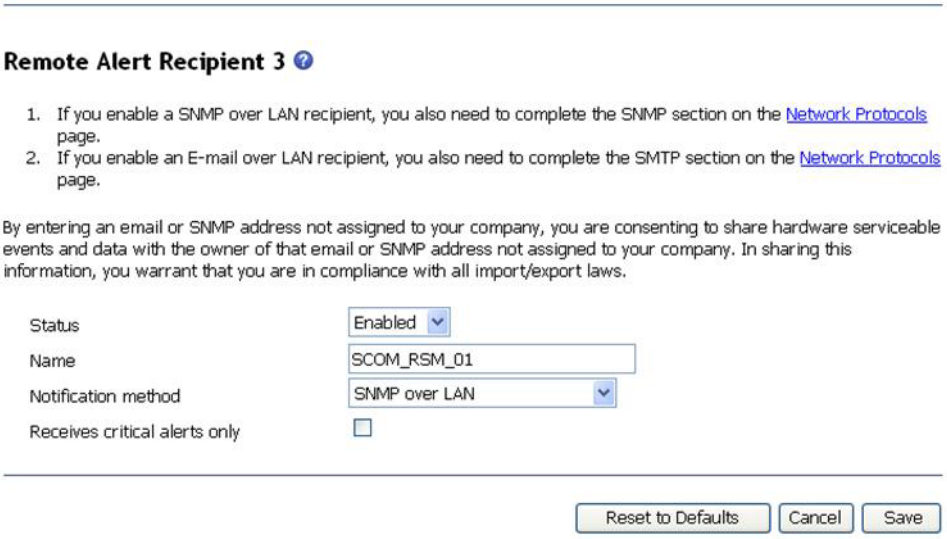

Figure 7. Remote Alert Recipient

7. Complete the following instructions for firmware revision 46:
   a. In the navigation pane, under **MM Control**, click **Alerts**.
   b. From the context menu, select **Monitor Alerts**.
   c. Select the alerts to send, and click **Save**.

The following figure provides an example of what is displayed after completing this task.

Figure 8. Monitored alerts

Discovering a BladeCenter in Microsoft System Center Operations Manager 2007

The following procedure describes how to discover a BladeCenter in Microsoft System Center Operations Manager 2007.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. In navigation pane, click **Administration** > **Device Management** > **Agent Managed** > **Discovery Wizard** to start the Computers and Device Management Wizard.

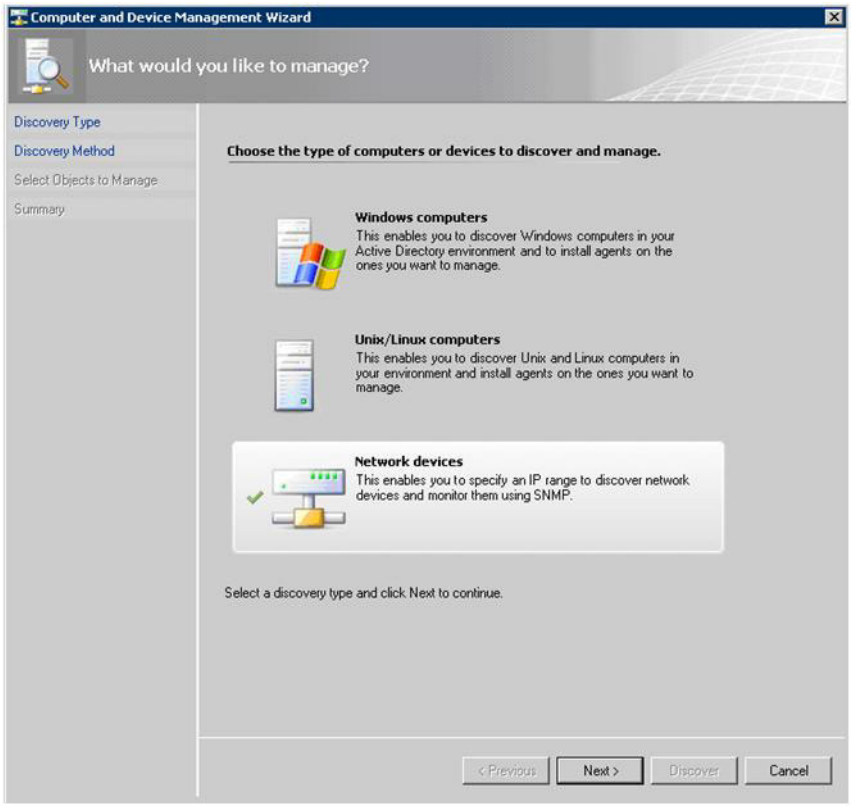

Figure 9. Discovery Wizard

2. On the What would you like to manage page, click **Network devices** and click **Next**, as shown in the figure above for Microsoft System Center Operations Manager 2007 R2.

   Note: For Microsoft System Center Operations Manager 2007 SP1, make the following selections:

   a. Click **Advanced discovery** for the **Auto or Advanced?**.
   b. Click **Network Devices for Computer & Device Types**.
   c. From the **Management Server** list, select the management server that will discover and manage the BladeCenter.

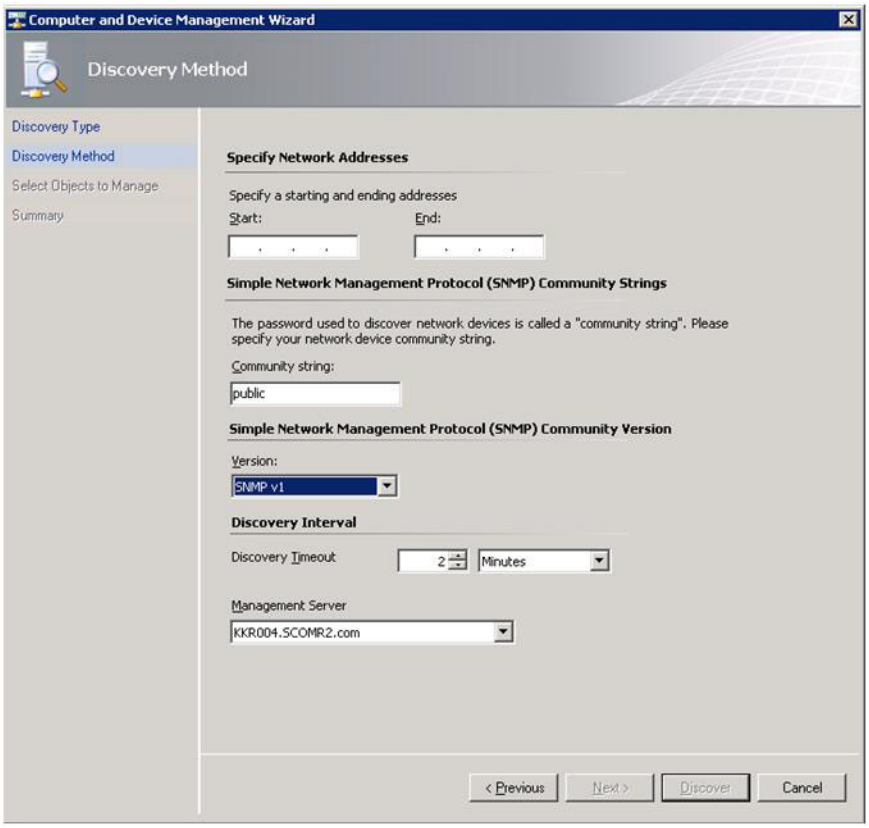

Figure 10. Discovery Method

3. On the Discovery Method page, enter the following information:
   a. **Specify Network Addresses**: Provide an IP address range for discovery. Enter the **start** and **end** IP addresses.
   b. **Community String**: Enter the name used on the chassis SNMP settings.
   c. **Version**: From the **Version** list, select **SNMPv1** .
   d. **Discovery Interval**: Select the Discovery Timeout, selecting the timeout number of minutes.
   e. **Management Server**: Select the Microsoft System Center Operations Manager management server that will discover and manage the target BladeCenter.

      Note: Ensure the management server that has Lenovo Hardware Management Pack installed is also setup to discover and manage the target chassis through its SNMP settings. For more information, see “Configuring BladeCenter SNMP settings” on page 27 and “Discovering a Flex System Chassis enabled for SNMP” on page 41.
   f. Click **Discovery** to open the Select Objects to Manage page.

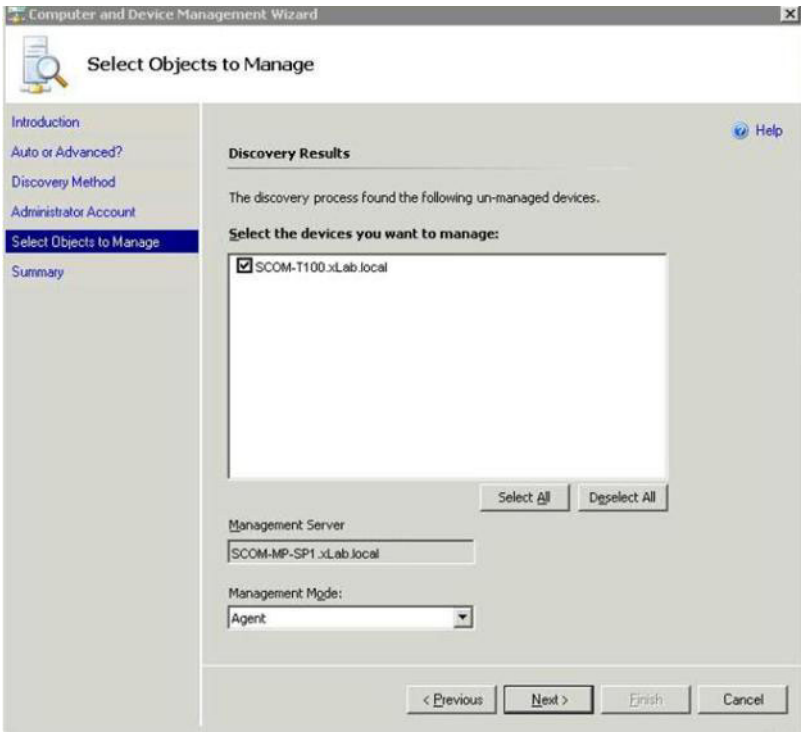

Figure 11. Select Objects to Manage

4. Complete the following steps, and then click **Next**.
   a. **Select the devices you want to manage**: Select the IP address of the chassis unit to manage.
   b. **Management Server**: Accept the default values.
   c. **Management Mode**: Accept the default values.

   Note: For Microsoft System Center Operations Manager 2007 SP1, enter the name of the Microsoft System Center Operations Manager Management Server that you entered in the **Proxy Agent** field on the Auto or Advanced page.

Discovering a BladeCenter in Microsoft System Center Operations Manager 2012

The following procedure describes how to discover a BladeCenter in Microsoft System Center Operations Manager 2012.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. In the navigation pane, click **Administration** > **Device Management** > **Agent Managed** > **Discovery Wizard** to start the Computers and Device Management Wizard.
2. In the navigation pane, click **Discovery Types**.

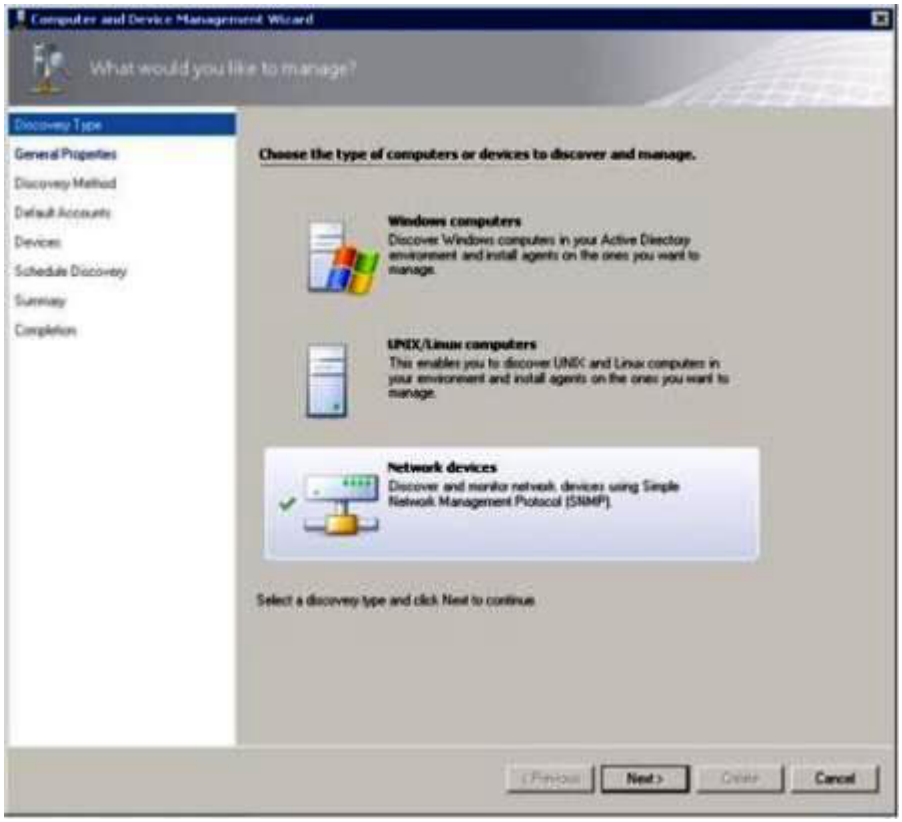

Figure 12. Discovery types

3. On the What would you like to manage page, click **Network devices** and click **Next**, as shown in the figure above.

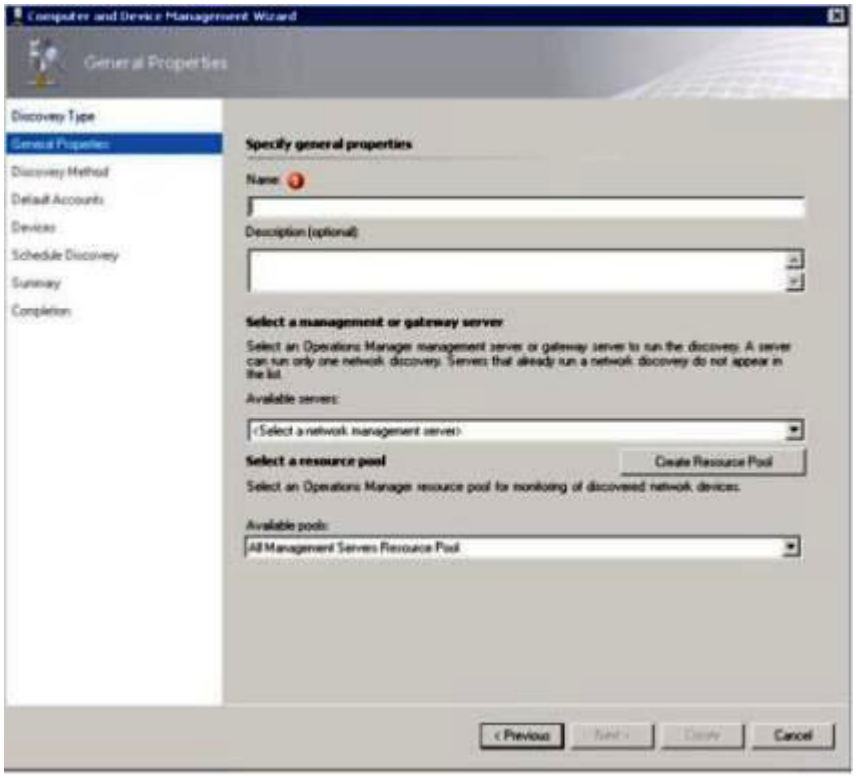

Figure 13. General Properties page

4. On the General Properties page, complete the following steps, and then click **Next**.
   a. In the **Name** field, enter the name of the discovery rule.
   b. Select **Available management server**.
   c. Select **Resource pool**.
5. On the Discovery Method page, select **Explicit Discovery** and click **Next**.
6. On the Default Accounts page, select **Create Account** and click **Finish** to create the community string. The Create Run As Account Wizard starts, and the Introduction page opens.

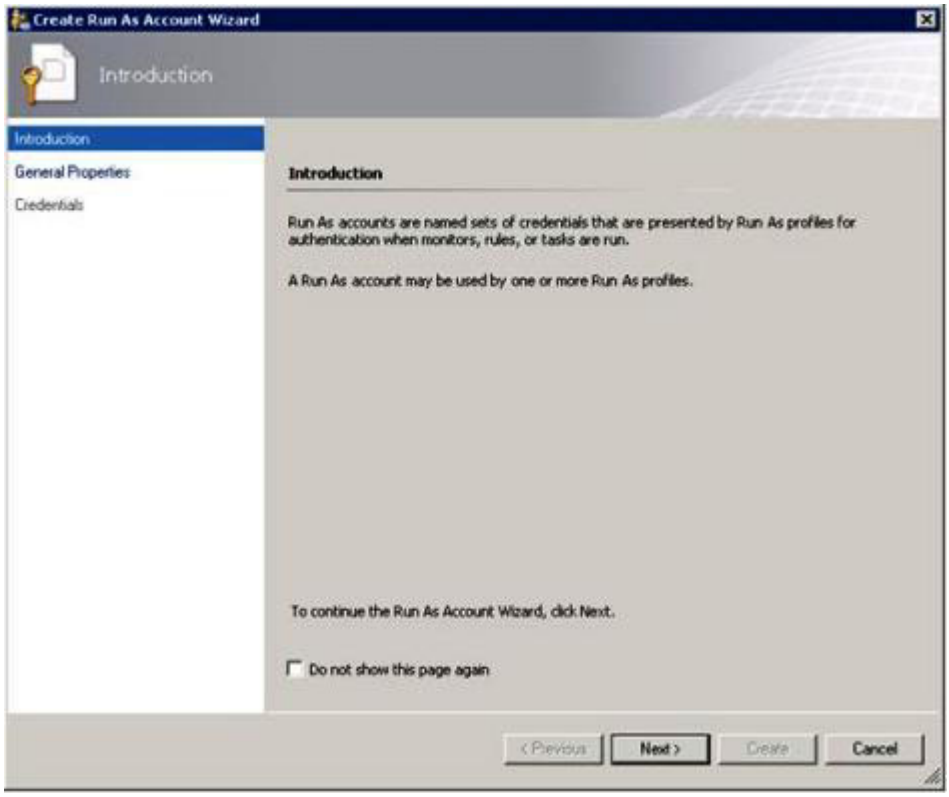

Figure 14. Introduction

7. On the Introduction page, click **Next**. The Devices page opens.

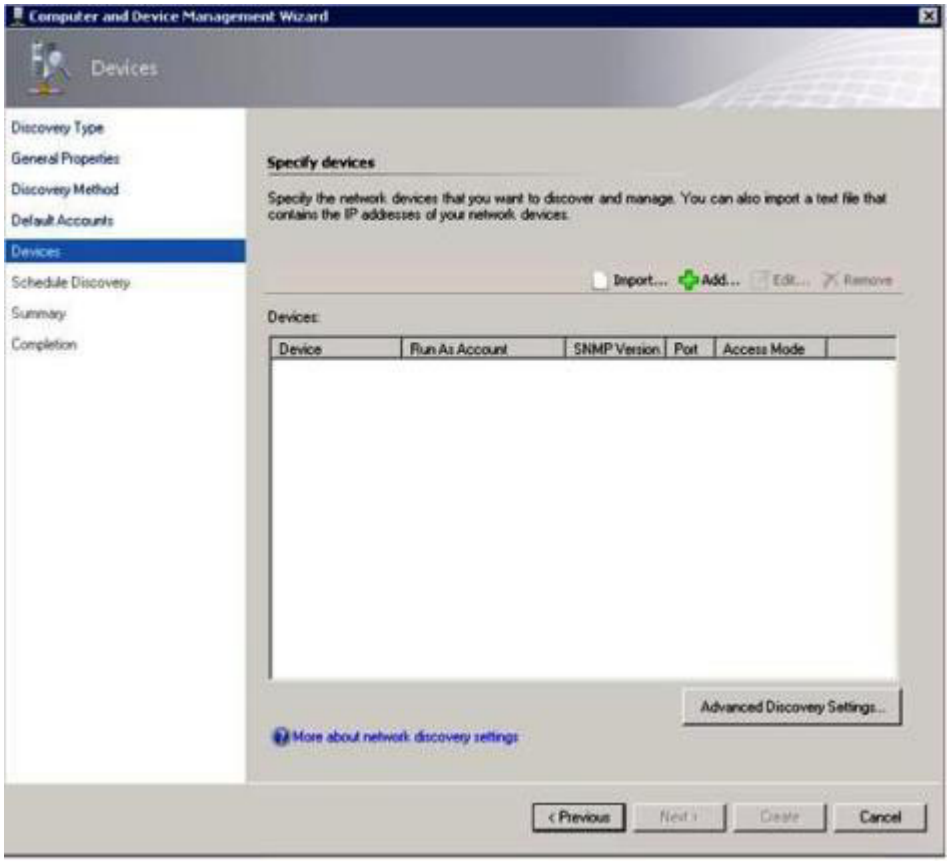

Figure 15. Devices

8. On the Devices page, click **Add**. The Add a Device dialog box opens.
9. In the Add a Device dialog box, complete the following steps:
   a. In the **BladeCenter IP address** field, enter the IP address of the BladeCenter.
   b. From the **Access Mode** list, select **SNMP**.
   c. In the **SNMP V1 or V2 Run as account** field, change the value for SNMPV1 or SNMPV2.
   d. Click **OK** to return to the Discovery Wizard.

   If you have additional devices to add, repeat steps 8 and 9.
10. Click **Next** to complete the Discovery Wizard.

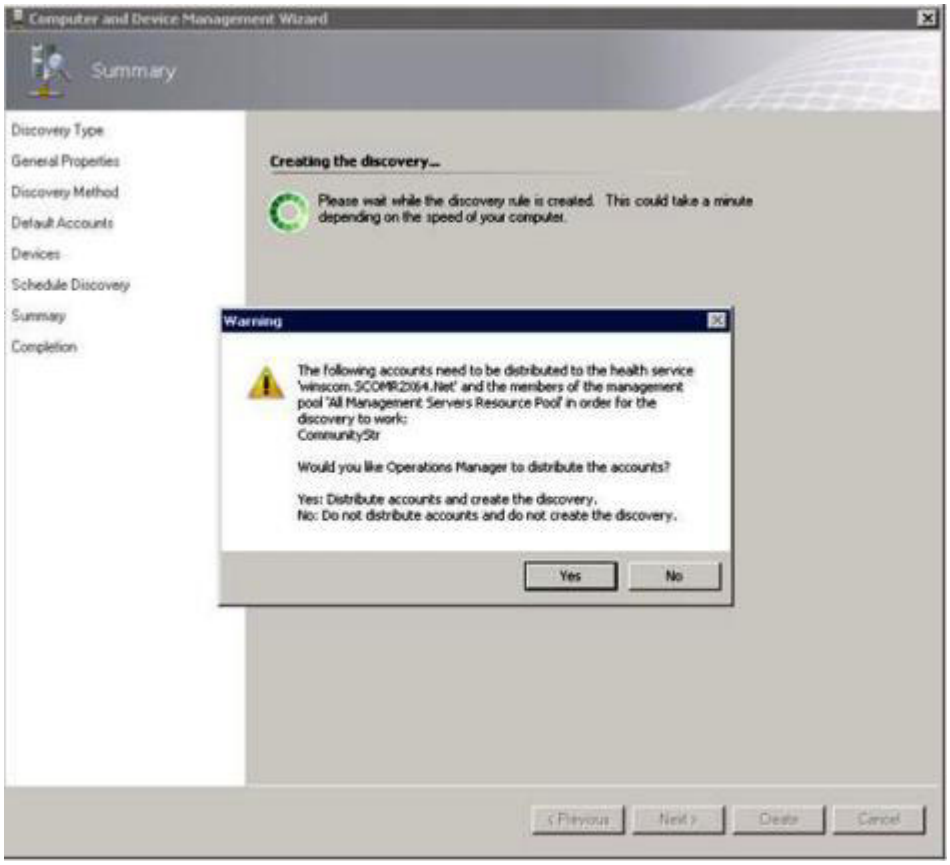

Figure 16. Creating the discovery warning

Note: If a Warning window opens asking if you would like to distribute the accounts, select **Yes** to complete the Discovery Wizard.

The Completion page opens.

Figure 17. Discovery Wizard Completion

11. On the Completion page, select one of the following options:
    - Click **Run the network discovery rule after the wizard is closed** and click **Close**. The progress of a network discovery rule running after the Discovery Wizard has closed is displayed.
    - Click **Close**, and go to the Discovery Rules page to select a Discovery Rule to run.

    The Discovery Rules page opens.

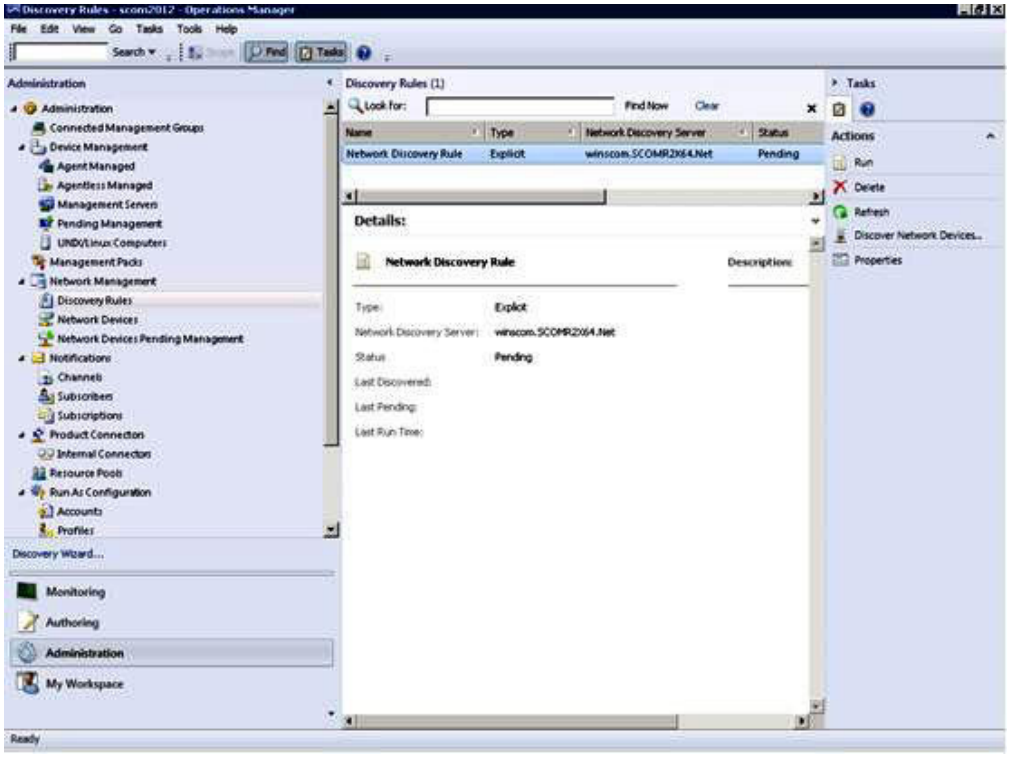

Figure 18. Discovery Rules

12. Select a **Discovery Rule** and click **Run**.

Removing a discovered BladeCenter Chassis

The following procedure describes how to remove a discovered BladeCenter Chassis from a group of discovered systems.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Administration** > **Device Management** > **Network Devices**. A list of BladeCenter Chassis is displayed in the results pane.
2. Right-click a BladeCenter Chassis and select **Delete** to start the delete task.

   When the chassis and its discovered components are removed from the group, the following components are no longer displayed for the BladeCenter that was deleted:

   - Lenovo BladeCenter Blades
   - Lenovo BladeCenter Chassis
   - Lenovo BladeCenter Cooling Modules
   - Lenovo BladeCenter I/O Modules
   - Lenovo BladeCenter Management Modules
   - Lenovo BladeCenter Media Modules
   - Lenovo BladeCenter Power Modules
   - Lenovo BladeCenter Storage Modules

Discovering a Flex System Chassis enabled for SNMP

A Flex System Chassis that is correctly enabled for SNMP can be discovered automatically by the Microsoft network device discovery. After installing Hardware Management Pack, you can verify if the Flex System Chassis is discoverable.

Procedure

1. To discover a Flex System Chassis, click **Lenovo Hardware** > **Lenovo Flex Systems and Modules** > **Windows Computers for managing Lenovo Flex Systems Chassis(s)**. You can also use this view to identify the health of computers that have Hardware Management Pack installed and discover and manage Flex System Chassis and components.

   Note: Only the management server that has the activation license installed can manage Flex System Chassis and modules.
2. To monitor Flex System Chassis and modules, click **Monitoring** > **Lenovo Hardware** > **Lenovo Flex System Chassis(s) and Modules**. Chassis units are displayed in the results pane and include a view of their components organized in the same way that the management modules present components:
   - Lenovo Flex System Compute Nodes/Storage
   - Lenovo Flex System Cooling Modules
   - Lenovo Flex System FanMux Modules
   - Lenovo Flex System I/O Modules
   - Lenovo Flex System Management Modules
   - Lenovo Flex System Power Modules
   - Lenovo Flex System RearLED Modules

   Each module type has a health state and the following properties:
   - A product name and a logical name for the module
   - Physical location info
3. Log in to the IBM Flex System Chassis CMM web console. To set SNMP communication ports for a Flex System Chassis, that has not been discovered automatically, click **Mgt Module Management** > **Network** > **Port Assignments on the Chassis management module web console**.

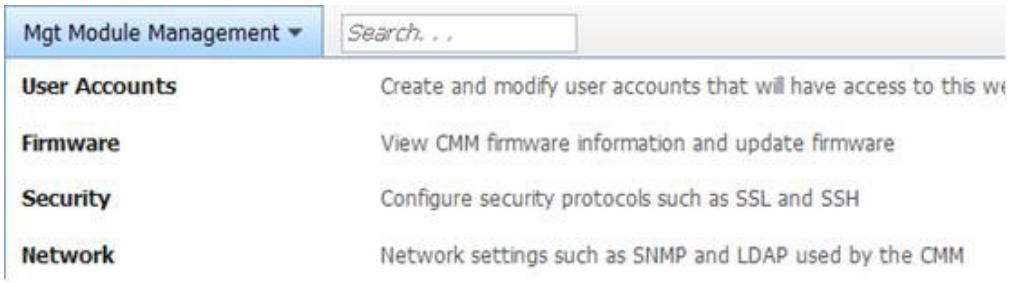

Figure 19. Default SNMP ports

It is important for the SNMP port settings to be consistent. Otherwise, Operations Manager cannot discover the Flex System Chassis. Use the following default SNMP ports:

- 161 for agent (queries/polling)
- 162 for trapping

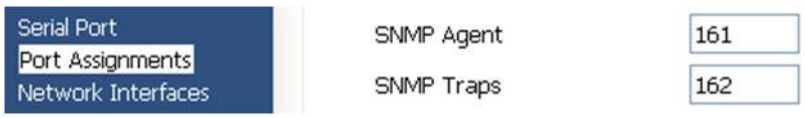

Figure 20. Setting default SNMP ports

4. To change the SNMP settings, click **Mgt Module Management** > **Network** > **SNMP**. There are two SNMP agent versions that can be selected for System Center Operations Manager (SCOM) to manage the Flex chassis. Select one of the following methods:
   - Method 1: Enabled for SNMPv1 Agent
   - Method 2: Enabled for SNMPv3 Agent

   To receive events from the management modules, a network connection must exist between the management module and the Microsoft System Center Operations Manager. You must also configure the management module to send events.
5. Using **SNMP over LAN**, click **Events** > **Event Recipients**.

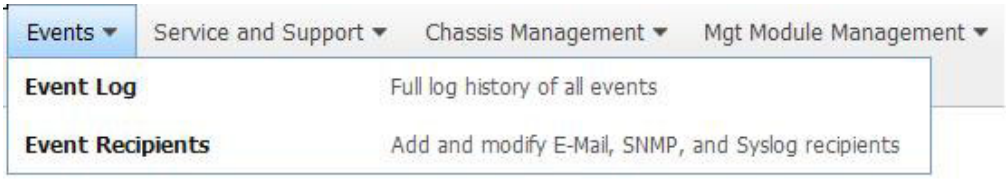

Figure 21. Selecting Event Recipients

6. Click **Create** > **Create SNMP Recipient**.

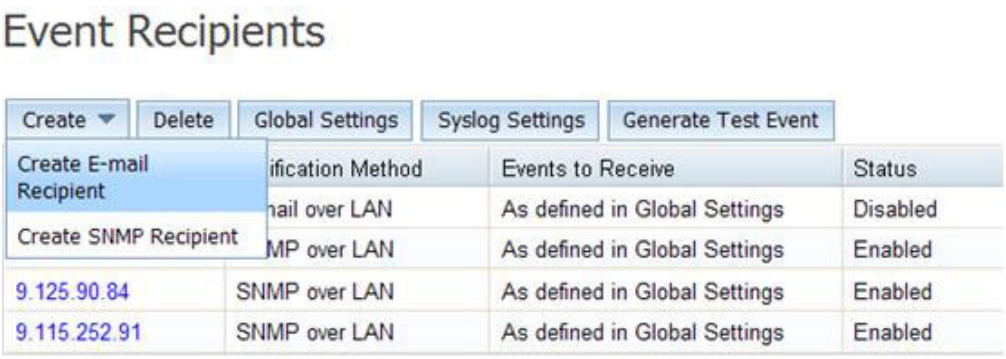

Figure 22. Create Event Recipients

7. In the Create SNMP Recipient dialog box, complete the following steps.
   - In the **Descriptive name** field, enter a name.
   - From the **Status** list, select **Enable this recipient**.
   - For **Events to Receive**, select **Use the global settings** or **Only receive critical alerts**.
   - Click **OK** to return to the Event Recipients page.

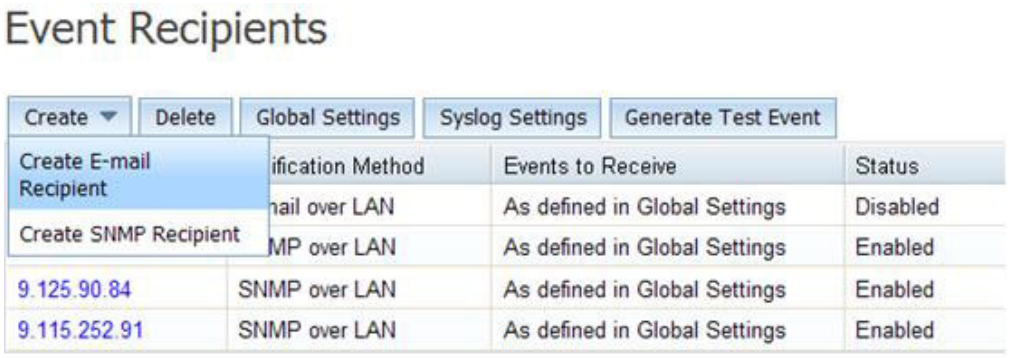

Figure 23. Creating an SNMP Recipient

8. If you selected, **Use the global settings**, the Event Recipient Global Settings dialog box is displayed.

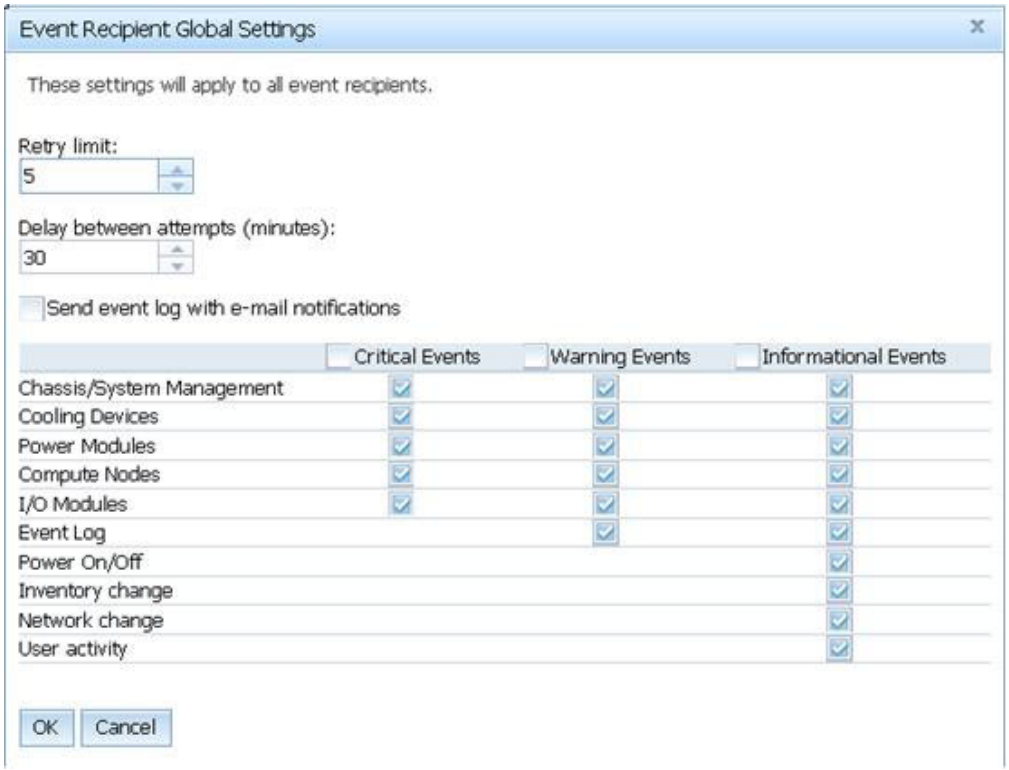

Figure 24. Event Recipient Global Settings

9. Click **OK** to return to the Event Recipients page.

Enabling SNMPv1 Agent

The following procedure describes how to enable SNMPv1 Agent protocol.

Procedure

1. Click **Enabled for SNMPv1 Agent**.

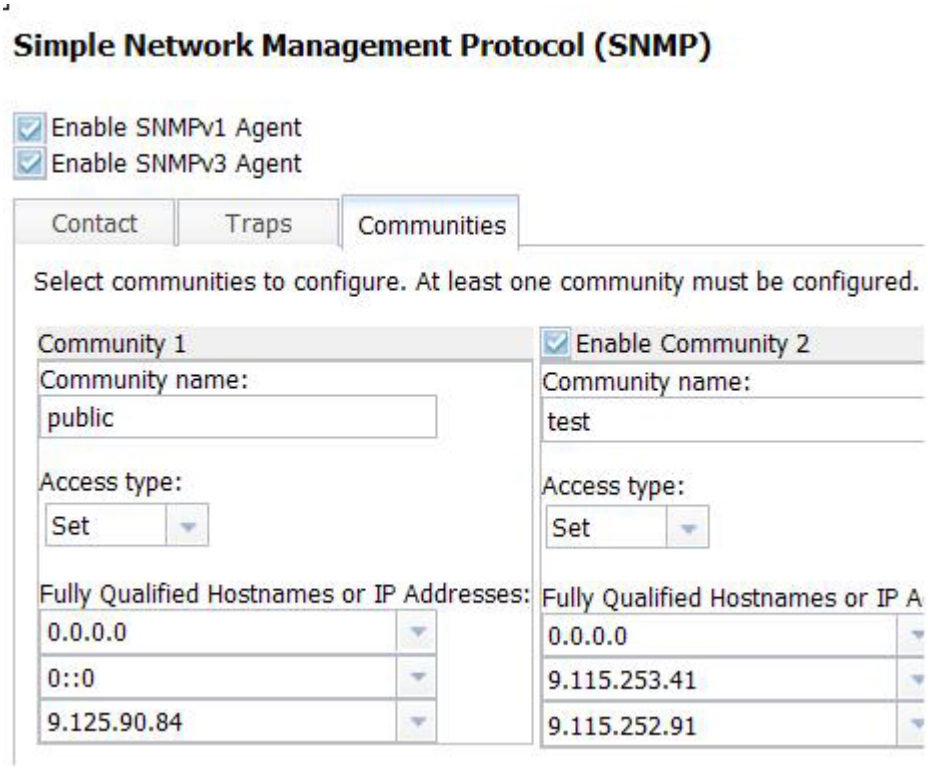

Figure 25. Simple Network Management Protocol (SNMP)

2. Click the **Traps** tab and click **Enable SNMP Traps**.
3. Click the **Communities** tab and complete the following steps for each Microsoft System Center Operations Manager server that will manage the Flex System.
   a. In the **Community name** field, enter the name that is assigned to the Flex System through which SNMP communicates.
   b. From the **Access type** list, select **Set**. This is required for enabling the management tasks. If you do not intend to allow this type of task through the Operations Manager Console, you can lower the access type to **Trap**. At a minimum, the **Trap** access type must be set so that the Operations Manager server can perform SNMP queries and receive SNMP traps from the Flex System.
   c. From the **Fully Qualified Hostnames or IP Addresses** lists, select the appropriate entries.

   Note: By default, the Chassis module Security Policies level is `Secure`. At this level, SNMPv1 cannot be enabled. To use SNMPv1, change the security level to **Legacy**, by clicking **Mgt Module Management** > **Security** > **Security Policies** > **Legacy**.

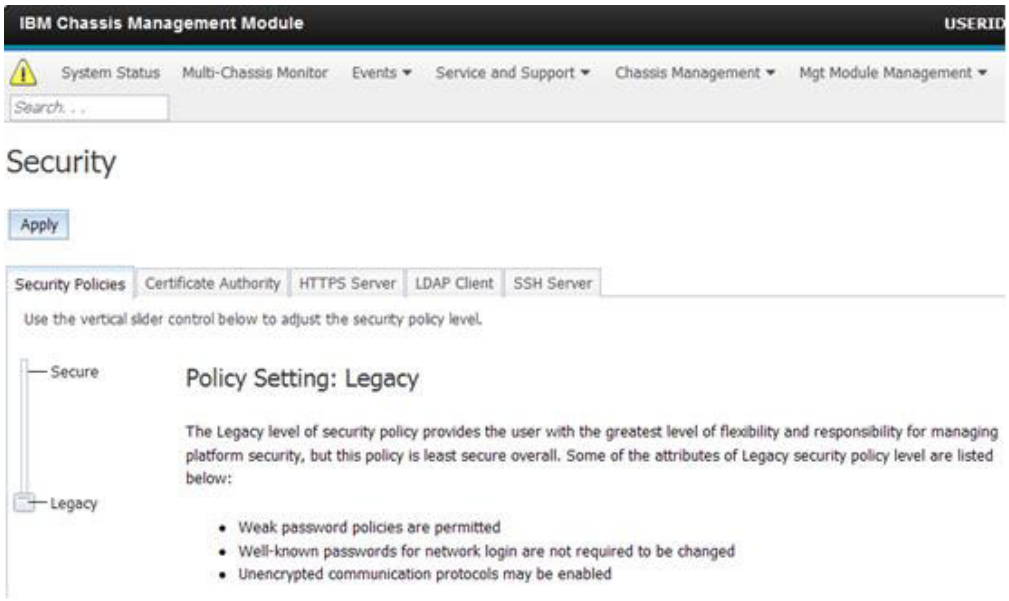

Figure 26. Security Policy setting

Enabling SNMPv3 Agent

The following procedure describes how to enable the Enabled for SNMPv3 Agent protocol. Using SNMPv3 Agent requires that you either create a new user with the Create User option or use the default user.

Before you begin

If you want to use SNMPv3 Agent to manage a Flex System Chassis from the Microsoft System Center Operations Manager server, you first need to create an SNMPv3 user account or select a default user from the list to open the User Properties page.

Procedure

1. Click **Mgt Module Management** > **User Accounts**.
2. Click the **General** tab and set the user password.
3. Click the **SNMPv3** tab and configure the **Authentication Protocol**.

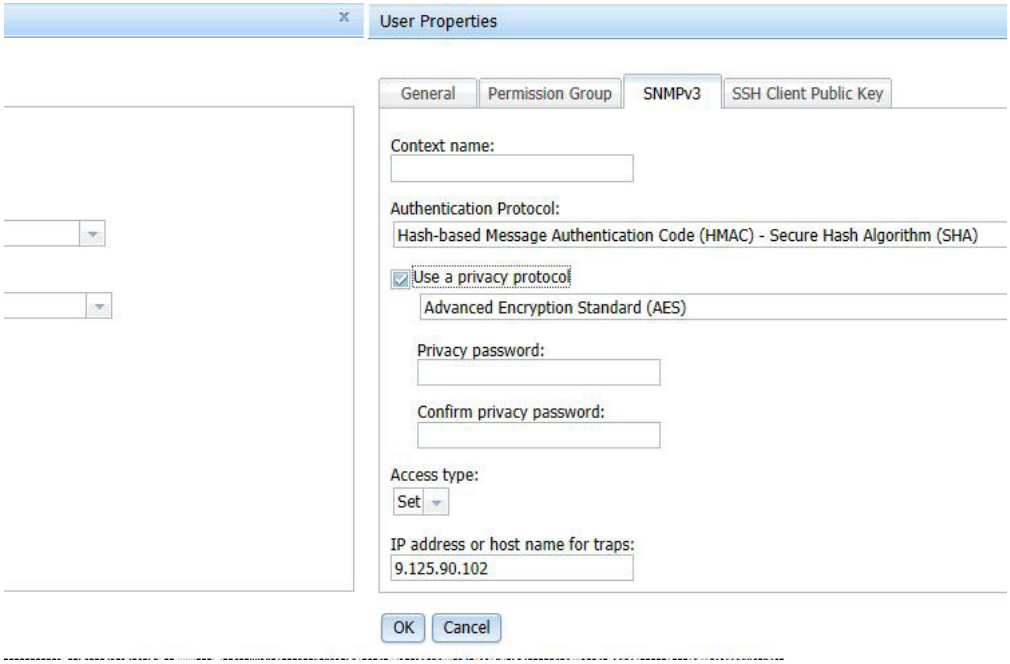

Figure 27. Account credentials for creating a new user for SNMPv3 devices

a. From the **Authentication Protocol** list, select **Use a Privacy Protocol**.
b. In the **Privacy password** field, enter the authentication key, and in the **Confirm privacy password** field, re-enter the authentication key.
c. Change the **Access type** to **Set**.
d. In the **IP address or host name for traps** field, enter the SCOM server IP address.

4. Click **OK**.

Discovering a Flex System Chassis in Microsoft System Center Operations Manager 2007

Microsoft System Center Operations Manager 2007 only supports SNMPv1 for managing an Flex System Chassis.

About this task

To discover a chassis and its components in Microsoft System Center Operations Manager 2007, refer to "Discovering a BladeCenter in Microsoft System Center Operations Manager 2007" on page 30.

Discovering a Flex System Chassis in Microsoft System Center Operations Manager 2012

The following procedure describes how to discover an Flex System Chassis in Microsoft System Center Operations Manager 2012.

Before you begin

On a management server, log in to the Microsoft System Center Operations Manager operations console as Administrator.

Note: This feature only supports a CMM IP address. Do not use an IMM IP address.

About this task

To discover a chassis and its components in Operations Manager 2012 using SNMPv1, refer to "Discovering a BladeCenter in Microsoft System Center Operations Manager 2007" on page 30.

To discover a chassis and its components in Operations Manager 2012 using SNMPv3, complete the following steps on a management server.

Procedure

1. Click **Administration** > **Device Management** > **Agent Management** > **Discovery Wizard** to start the Computers and Device Management Wizard.
2. In the navigation pane, click **Discovery Types**.
3. On the What would you like to manage page, click **Network devices** and click **Next**.
4. On the General Properties page, complete the following steps:
   a. In the **Name** field, enter the discovery rule.
   b. Select an **Available management server**.
   c. Select a **Resource Pool**.
5. On the Discovery Method page, select **Explicit Discovery** and click **Next**.
6. On the Default Accounts page, select **Next**.
7. On the Devices page, click **Add**. The Add a Device dialog box opens.
8. In the Add a Device dialog box, complete the following steps.
   a. Enter the **Flex System IP address**.
   b. Select **SNMP** for the Access mode.
   c. Select **v3** for the SNMP version.
   d. Select **Add SNMP V3 Run As Account**.
   e. Perform the steps in the Create Run As Account Wizard to fill in the SNMPv3 account you just created in Flex Management web console.
   f. Click **OK** to return to the Discovery Wizard.

   If you have additional devices to add, repeat steps 7 and 8.
9. Click **Next** to complete the Discovery Wizard.
10. On the Completion page, select one of the following options:
    - Click **Run the network discovery rule after the wizard is closed** and then click **Close**. When the Discovery Wizard has closed, the progress of the network discovery rule running is displayed.
    - Click **Close**.
11. Select a **Discovery Rule** and click **Run**.

    Note: You can also modify the discovery rule by selecting the rule's **Properties**.

Discovering a Flex System Chassis that is or will be managed by Lenovo XClarity Administrator

With Lenovo centralized management being introduced, Systems Center Operations Manager might have an issue accessing CMM through SNMP.

About this task

To manage a Flex System Chassis that is or will be managed by Lenovo XClarity Administrator, you need to select a workaround option. Listed below are two options that can be used.

Workaround Option A (Recommended):

This option allows CMM and IMM2 to continue running in *secure* mode. However, it does have some usability issues, requiring unmanage and managing password expirations.

This option is for a new chassis managed by Lenovo XClarity Administrator and a CMM that is already managed by Lenovo XClarity Administrator.

Workaround Option B (Not Recommended):

This option requires both CMM and IMM2 to stay in *legacy* mode and weakens the overall security status of the chassis.

This option can be used if you intend to run in *legacy* mode for other reasons.

This option is for a new chassis managed by Lenovo XClarity Administrator or a CMM that is already managed by Lenovo XClarity Administrator.

Workaround Option A

Use this procedure if you will continue running CMM and IMM2 in *secure* mode and have a new chassis managed by Lenovo XClarity Administrator and a CMM that is already managed by Lenovo XClarity Administrator.

Before you begin

If CMM is already managed, unmanage CMM first before proceeding with these steps.

Procedure

1. Create a user account on CMM.
   a. Configure the SNMP properties on CMM for the new user account.
   b. Set the user account to provision the SNMP account to IMM2.
   c. Enable node account management by CMM.
   d. Repeat steps a, b and c for each additional SNMP account that will be supported by CMM. CMM can support a total of 12 SNMP accounts.
   e. For each new user login, change the first-time password. New passwords are valid for 90 days.
2. Manage (or remanage) the chassis.

What to do next

When an SNMP account password expires:

1. Unmanage the chassis and change the password for SNMP users that have an expired password. It is recommended that you change all of the SNMP user account passwords before they expire in 90 days to avoid account disruption.
2. Remanage the chassis after changing SNMP user passwords.

Workaround Option B:

Use this procedure if you will be running both CMM and IMM2 in *legacy* mode.

About this task

Select the applicable procedure step:

- Complete step 1 for a new chassis that is not already managed by CMM.
- Complete step 2 for a CMM that is already managed by Lenovo XClarity Administrator.

Procedure

1. Complete these steps for a new chassis that is not already managed by CMM:
   a. Change the CMM security policy to *legacy*.
   b. Change the CMM global login settings to *legacy* There are no requirements for changing the password on first login, and there is no password expiration.
   c. Create a user account on CMM.
   d. Configure the SNMP properties on CMM for the new user account.
   e. Set the user account to provision the SNMP account to IMM2.
   f. Enable node account management by CMM.
   g. Repeat steps a, b and c for each additional SNMP account that will be supported by CMM. CMM can support a total of 12 SNMP accounts.
   h. Manage the chassis.

      Notes:

      - This workaround does not require chassis unmanage to change passwords because passwords do not expire.
      - This approach also allows new SNMP users to be created while being managed on CMM and IMM2.
      - SNMP accounts created on CMM while being managed are not provisioned.
2. Complete these steps for a CMM that is already managed by Lenovo XClarity Administrator:
   a. Change the CMM security policy to *legacy*.
   b. Change the CMM global login settings to *legacy*

      There are no requirement to change the password on first login, and there is no password expiration.

      Notes:

      - CMM SNMP account provisioning is already disabled when it is managed by Lenovo XClarity Administrator. No explicit action is required to disable provisioning.
      - This workaround does not require chassis unmanage to change passwords because passwords do not expire.
      - This approach also allows new SNMP users to be created while being managed on CMM and IMM2.
      - SNMP accounts created on CMM while being managed are not provisioned.

Removing a discovered Flex System Chassis

The following procedure describes how to remove a discovered Flex System Chassis from the group of discovered systems.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Administration** > **Network Devices**.
2. In the results pane, select the Flex System or BladeCenter Chassis you want to delete.
3. Right-click and select **Delete** to start the delete task.

   When the chassis and its discovered components are removed from the group, the following components of a Flex System Chassis are no longer displayed:

   - Lenovo Flex System Chassis Compute Nodes/Storage
   - Lenovo Flex System Chassis Cooling Modules
   - Lenovo Flex System Chassis FanMux Modules
   - Lenovo Flex System Chassis I/O Modules
   - Lenovo Flex System Chassis Management Modules
   - Lenovo Flex System Chassis Power Modules
   - Lenovo Flex System Chassis RearLED Modules

Chapter 5. Working with Lenovo Hardware Management Pack

The topics in this section describe how Hardware Management Pack enhances the functionality of Operations Manager by providing more detailed information about the managed Lenovo systems.

To learn more about using Operations Manager when Hardware Management Pack is installed, perform the tasks in the "Monitoring through the Operations Manager Console" topic.

Lenovo Hardware Management Pack provides the ability to:

- Monitor a system from the Monitoring pane of the Operations Manager Console, as described in "Monitoring through the Operations Manager Console."
- Add a Lenovo system to the managed systems, as described in "Adding a system that will be managed by Operations Manager" on page 59.
- Monitor the health of systems, components, and systems-management software, as described in "Monitoring the health of systems, hardware components, and other targets" on page 70.
- Identify and resolves errors, as described in "Using Health Explorer to identify and resolve problems" on page 73.
- Access the Lenovo knowledge pages, as described in "Using knowledge pages to resolve problems" on page 75.

Monitoring through the Operations Manager Console

The following procedure describes how to use the Operations Manager Console with Hardware Management Pack installed. After installing Hardware Management Pack, you can use the Monitoring pane of the Operations Manager Console to select folders and views that provide complete health information of your BladeCenter Chassis, Flex System Chassis and chassis components, Integrated Management Module, and System x and x86/x64 Blade servers. From the Operations Manager Console you can also discover an Integrated Management Module (IMM) to enable and monitor Hardware Failure Management.

About this task

Perform these steps to become familiar with the Monitoring pane of the Operations Manager Console and the features that Hardware Management Pack adds:

Procedure

1. In the navigation pane, click the **Monitoring** tab. The Monitoring pane lists the systems and hardware components that you can monitor with Hardware Management Pack. The following figure shows a portion of the Monitoring pane after you install Hardware Management Pack.

Figure 28. Monitoring pane

The **Lenovo Hardware** folder consists of several different views and folders that monitor data collected from Lenovo systems. The **Windows Computers on Lenovo System x or x86/x64 Blade Servers** view provides a global view. The other folders provide additional views for different types of monitoring data collected from Lenovo systems.

Lenovo Hardware:
This folder includes active alerts, task status, and aggregate targets for all discovered Lenovo systems and hardware components.

Lenovo Integrated Management Module (IMM):
This view provides the status of IMM-based servers.

Lenovo Licensed System Group:
This view provides the status of Windows computers on a server with the premium features enabled.

Lenovo Unlicensed System Group:
This view provides the status of Windows computers on a server when the premium features are not enabled.

Windows Computers for Managing Lenovo License:
This view provides the status of Operations Manager management servers that are capable of managing the premium features.

Windows Computers on Lenovo System x or x86/x64 Blade Servers:
This view provides the status of System x or x86/x64 Blade servers. Use this view as you would the **Monitoring** > **Computers** view. The difference is that this view contains only System x or BladeCenter x86/x64 Blade servers.

Lenovo BladeCenter(s) and Modules:
This folder contains a summarized view for all of the BladeCenters and Modules and personalized summary views of specific alerts, task status, BladeCenters, and Windows computers for managing BladeCenters.

Lenovo Flex System Chassis and Modules:
This folder contains a summarized view for all of the Flex System Chassis and Modules and personalized summary views of specific alerts, task status, Flex System Chassis, and Windows computers for managing Flex System Chassis.

Lenovo Integrated Management Module (IMM):
This folder contains a summarized view for hardware components of IMM-based servers and personalized summary views of active alerts, cooling devices, fibre channel, infiniband, network adapter, numeric sensor, physical memory, processor, raid controller, and pci device.

Lenovo System x and x86/x64 Blade Servers:
This folder contains a summarized view for all of the systems including: System x and BladeCenter x86/x64 Blade systems and personalized summary views of specific types of System x and BladeCenter x86/x64 Blade servers. These systems are grouped by platform type and include tower, rack, blade, enterprise server, and unclassified.

2. Click **Windows Computer on Lenovo System X or x86/x64 Blade Servers** to view detailed information for System x or x86/x64 Blade servers running Windows.

   Only manageable hardware components are discovered and monitored, and therefore not all components are included. For example, a system with one or more non-manageable fans does not have all of its fans discovered or monitored. In the following figure, the detail view for the pane labeled Lenovo Hardware Components of LenovoSystem x or x86/x64 Blade servers shows various components.

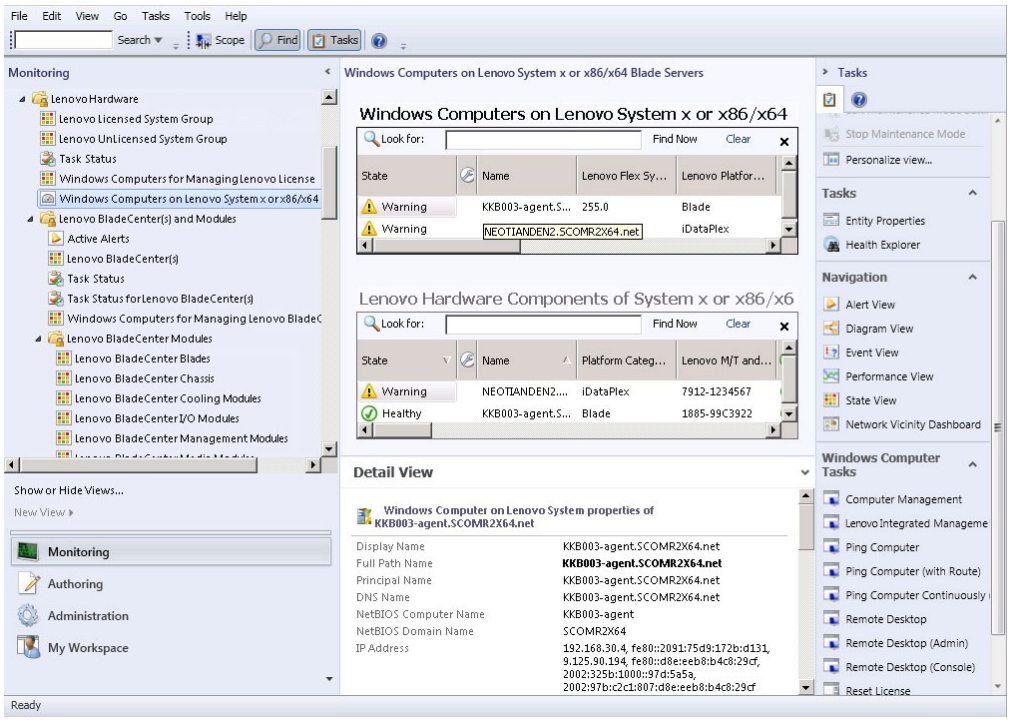

Figure 29. Windows Computers on Lenovo System x or x86/x64 Blade Server view

3. Click the **Lenovo BladeCenter(s) and Modules** folder to view detailed information about BladeCenter(s) and modules.

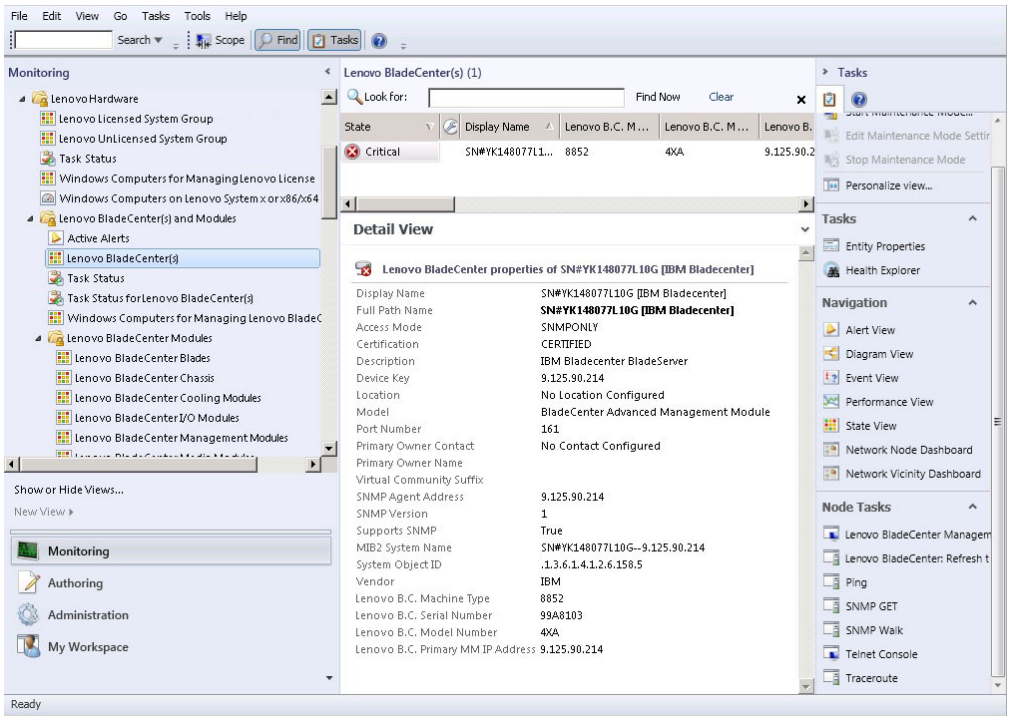

Figure 30. Lenovo BladeCenter(s) and Modules folder view

The **Lenovo Bladecenter(s) Modules** folder contains five views and one folder:

Active Alerts:
This view provides the status of the BladeCenter alerts.

Lenovo BladeCenter(s):
This view provides a summarized list of all BladeCenter Chassis and chassis components, such as Blades, Cooling, I/O, Storage, Power, Management Modules, and other components.

Task Status:
This view provides the status of the Lenovo BladeCenters Modules and Chassis.

Task Status for BladeCenter(s):
This view provides the status of the Lenovo BladeCenters.

Windows Computers for Managing Lenovo BladeCenter(s):
This view shows the management modules that communicate with Lenovo BladeCenter Chassis.

Lenovo BladeCenter Modules:
This folder contains all of the component information and status information for the BladeCenter Chassis, chassis components, and blade servers. Categories include Blades, Chassis, Cooling, I/O, Management Modules, Media Modules, Power, and Storage.

4. Click the **Lenovo BladeCenter Modules** folder to display the views in this folder.

   After discovering a BladeCenter Chassis and its chassis modules, Hardware Management Pack classifies the modules according to their module type and then adds each module to the applicable module view:

   - Lenovo BladeCenter Blades
   - Lenovo BladeCenter Chassis

- Lenovo BladeCenter Cooling Modules
- Lenovo BladeCenter I/O Modules
- Lenovo BladeCenter Management Modules
- Lenovo BladeCenter Media Modules
- Lenovo BladeCenter Power Modules
- Lenovo BladeCenter Storage Modules

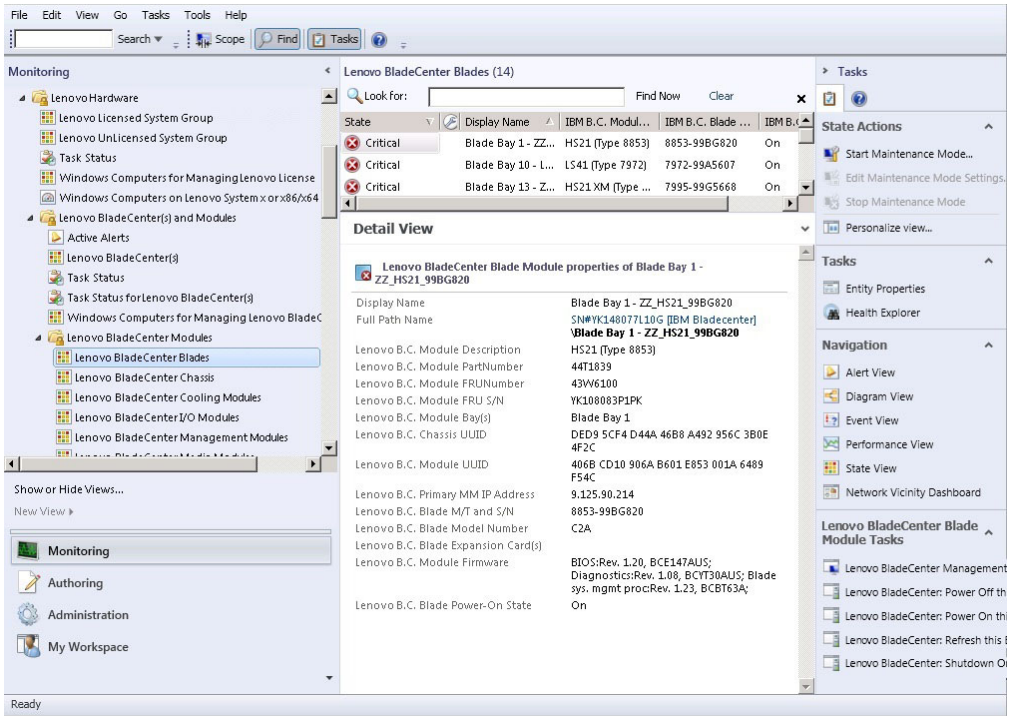

Figure 31. Lenovo BladeCenter Modules

5. Click the **Lenovo Flex System Chassis and Modules** folder to display detailed information about Flex System Chassis and modules.

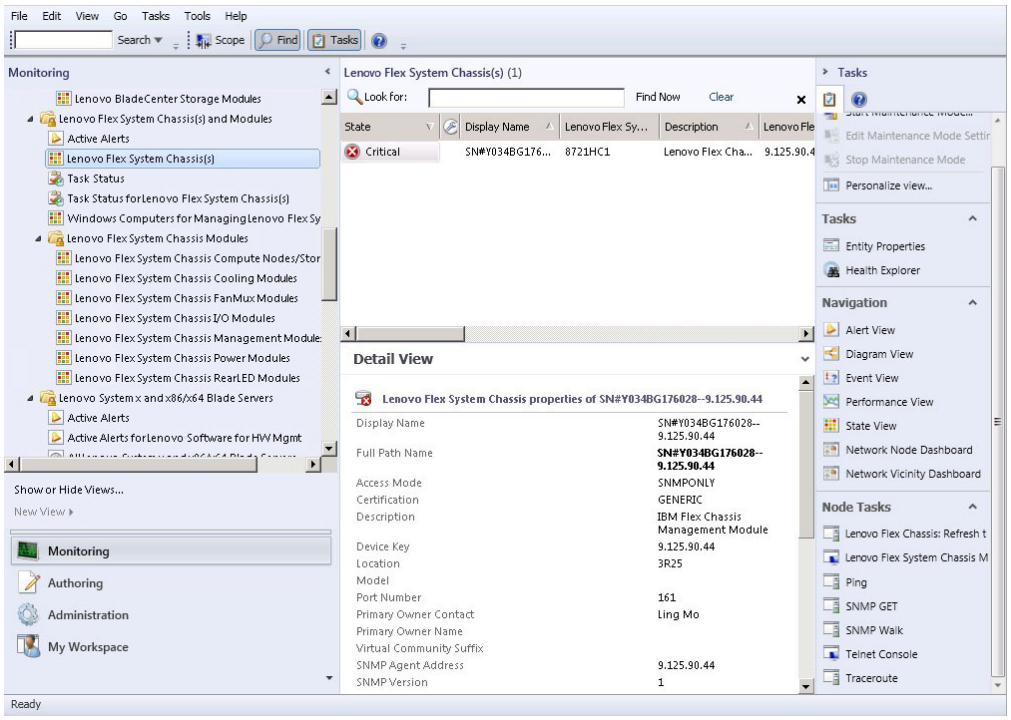

Figure 32. Lenovo Flex System Chassis folder view

The **Lenovo Flex System Chassis and Modules** folder has five views and one folder:

Active Alerts:
This view provides the status of the Flex System Chassis alerts.

Lenovo Flex System Chassis:
This view provides a summarized list of all Flex System Chassis and chassis components, such as: Compute Nodes, Cooling, I/O, Storage, Power, Management Modules, and other components.

Task Status:
This view provides the status of the Flex System Chassis Modules and Chassis.

Task Status for Lenovo Flex System Chassis:
This view provides the status of the Flex System Chassis.

Windows Computers for Managing Lenovo Flex System Chassis:
This view shows management modules that can communicate with Flex System Chassis.

Lenovo Flex System Chassis Modules:
This folder contains all of the component information and status information for the Flex System Chassis, chassis components, and compute nodes. Categories include Compute Node, Cooling, FanMux Modules, FSM, I/O Modules, Management Modules, Power Modules, Rear LED Modules, and Storage.

6. Click the **Lenovo Flex System Chassis Modules** folder to display the views in this folder. After discovering an Flex System Chassis and the chassis modules, Hardware Management Pack classifies the chassis modules according to their module type and then adds each module to the applicable module view:
   - Lenovo Flex System Chassis Compute Nodes

- Lenovo Flex System Chassis Cooling Modules
- Lenovo Flex System Chassis FanMux Modules
- Lenovo Flex System Chassis FSM
- Lenovo Flex System Chassis I/O Modules
- Lenovo Flex System Chassis Management Modules
- Lenovo Flex System Chassis Power Modules
- Lenovo Flex System Chassis RearLED Modules
- Lenovo Flex System Chassis Storage

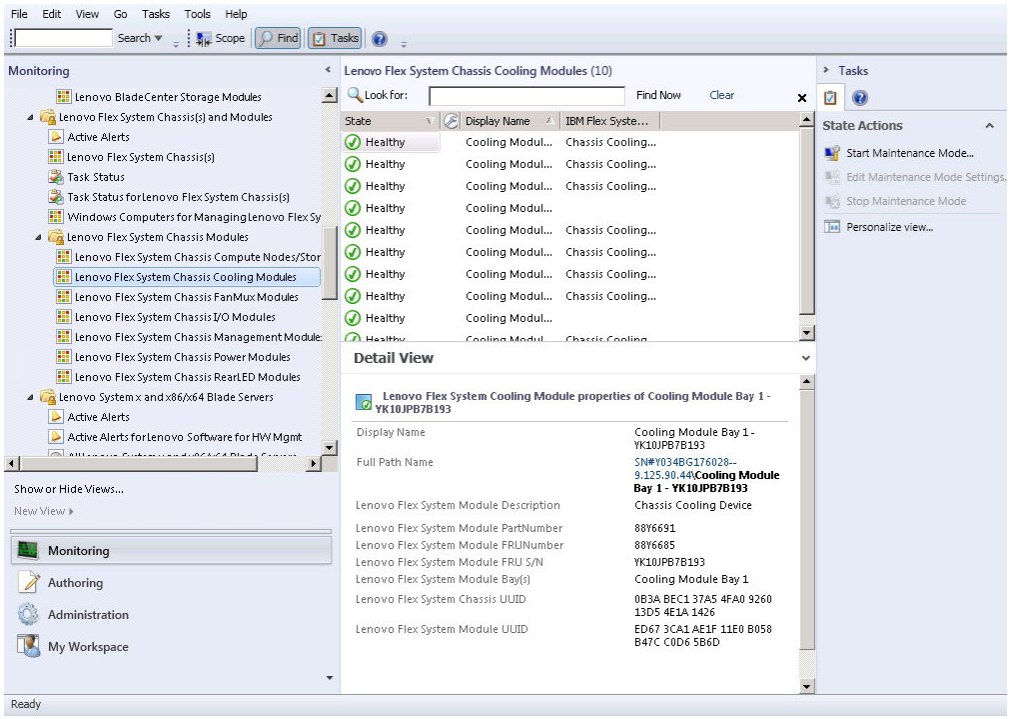

Figure 33. Lenovo Flex System Chassis Modules

7. Click the **Lenovo Integrated Management Module** view to display the views in the folder. After discovering an IMM-based system using agentless mode, Hardware Management Pack adds the system to the view of Lenovo Integrated Management Module, and adds sub-hardware components into the **Lenovo System x and x86/x64 Blade Servers** group views (if applicable):
   - Cooling Devices
   - Fibre Channel
   - Firmware/VPD
   - InfiniBand
   - Network Adapter
   - NumericSensor
   - PCI Device
   - Physical Memory
   - Processor
   - RAID Controller

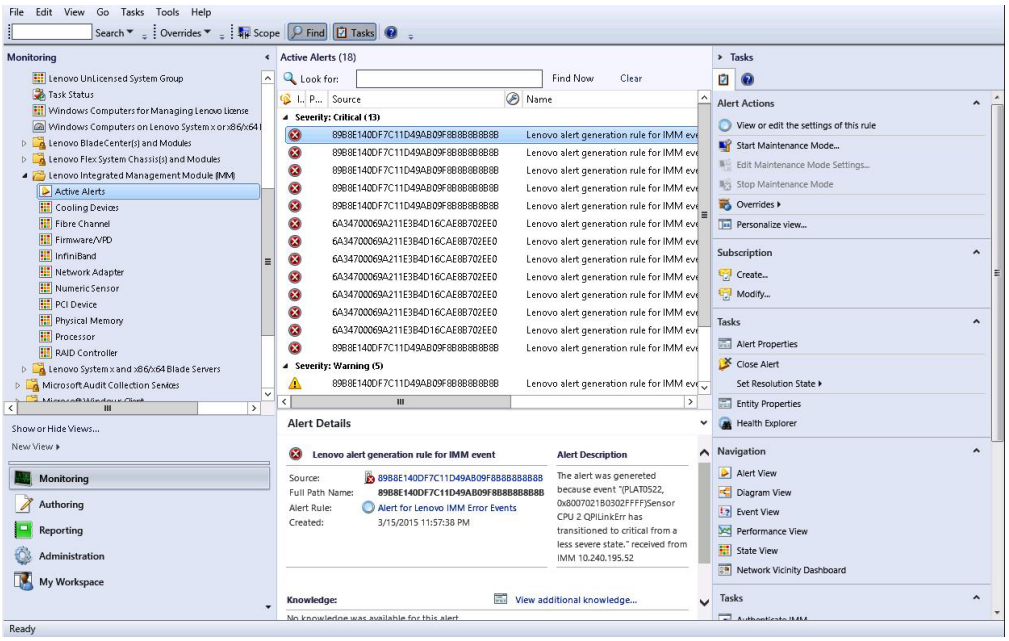

Figure 34. Lenovo Integrated Management Module Active Alerts view

8. Click the **Lenovo System x and x86/x64 Blade Servers** view to display the views in the folder.

   After discovering a Lenovo system with Windows, Hardware Management Pack classifies the system according to its system type and then adds the system to the view of **All Lenovo System x and x86/x64 Blade Servers** and to one of the following system group views, according to the system platform type:

   - Active Alerts for Lenovo Software for HW Mgmt
   - All Lenovo System x and x86/x64 Blade Servers
   - Lenovo Flex System x86/x64 Compute Nodes
   - Lenovo System x Enterprise/Scalable Systems
   - Lenovo System x iDataPlex® Systems
   - Lenovo System x Rack-mount Systems
   - Lenovo System x Tower Systems
   - Lenovo x86/x64 Blade Systems
   - Lenovo Blade OOB-IB Reflection Group: This view provides the status of Windows computers on Lenovo x86/x64 Blade servers and the relationship between a Lenovo BladeCenter x86/x64 Blade server in the **LenovoSystem x and BladeCenter x86/x64 Blade Servers** (monitored through Inband) and **BladeCenter(s) and Modules** (monitored through Out of Band) folders.

     Note: This view is available only when the premium features are enabled.
   - Task Status
   - Unclassified Lenovo System x and BladeCenter x86/x64 Blade Systems (systems that are either too old or too new to be classified correctly)
   - Hardware Components of Lenovo System x or x86/x64 Blade Servers (folder)

9. Click the **All Lenovo System x and x86/x64 Blade Servers** view to display the dashboard views of its systems and hardware components.

Each view within the **All Lenovo Systems x and x86/x64 Blade Servers** view provides a dashboard of health states and manageable hardware components for each system, as shown in the following figure.

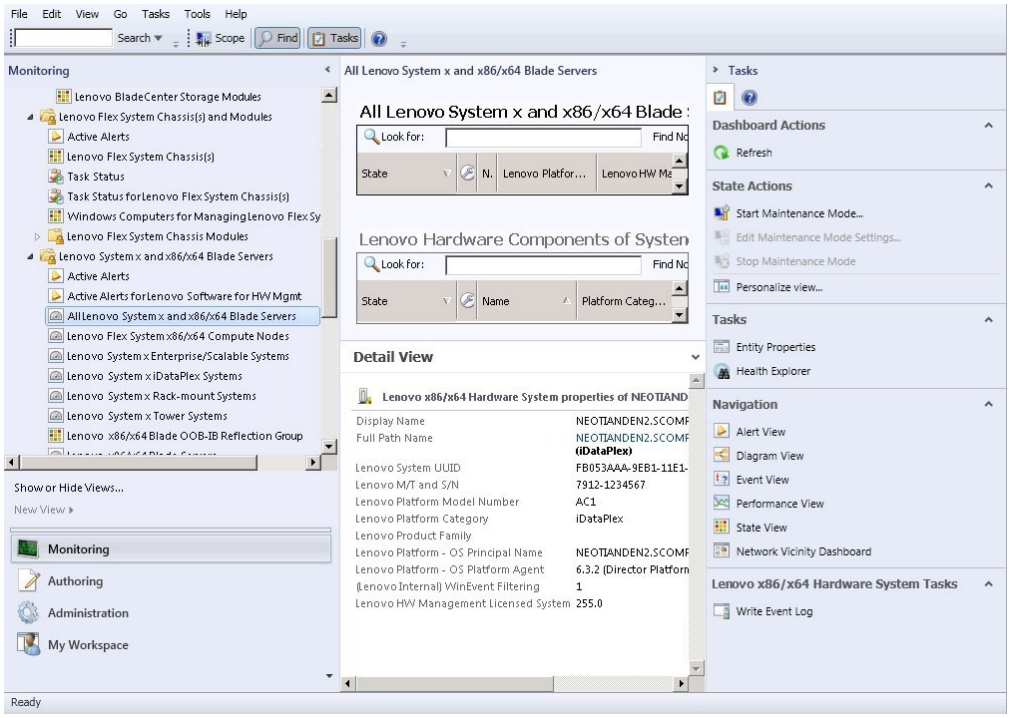

Figure 35. Dashboard view

Adding a system that will be managed by Operations Manager

Use the Microsoft System Center Operations Manager 2007 Discovery Wizard to discover and add systems that will be managed by Operations Manager. The Discovery Wizard deploys Hardware Management Pack to the discovered system.

Note: The Discovery Wizard does not show systems that are already being monitored.

Optional steps before starting this task

When the Lenovo License Entitlement Pack is installed and the root management server of Microsoft System Center Operations Manager is registered with the Lenovo License Entitlement Pack, the Hardware Management Software Configuration Advisor for Lenovo Systems (SW Configuration Advisor) program analyzes the software dependencies of Lenovo Hardware Management Pack for Windows computers managed by Microsoft System Center Operations Manager.

For details about the Lenovo License Entitlement Pack, contact your Lenovo sales representative.

How to check software dependencies on a remote computer

The following procedure describes how to check for software dependencies by using the Software Configuration Advisor program.

Procedure

1. Log in to the Operations Manager server and open a command shell window, a DOS commands window, or a PowerShell command window.
2. Change the directory to the `toolbox` directory. By default, the toolbox directory path is: `%ProgramFiles%\Lenovo\Lenovo Hardware Management Pack\toolbox`. (This directory is located after the installation directory of Lenovo Hardware Management Pack for Microsoft System Center Operations Manager).
3. Start `ibmSwConfigurationAdvisor.vbs`. This is the program name for the Hardware Management Software Configuration Advisor for Lenovo Systems. You can use the following options when running this program:

   `/help:`
   Provides the syntax of the `ibmSwConfigurationAdvisor.vbs` program.

   `/opt detail:`
   Provides additional, detailed information about the target computer.
4. Enter the following required account information for the account that is a member of the Administrators role for the Windows computer.

   This program is in the format of a Microsoft Visual Basic Script.

   - Computer Name: `IBMUIM004`
   - Domain name: `d205`
   - Username: `admind205`
   - Password: `aWd25$tg`

   The target computer information is listed in the program's Analysis Summary:

```
> cscript //nologo cscript //nologo ibmSwConfigurationAdvisor.vbs
/remote IBMUIM004 d205 admind205 aWd25$tg
============>>> Computer: IBMUIM004 <<<============
-------- Analysis Summary --------
 Computer Name           : IBMUIM004
 Manufacturer            : IBM                   MT-Model-S/N: 7870-AC1-
0XXX493
 Machine Summary         : BladeCenter HS22 -[7870AC1]-
-- Operating System --
 Detected : Microsoft Windows Server 2008 R2 Enterprise  (64-bit) - No
Service Pack Information
-- SMBIOS IPMI Support --
 Detected : Default System BIOS
       SMBIOS IPMI Support is installed
-- MS IPMI --
 Detected : Microsoft Generic IPMI Compliant Device
       Microsoft IPMI Driver is running
-- Systems Director --
 Detected : 6.2.1 (Director Platform Agent)
       Systems Director is running
-- ServeRAID-MR,MegaRAID,ServeRAID-BR/IR,Integrated RAID --
 Detected : ServeRAID-BR10il
```

Figure 36. Hardware Management Software Configuration Advisor program

5. Check the Hardware Management Software Configuration Advisor for the Lenovo Systems report. This report provides a summary of the analysis results. If there are any software dependency problems reported, examine the report body for possible resolutions for the software dependencies.

Example

In many cases, multiple computers are the target of the software dependency analysis. Using a command shell pipeline increases the productivity of this analysis.

The following example uses PowerShell to pipe a net view computer name list to `ibmSwConfigurationAdvisor.vbs` and saves the program output in the file called "`OneShotServey4IbmHwMp.txt`".

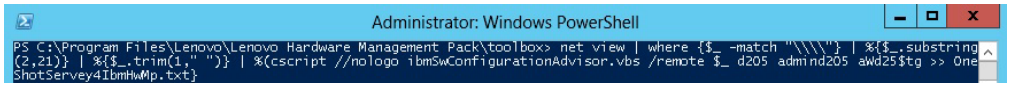

Figure 37. PowerShell example of net view

The sample shown in the figure above is dependent on the Windows network setup and PowerShell environment. Adjustments for the network configuration and the PowerShell installation might be required.

Using the Discovery Wizard to add a system

The following procedure describes how to add a system that will be managed by Operations Manager.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Administration** > **Device Management** > **Agent Managed** > **Discovery Wizard** to start the Computers and Device Management wizard.

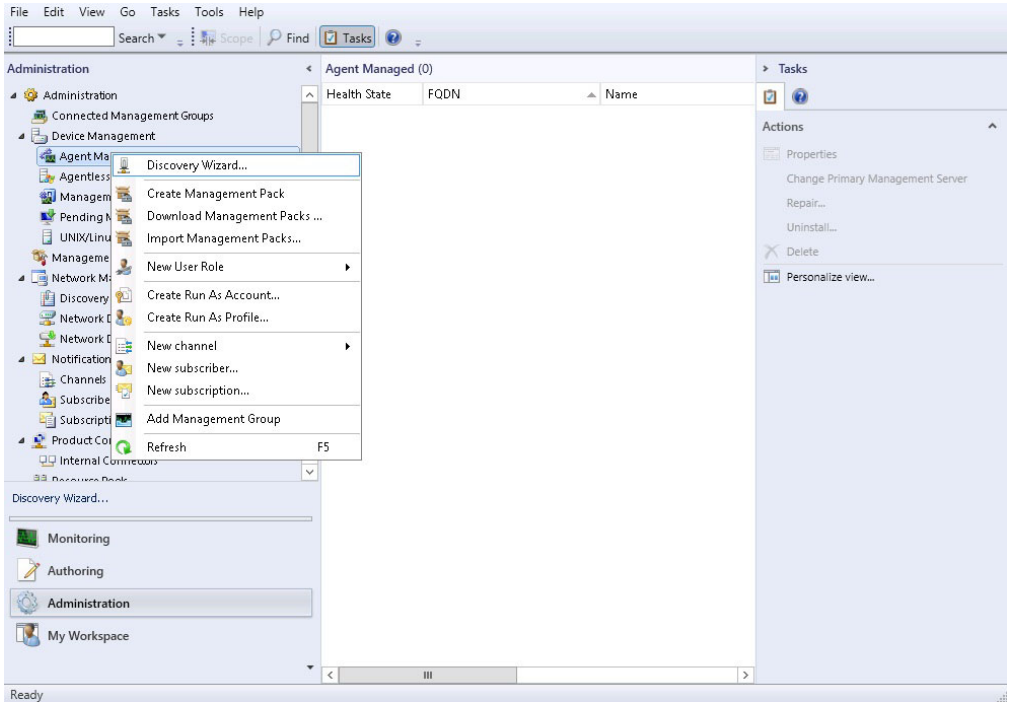

Figure 38. Using the context menu to select the Discovery wizard

From the **Actions** menu, you can also select **Configure computers and devices to manage**.

Note: For Microsoft System Center Operations Manager 2007 SP1, the interface is somewhat different, as shown in the following figure.

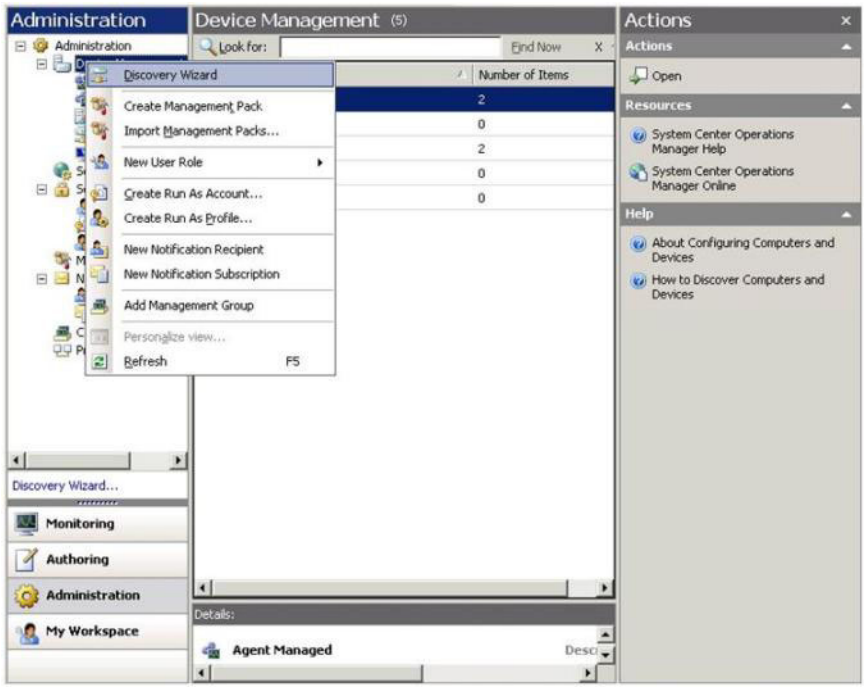

Figure 39. Using the context menu to select the Discovery Wizard (SP1)

2. Click **Next** if the Introduction page opens.

   Note: The Introduction page does not display if the Computer and Device Management Wizard has been run before and you selected **Do not show this page again**. If you would prefer that the introduction page not be displayed again, select the **Do not show this page again** check box, before clicking **Next**.

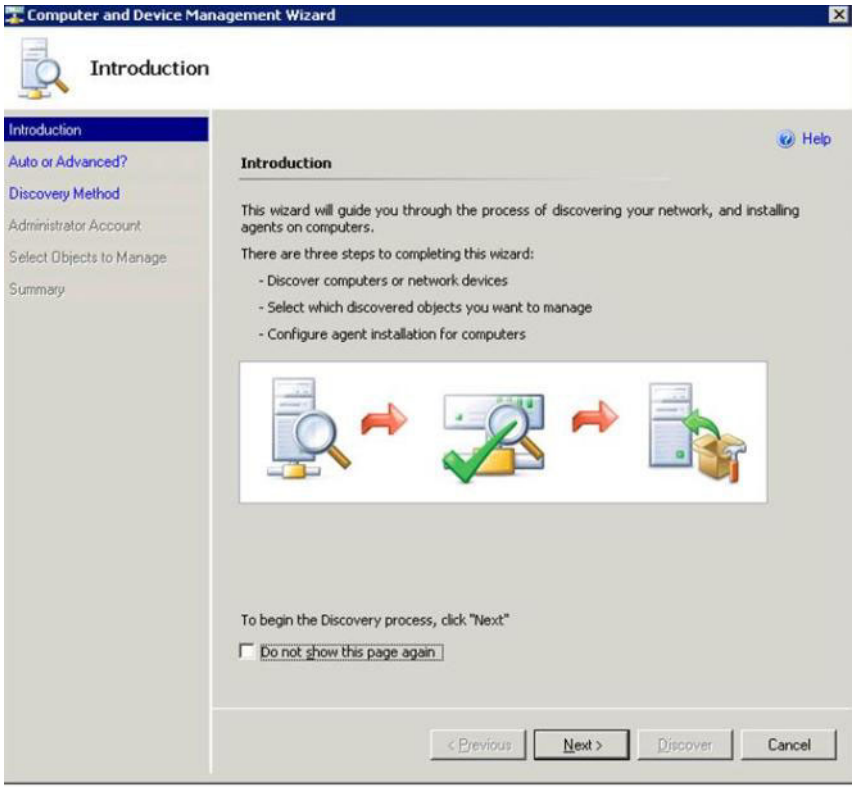

Figure 40. Computer and Device Manager Introduction

3. Select **Advanced discovery** on the Auto or Advanced page.

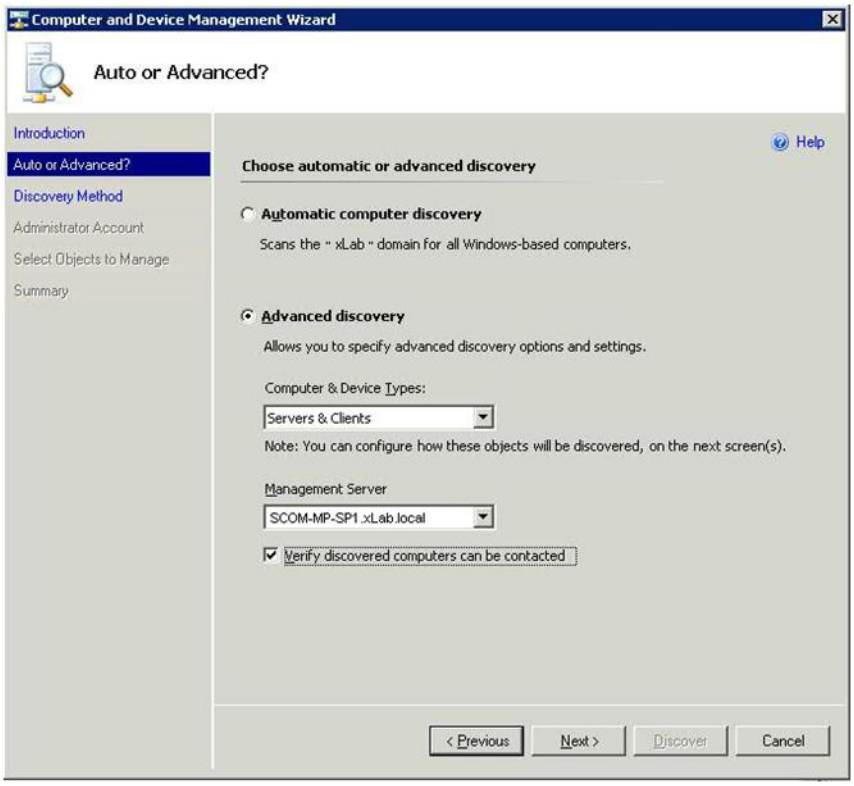

Figure 41. Selecting the Auto or Advanced discovery method

4. From the **Computer & Device Types** list, select **Servers & Clients**.
5. From the **Management Server** list, select the management server to be used for discovery.
6. Select the **Verify discovered computers can be contacted** check box.
7. Click **Next** to open the Discovery Method page.

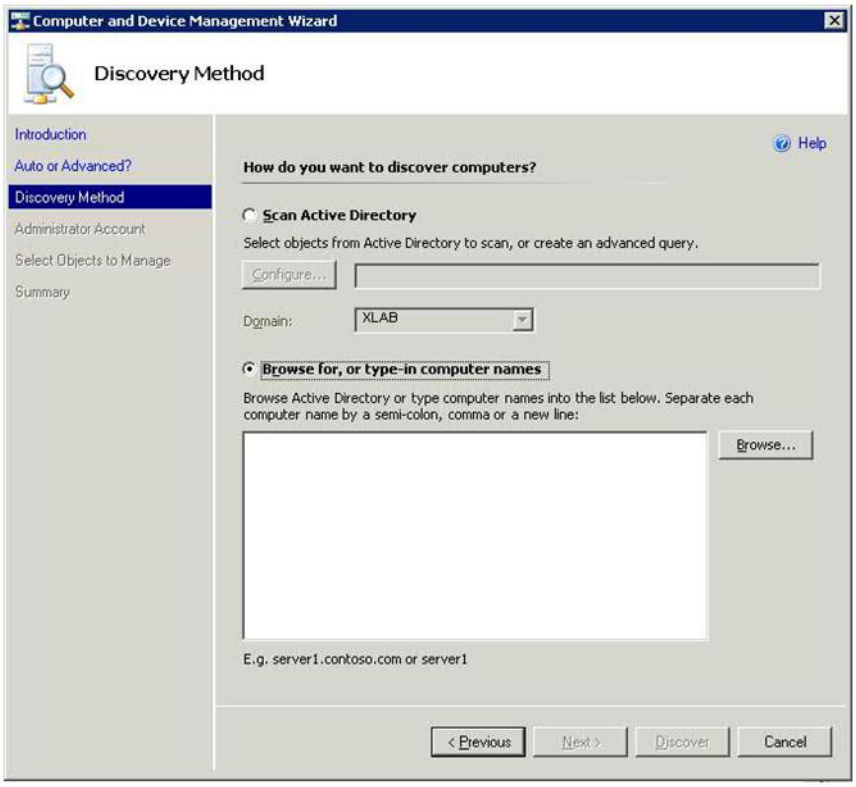

Figure 42. Discovery Method

8. Click **Browse for, or type-in computer names**, or click **Browse** to locate the computer name or enter the computer name of the Lenovo system and click **Next.**

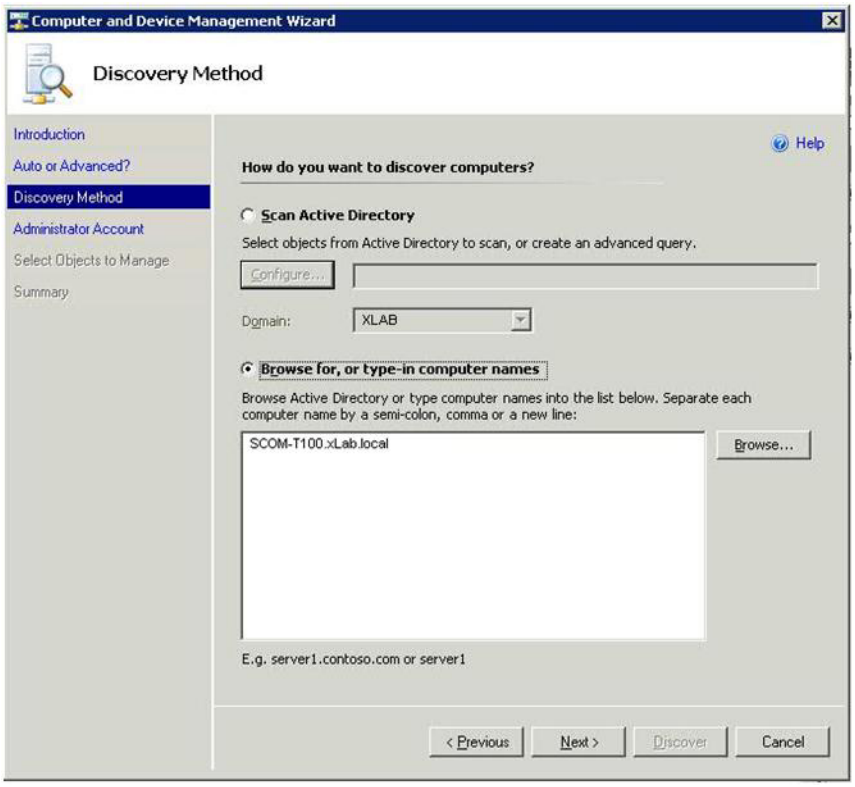

Figure 43. Discovery Method with sample information

9. On the Administrator Account page, choose one of the following options:
   - Click **Use selected Management Server Action Account** and then click **Next**.
   - Click **Other user account** and enter the following information for an account that is a member of the Administrator role:
     - User Name
     - Password
     - Domain Name
10. Click **Discover** to open the Discovery Progress page.

    Attention: The time it takes for the discovery process to finish depends on the number of computers in the network and other factors. The Discovery Wizard might return up to 4,000 computers if you selected the **Verify discovered computers can be contacted** check box, or up to 10,000 computers if the check box is not selected.

    When the discovery is finished, the Discovery Results are displayed and you can select the objects to manage.

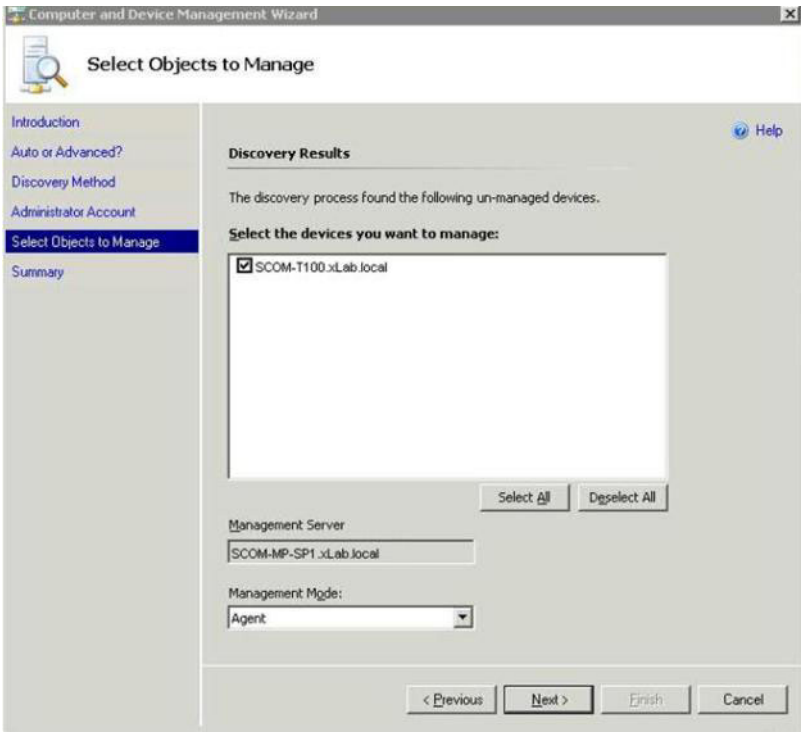

Figure 44. Select Objects to Manage

11. From the **Select the devices you want to manage** list, select the devices to be managed by selecting an individual device or by clicking **Select All**. You also have the option of clicking **Deselect All** to change the devices you want to manage.
12. From the **Management Mode** list, select **Agent** and click **Next**.

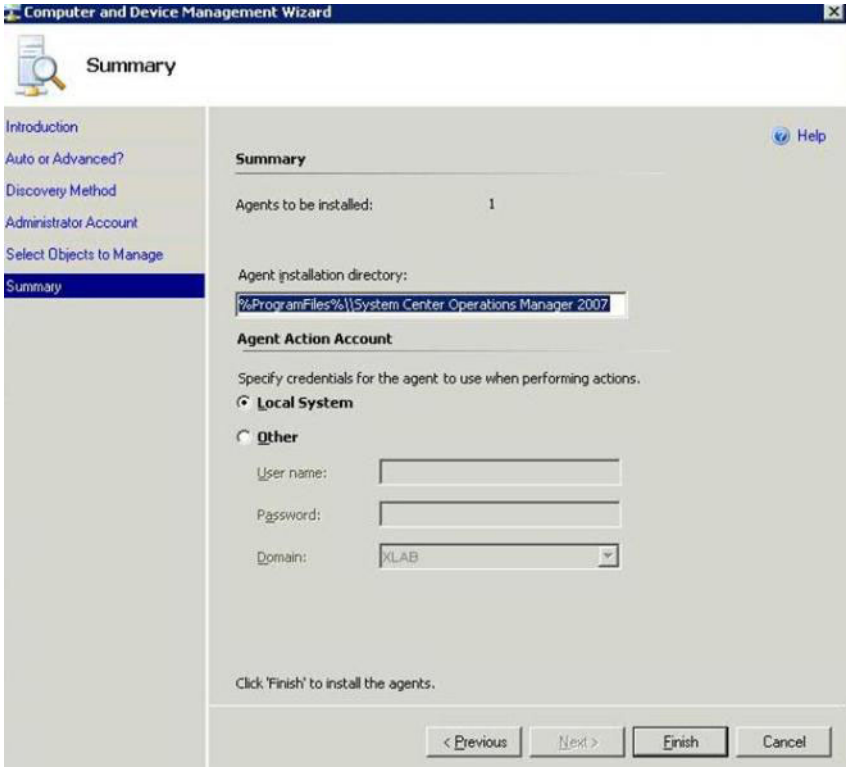

Figure 45. Computer and Device Management Wizard Summary

13. On the Summary page, click **Finish**. The Agent Management Task Status page is displayed.

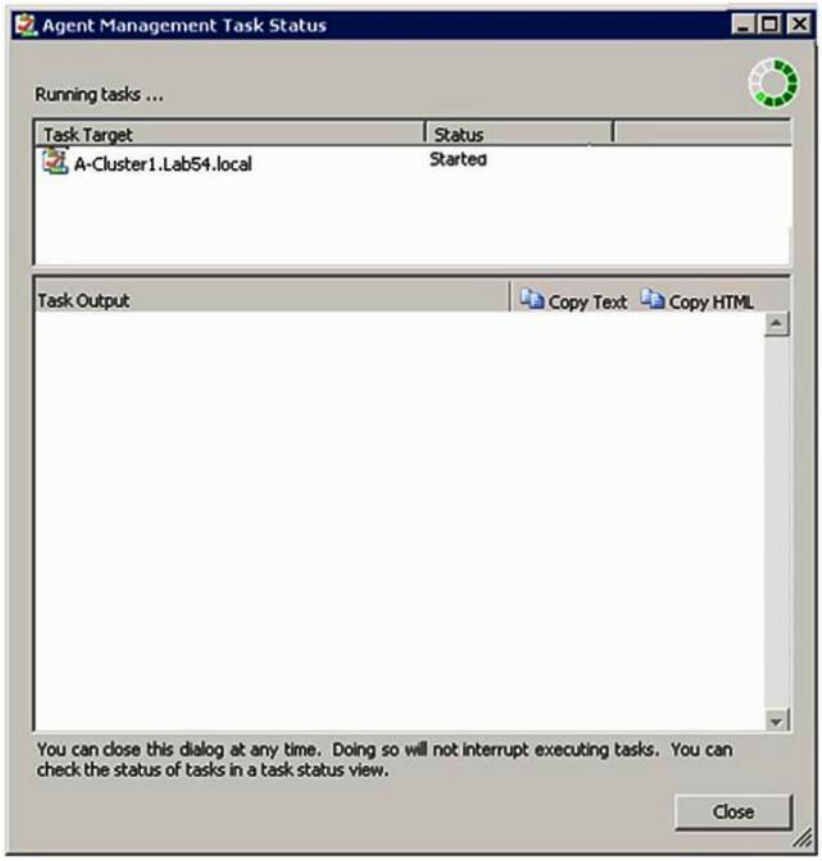

Figure 46. Agent Management Task Status

14. To view the agent installation task status, review the Agent Management Task Status page.

    Note: While this task is running, an indicator is displayed on the upper right side of the page. You can close this page at any time without interrupting the task.
15. Optional: To check the Agent Management Task Status and verify that the status of selected computers is changed from *Queued to Success*, click **Monitoring** > **Task Status**.
16. Click **Close** on the Agent Management Task Status page.

What to do next

For more information about using the Discovery Wizard, see TechNet Library: Systems Center Operations Manager.

Viewing inventory

The following procedure describes how you can use Microsoft System Center Operations Manager to view a complete inventory of configured management modules.

Procedure

1. To view BladeCenters and their modules, in the Operations Manager Console window, within the Computer and Groups pane, click **Computers and Groups View** > **Lenovo Hardware** > **Lenovo BladeCenters and Modules**.
2. To view the System x servers, BladeCenter blade servers, and other individual systems that have been discovered, click **Computers and Groups View** > **Lenovo Hardware** > **Lenovo System x and x86/x64 Blade Servers**.

Monitoring the health of systems, hardware components, and other targets

Hardware Management Pack discovers and monitors the health of the following hardware components: fans, memory, management controllers, network adapters, power supplies, processors, storage, temperature sensors, and voltage sensors. Hardware Management Pack can also discover and monitor the health of systems-management software, such as IBM Systems Director Agent, Intelligent Platform Management Interface (IPMI) driver, Lenovo IPMI Mapping Layer, and ServeRAID™ Manager Level 1 Agent.

About this task

Component discovery and health monitoring is dependent on firmware support, hardware compatibility, and management-software support. Because of these factors, not all components are discoverable. If a component is not discovered, it cannot be monitored or managed.

This task is performed from the Operations Manager Console.

Procedure

1. In the navigation pane, click **Monitoring** > **Lenovo Hardware** to display the folders and views that Hardware Management Pack adds to the Operations Manager Console.
2. Select either **Lenovo BladeCenter(s) and Modules** or **Lenovo System x and x86/x64 Blade Servers**.
3. Click **Active Alerts** to see if there any critical or warning alerts associated with your hardware. The following figure shows an example of how Active Alerts might be displayed:

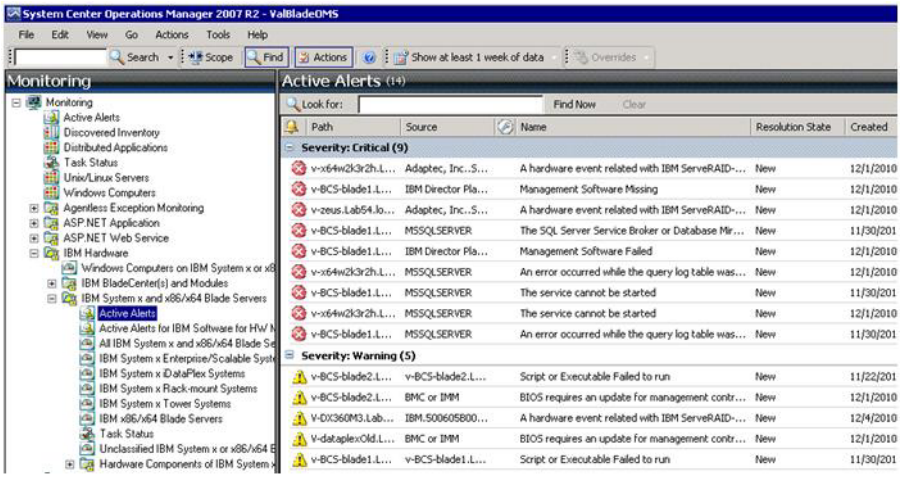

Figure 47. Active Alerts example

4. You can check the health of your systems by using one or more of the following options:

   Windows Computer on Lenovo System x or x86/x64 Blade Servers:
   Provides the status of the Windows platform on each system in the **Lenovo Hardware** folder.

   Lenovo BladeCenter(s) and Modules:
   Provides a view of the health information for all modules. Select this view to check the status of all BladeCenter Chassis, and then select the **Lenovo BladeCenter Modules** view.

   Lenovo System x and x86/x64 Blade Servers:
   Provides the hardware status of all Lenovo systems.

   All Lenovo System x and x86/x64 Blade Servers:
   Lists the health indicators in the first column of the system dashboard, and the first column of the hardware components dashboard.

   To check the status of a system in this view, select a group view.

What to do next

For more information on how to use the Health Explorer for analyzing a critical problem, see "Using Health Explorer to identify and resolve problems" on page 73.

Viewing alerts

The following procedure provides an example and instructions for using Microsoft System Center Operations Manager to view alerts sent from properly configured management modules and Lenovo System x systems and BladeCenter Blade servers.

About this task

This task is performed from the Operations Manager Console.

Procedure

- To view BladeCenter Chassis alerts, click **Monitoring** > **Lenovo Hardware** > **Lenovo BladeCenters and Modules** > **Active Alerts**.

In **Lenovo BladeCenters and Modules** view, you can see the following components listed under each chassis.

- Lenovo BladeCenter Blades
- Lenovo BladeCenter Chassis
- Lenovo BladeCenter Cooling Modules
- Lenovo BladeCenter I/O Modules
- Lenovo BladeCenter Management Modules
- Lenovo BladeCenter Media Modules
- Lenovo BladeCenter Power Modules
- Lenovo BladeCenter Storage Modules

An alert from the BladeCenter creates an additional alert for Lenovo x86/x64 Blade servers that may be affected by this alert condition, when the Windows operating system is installed on a Lenovo x86/x64 Blade server and when the premium feature is enabled.

The **Lenovo Blade OOB-IB Reflection** group view shows the health of Lenovo x86/x64 Blade servers based on this additional alert from Lenovo BladeCenters and Modules.

- To view individual System x, xSeries, BladeCenter blade servers, and other systems, click **Monitoring** > **Lenovo Hardware** > **Lenovo System x and x86/x64 Blade Servers** > **Active Alerts**.

  The Lenovo x86/x64 Blade alert reflecting BladeCenter Chassis alerts is displayed in the **Active Alerts** view, when the Windows operating system is installed on Lenovo x86/x64 Blade servers and when the premium feature is enabled.

  The Lenovo x86/x64 Blade alert displaying BladeCenter Chassis alerts has information about the malfunctioning component location in Lenovo BladeCenter.

- To review the details of the malfunctioning component, click **Monitoring** > **Lenovo Hardware** > **Lenovo BladeCenters and Modules** > **Active Alerts** to see the **Active Alerts** view for BladeCenter Chassis alerts.

  Notes:

  - Lenovo Hardware Management Pack has limited support for tools like `WinEvent.exe` that generate IBM Systems Director events and do not fully prescribe specific target instances.
  - In some circumstances, the `WinEvent.exe` tool does not correctly support the **`event ID`** and the **`event description`** parameters. This can cause the `WinEvent.exe` tool to be unreliable for displaying all events.
  - All WinEvents are reported under one monitor.
  - Successfully simulated events are displayed in the Operations Manager Console under the **Alerts** and **Events** views.
  - Monitored systems that have IBM Systems Director Agent 5.1.x installed and that use the `WinEvent.exe` tool can cause errors to reoccur even after manually clearing the alerts from the **Health Explorer** view.
  - To eliminate such an event recurrence, delete the `IBM\director\cimom\data\health.dat` file and all `IBM\director\cimom\data\health.dat\*.evt` files from the client system and restart the system.

- To open a monitoring view, right-click a BladeCenter Chassis, a System x server, a BladeCenter Blade server, or any other system. You can monitor these systems by using any of the following views: **Alerts**, **Diagram**, **Event**, and **State**.

Locating and viewing hardware errors

You can locate and view hardware errors by navigating to **All Lenovo System x and x86/x64 Blade Servers**.

Using Health Explorer to identify and resolve problems

The following procedure describes how you can use Health Explorer to identify and resolve error states that occur when monitoring systems and hardware components.

About this task

To perform a quick check of existing alerts on your Lenovo hardware, select one of the following views:

- Active Alerts
- Windows Computers on Lenovo System x or x86/x64 Blade Servers
- All Lenovo System x and x86/x64 Blade Servers

Health Explorer can assist you in troubleshooting alerts. You can use Health Explorer to view, learn about, and take action on alerts, state changes, and other issues raised by a monitored object.

For example, if you see a critical error when you are monitoring your system and hardware components, as shown in the figure below, you can use the following procedure to identify and resolve the error.

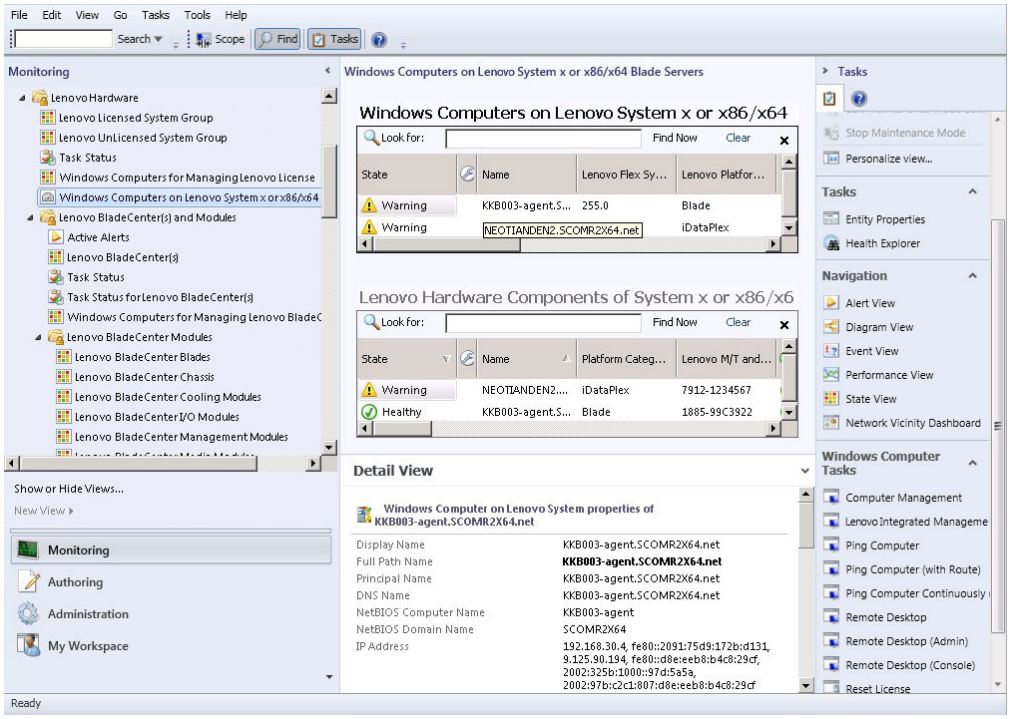

Figure 48. Example of a critical error showing up in a managed system

Procedure

1. When there is a warning or critical alert, open Health Explorer by clicking **All Lenovo System x and x86/x64 Blade Servers**, and then double-click **state**.

Note: By default, when Health Explorer opens, all of the failed monitors are displayed in an expanded view.

The following figure shows how such an error might be displayed in Health Explorer:

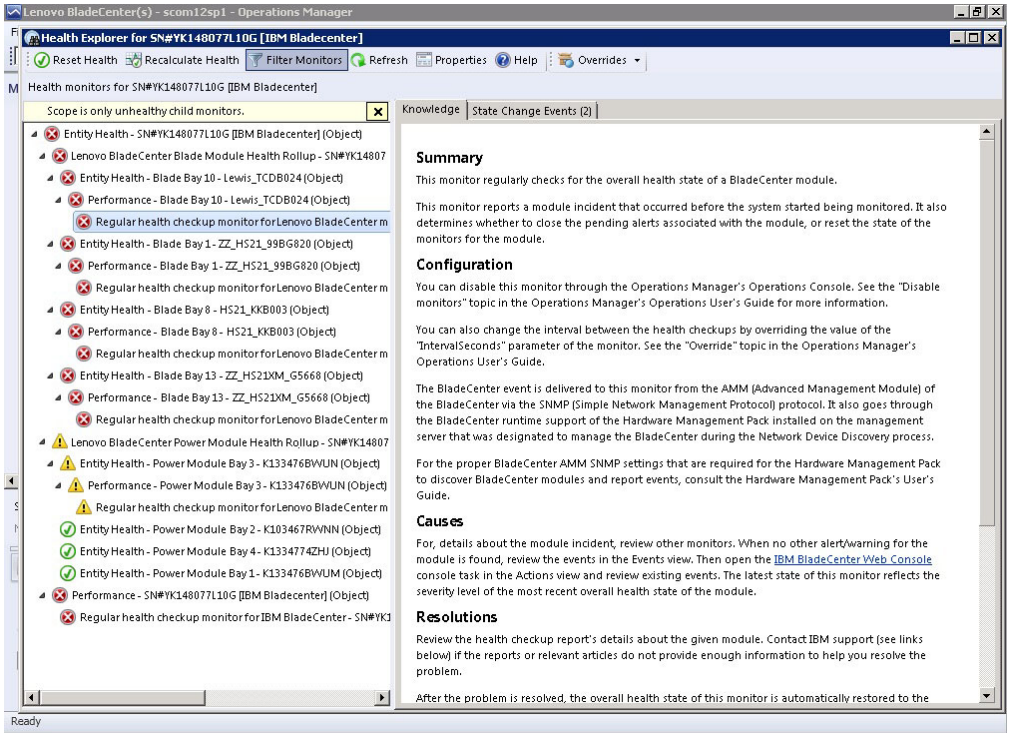

Figure 49. Example of hardware components causing a system to be in error

Use Health Explorer to identify the basal-level health monitor indicating an error. This indication should refer to a particular component instance. As shown in the figure above, the cause of the error is a faulty fan.

2. To see the latest state change event, click **State Change Events**. The results pane provides details.

   You can also read details about the nature of the error. When the premium feature is enabled, the **Lenovo BladeCenter Blade Out of Band Health Reflection Rollup** reflects the component health in the BladeCenter.

3. Check the **Lenovo BladeCenters and Modules** folder view for further analysis when you see a warning or critical alert in the **Lenovo BladeCenter Blade Out of Band Health Reflection Rollup**.

4. If there are no warnings or critical alerts visible, you can use Health Explorer to view other information, such as the **system_name**:

   a. From the **All Lenovo System x and x86/x64 Blade Servers** view, select a Lenovo system to view.

   b. Right-click on the system name and click **Health Explorer** > **Open**.

What to do next

Refer to the “Using knowledge pages to resolve problems” on page 75 topic to understand how you can use the IBM Knowledge pages to assist you with resolving errors.

Using knowledge pages to resolve problems

Knowledge pages provide information about errors, events, and components. To learn more about a system, hardware components, and how to resolve errors when they occur, refer to the knowledge pages. Knowledge pages are written by IBM developers to help you better understand System x and x86/x64 Blade servers events, alerts, components, and other information.

Procedure

1. Select one of these methods to access a knowledge page:
   - Use the **Health Explorer/Monitors** view to access Hardware Management Pack monitor information.
   - Use the **Events** view to access information about an event.
2. Click the **Knowledge** tab in the right pane of Health Explorer to get additional information about an error event, including explanations and necessary steps that might help you to fix the problem. Some knowledge pages have links to another knowledge page for possible causes and suggested actions. These pages might describe specific errors and their remedies or describe hardware components.
3. Click the **Director Core Services failed or is not started** link. This link opens another knowledge page, as shown in the figure below.

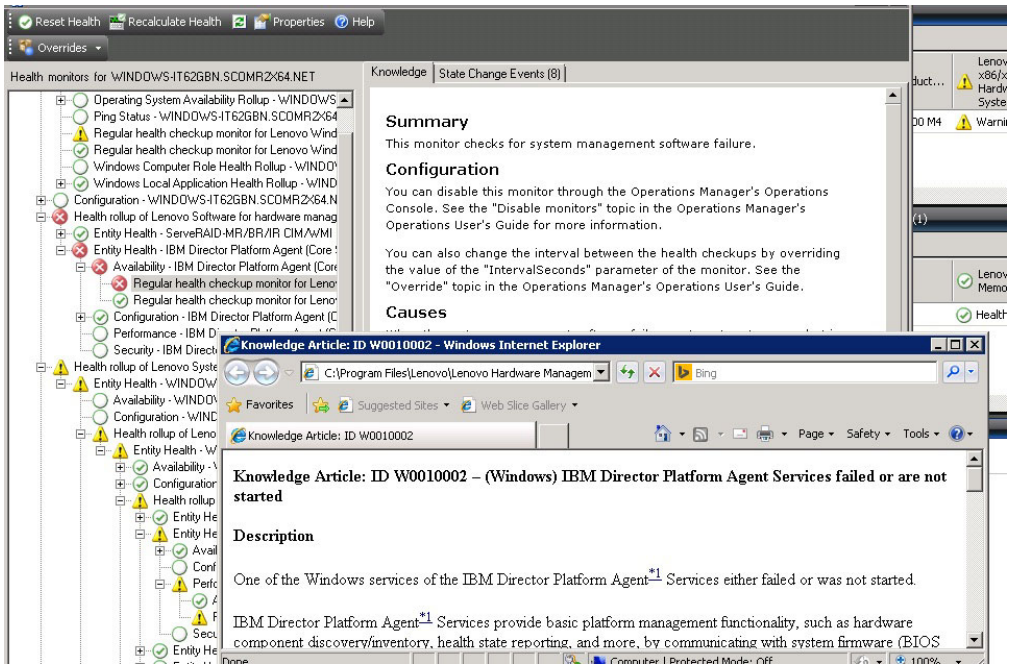

Figure 50. Example of one knowledge page linking to another

4. Perform the procedure identified in the knowledge pages to resolve the error and reset the health sensor, if necessary.

What to do next

The knowledge pages are also accessible through the **Active Alerts** view.

To view the Alert Properties, double click an alert. The Alert description is displayed in the **General** tab. The **Product Knowledge** tab includes a link to the

knowledge page. The figure below provides an example of the Alert Properties window.

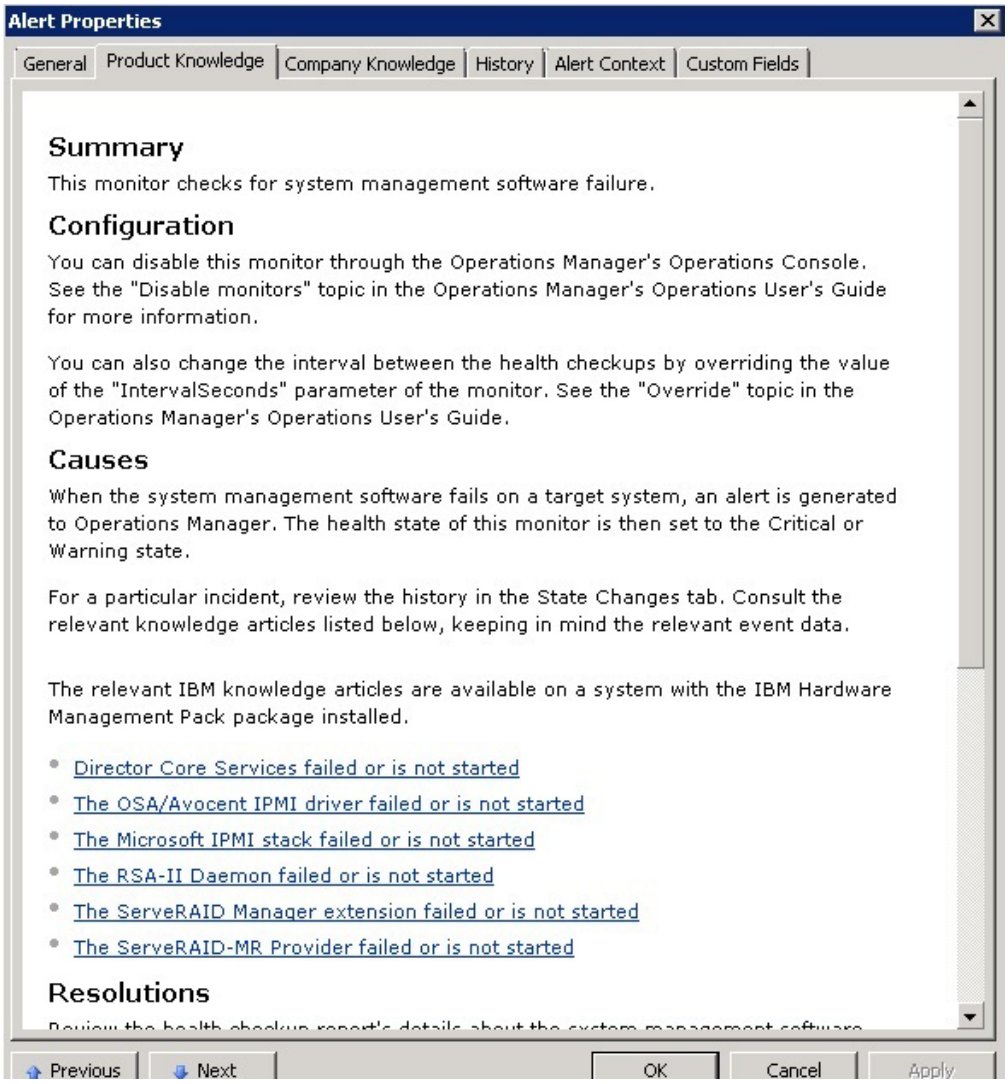

Figure 51. Example of Alert Properties

Chapter 6. Using premium features

The topics in this section describe how to use the Hardware Management Pack premium features. The premium features are available when the Hardware Management Pack installation is registered with the Lenovo XClarity Integrator for Microsoft System Center Installer.

For additional information about the premium features, refer to "Premium features" on page 1.

Health monitoring of IMM-based servers

Lenovo Hardware Management Pack manages IMM-based servers using agentless mode.

Hardware Management Pack provides the following functionality for IMM-based servers:

- Discovery of an Integrated Management Module (IMM) and the ability to correlate it with the host.
- IMM authentication and the ability to obtain information through the IMM CIM.
- IMM deletion option.
- Power management implementation.

Adding an IMM-based server that will be managed by Operations Manager

To add an IMM-based server using the Operations Manager Console with Lenovo Hardware Management Pack installed, complete the procedure described in the "IMM discovery and authentication" topic.

IMM discovery and authentication

Lenovo Hardware Management Pack leverages the Operations Manager task for discovering an IMM node.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Windows Computers**. In the center pane, the IMM Discovery Console is displayed.

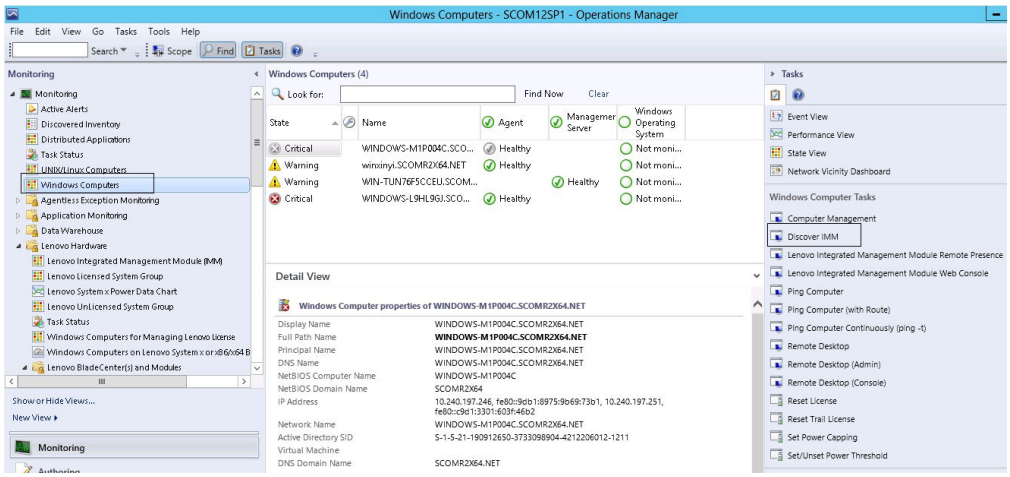

Figure 52. IMM Discovery Console

2. In the Windows Computer Tasks pane located in the bottom right corner of the window, click **Discover IMM**. The IMM Discovery page opens.

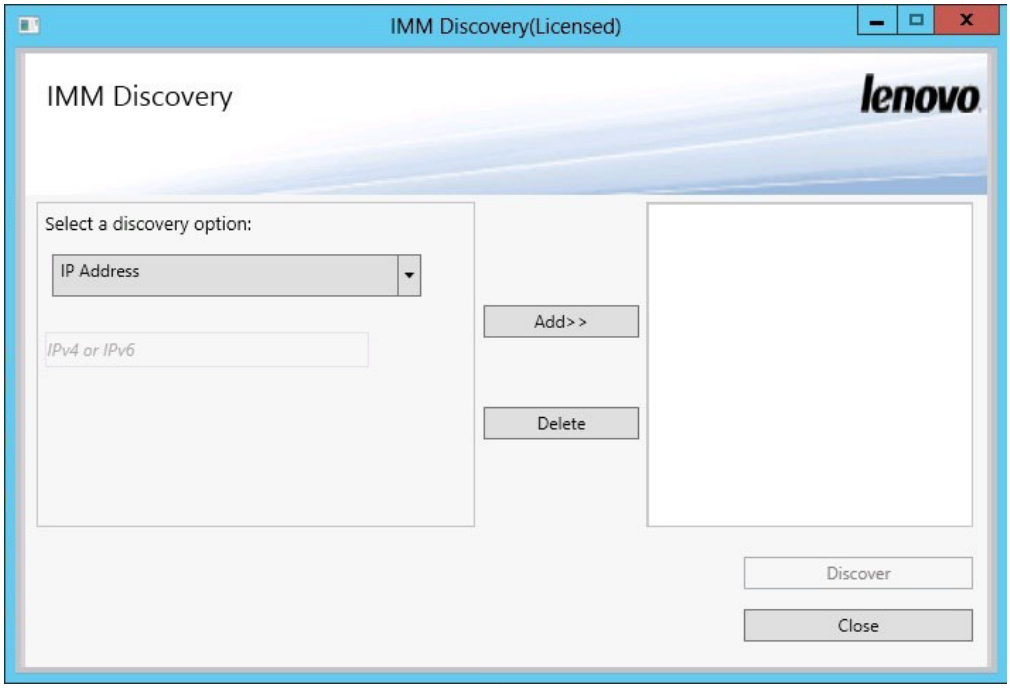

Figure 53. IMM Discovery

3. Using the IMM Discovery dual-list, perform the following steps to create an IMM discovery list:
   a. On the left side, select one of the following two discovery options from the list: **IPv4Address** or **IPv4Range**.
   b. In the **IP Address** field, enter the `IPv4Address` or the `IPv4Range`.
   c. Click **Add**.
   d. Click **Discover**.

This task may take several minutes to discover all of the Integrated Management Modules and for Operations Manager to perform a query of discovered data.

When the IMM discovery is finished, the IMM nodes are displayed in the Lenovo Integrated Management Module pane.

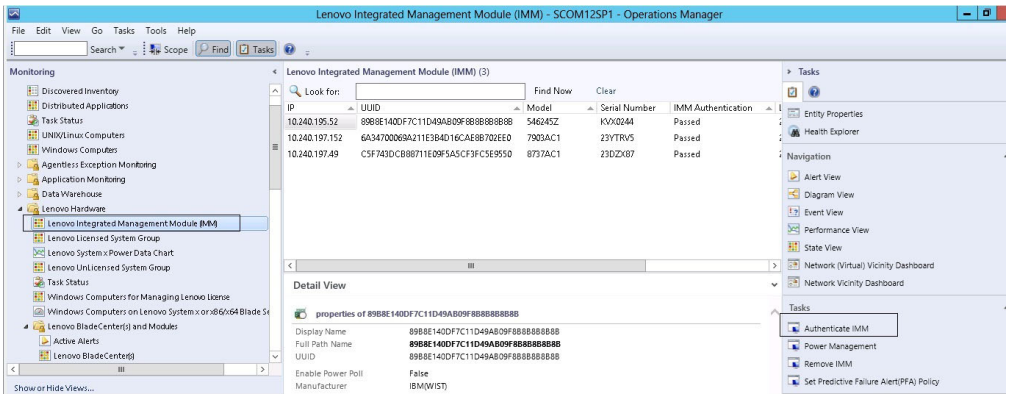

Figure 54. Lenovo Integrated Management Module

4. Click an **IMM node**. A corresponding task list is displayed on the right.
5. From the **Tasks** list, select **Authenticate IMM**.

   The IMM Authentication dialog box opens.

Figure 55. IMM Authentication

6. Enter the `User name` and `Password`, then click **Connect**.

   Note: Due to an IMM security policy limitation, IMM Authentication will only try to authenticate the `User name` and `Password` twice. After two incorrect attempts, the IMM log in username is locked.

Using the power management feature for Hardware Failure Management

A discovered Integrated Management Module (IMM) supports the basic power management feature. The power management feature only supports a rack-type server. Power capping of BladeCenter and Flex Systems are integrated by using the Advanced Management Module (AMM) and the Chassis Management Module (CMM).

Procedure

1. Select the IMM instance and then from the **Tasks** list, select **Power Management**. The Power Capping Management dialog box is displayed.

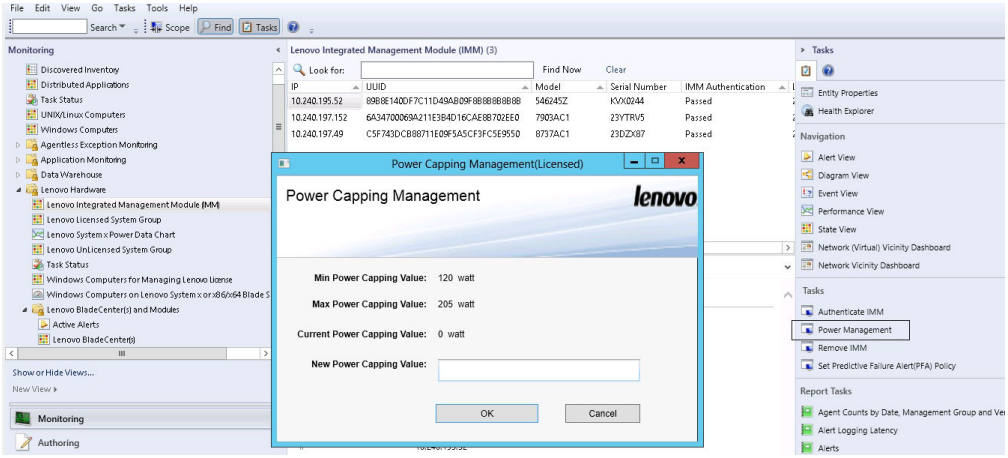

Figure 56. Power Capping Management

2. Enter a `New Power Capping Value` and then click **OK** to save the new value.

Remote control of BladeCenter x86/x64 Blade servers

This feature allows you to remotely control the BladeCenter Blade module to select power on, off, or shutdown of the operating system. When the premium feature is enabled, this task is available in the Actions pane of the Operations Manager Console.

Remote Shutdown of an operating system

The following procedure provides instructions for an orderly shutdown of an operating system on the BladeCenter x86/x64 Blade module using the physical location of the Blade.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** > **Lenovo Hardware** > **Lenovo BladeCenter(s) and Modules** > **Lenovo BladeCenter Blades**.
2. From the **Lenovo BladeCenter Blades** view located in the results pane of the Operations Manager Console, select a **Blade server**.

3. In the Actions pane, click **Lenovo BladeCenter: Shutdown Operating System on this Blade**.

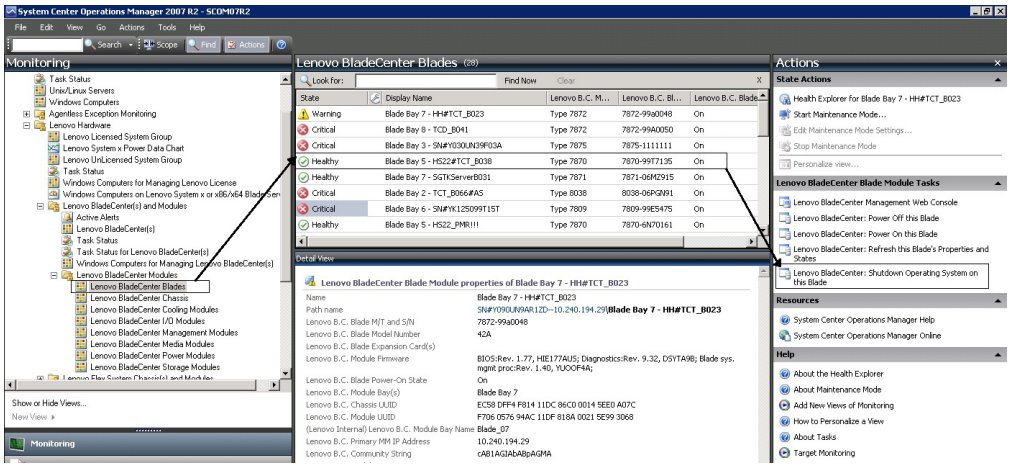

Figure 57. Operations Manager Console premium feature is enabled example

4. Verify the task targets by checking the (top-middle) results pane of the Operations Manager Console.

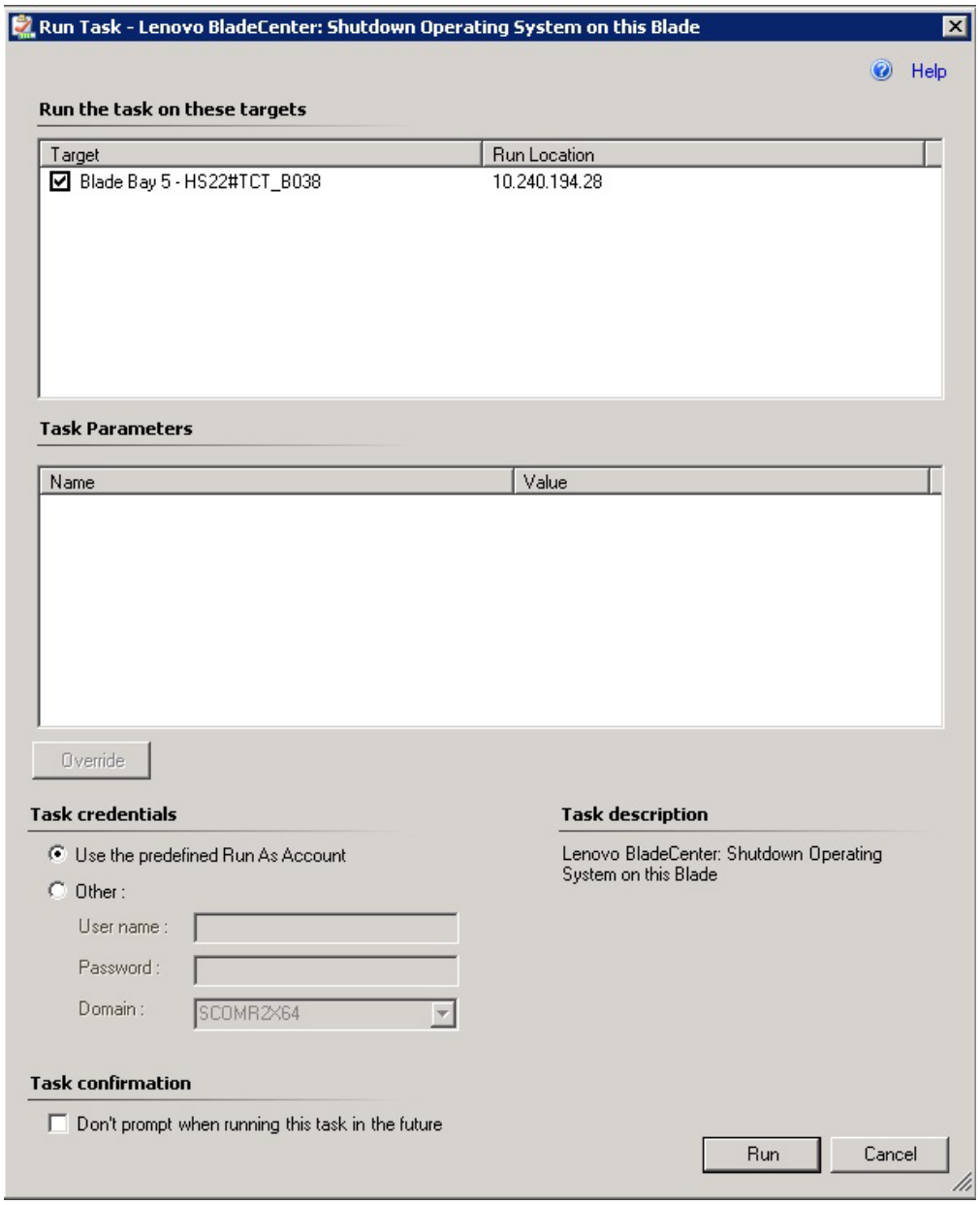

Figure 58. Task Status for Shutdown Operating System on this Blade

5. Click **Run**.

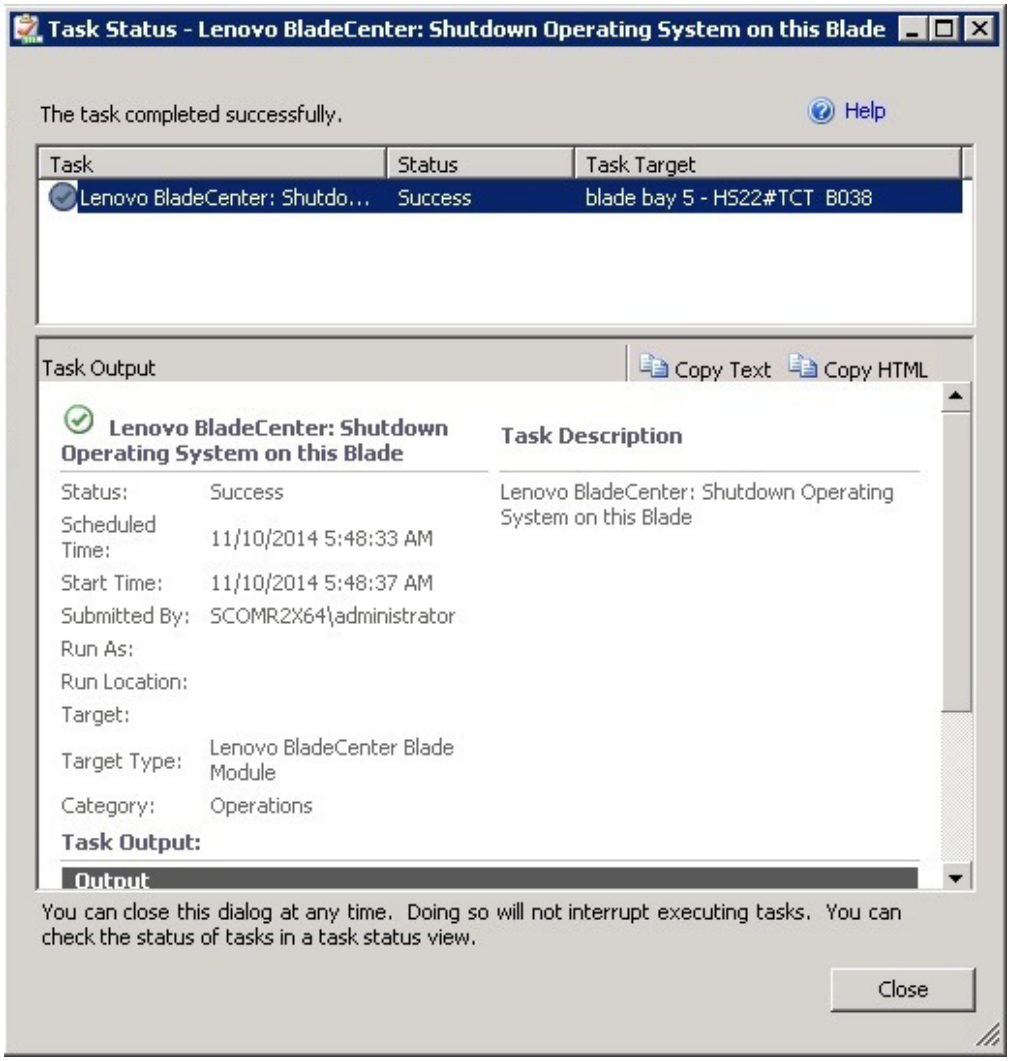

Figure 59. Task status indicating the shutdown task has been sent to this Blade

The task status window indicates that the task has been sent to the Lenovo BladeCenter for the target blade server.

6. Click **Close**.

Note: When the premium feature is not enabled, this task fails. A message is displayed in the Task Output section indicating that the free version of Lenovo Hardware Management Pack is being used.

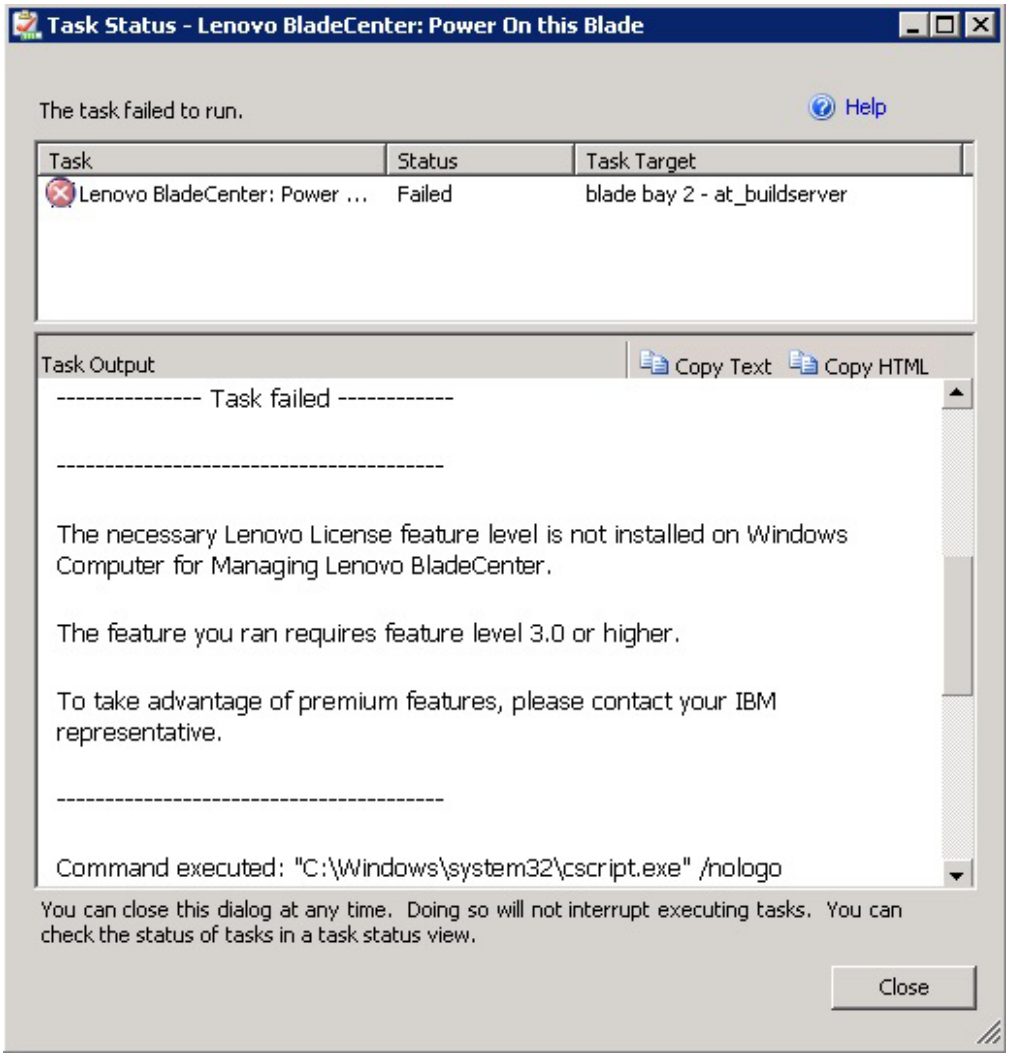

Figure 60. Example of a Task Output message

7. Click **Close**.
8. In the Actions pane, click **Lenovo BladeCenter: Refresh this Blade's Properties and Status** for an immediate Blade power status check.

Setting the power threshold

Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 offers the ability to customize power consumption thresholds for Power Monitoring alerts. The following procedure provides instructions and an example of how to set and unset the power threshold feature.

Before you begin

The target system must be capable of power monitoring to execute this task. This task is used to set or unset a warning or critical power threshold on a system. To see the current threshold values and the *MonitoringCapable* property, refer to the Detail View of a system under the **Lenovo Licensed Systems Group**. If you specify a blank or zero value for a particular threshold, that threshold is reset to its default value.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** > **Lenovo Hardware** > **Lenovo Licensed System Group**.
2. In the **Lenovo Licensed System Group** view located in the center pane, click **Server**.
3. Click **Set/Unset Power Threshold** in the right pane.

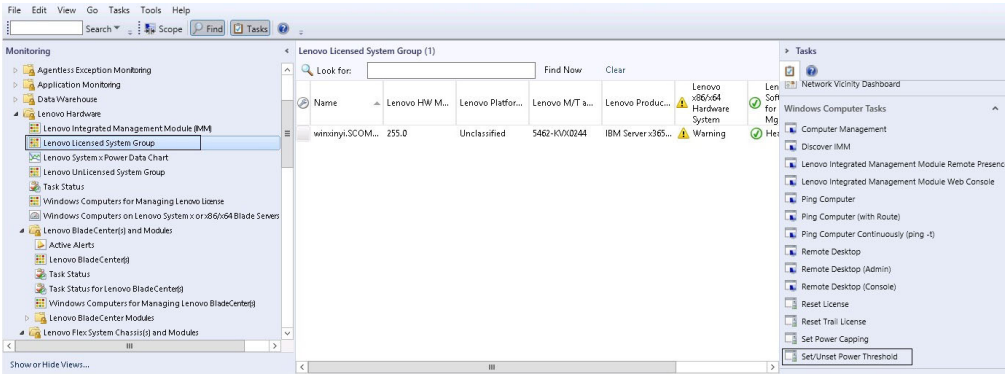

Figure 61. Example of Set/Unset Power Threshold task

4. Verify the task targets display in the Run the task on these targets pane.

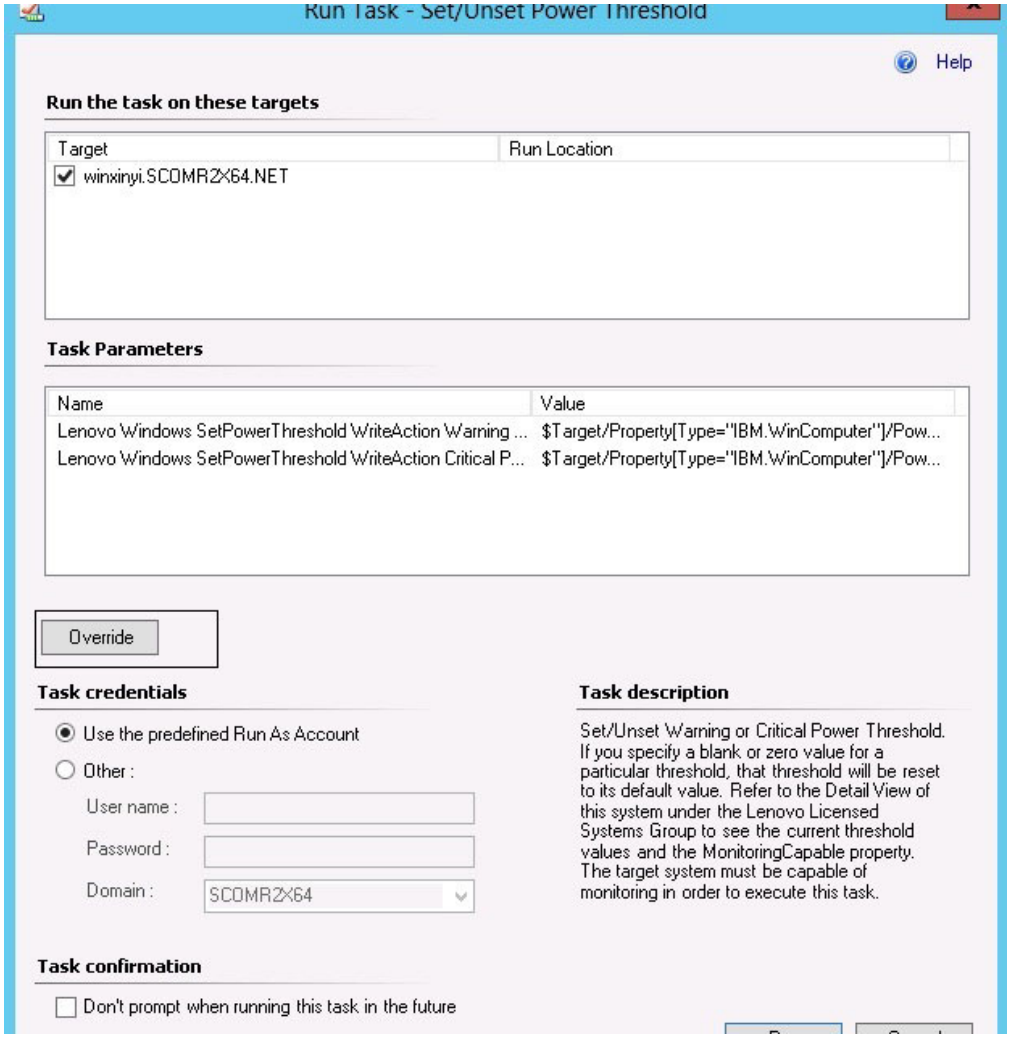

Figure 62. Target and task parameters of Set/Unset Power Threshold task

5. Click **Override** to override the power threshold values.

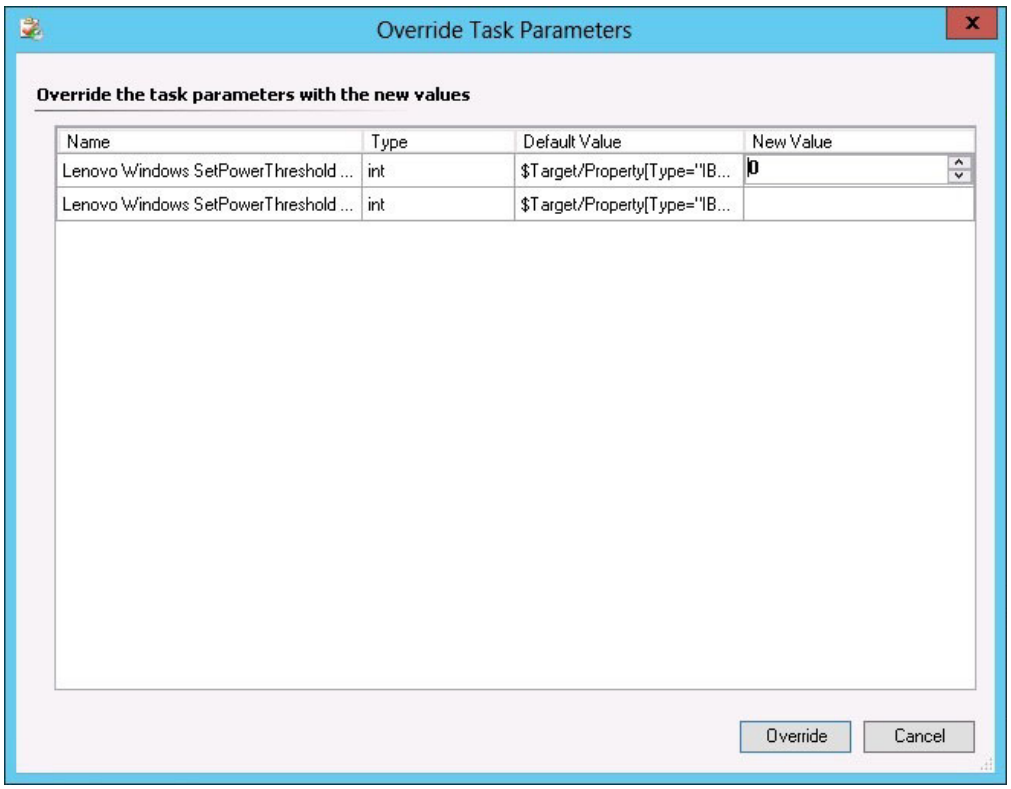

Figure 63. Override the task parameters of Set/Unset Power Threshold task

6. Enter new values for the threshold parameters and click **Override**.
7. Verify the values that you just set in the Task Parameters pane.

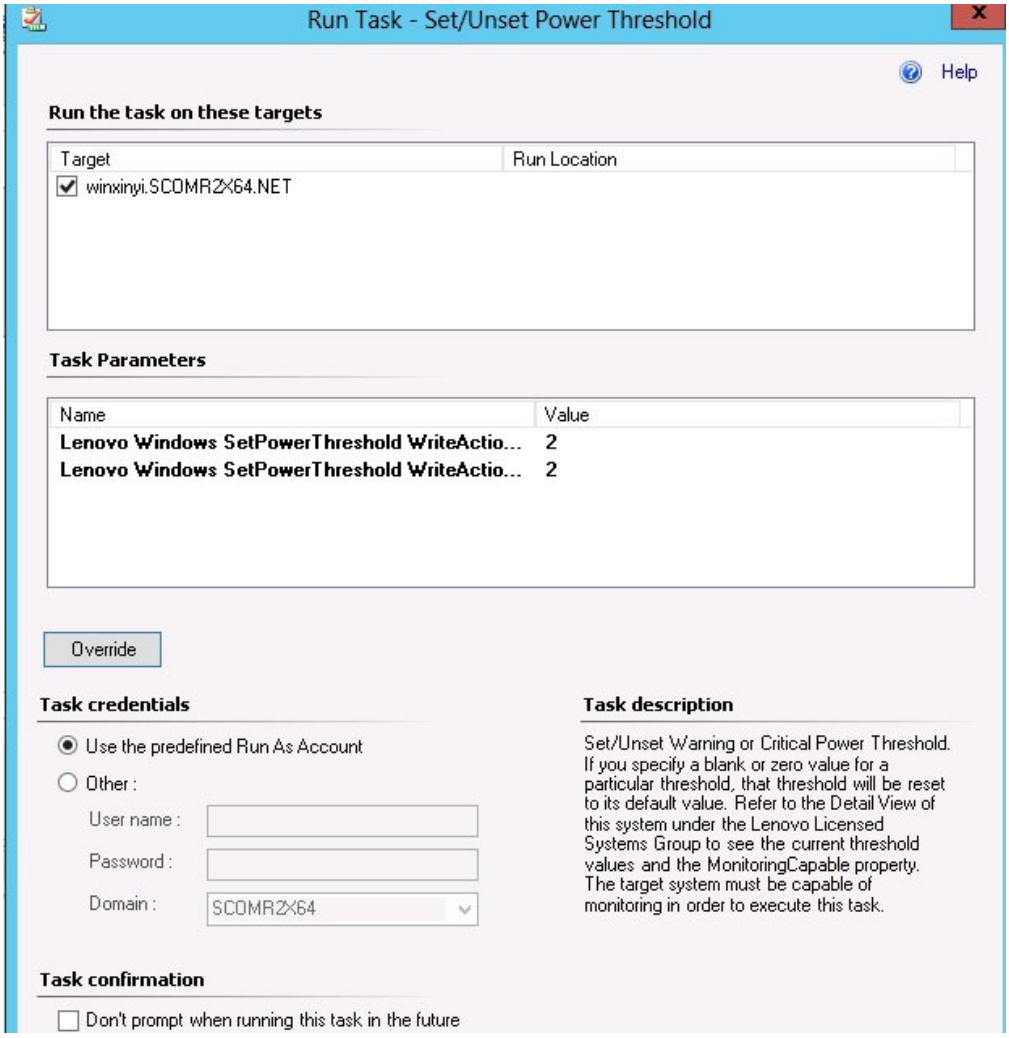

Figure 64. New values of the task parameters of Set/Unset Power Threshold task

8. Optional: Click **Override** if you want to change the values again.
9. After verifying the new values, click **Run**. The task status window indicates the task has been sent to the target server.

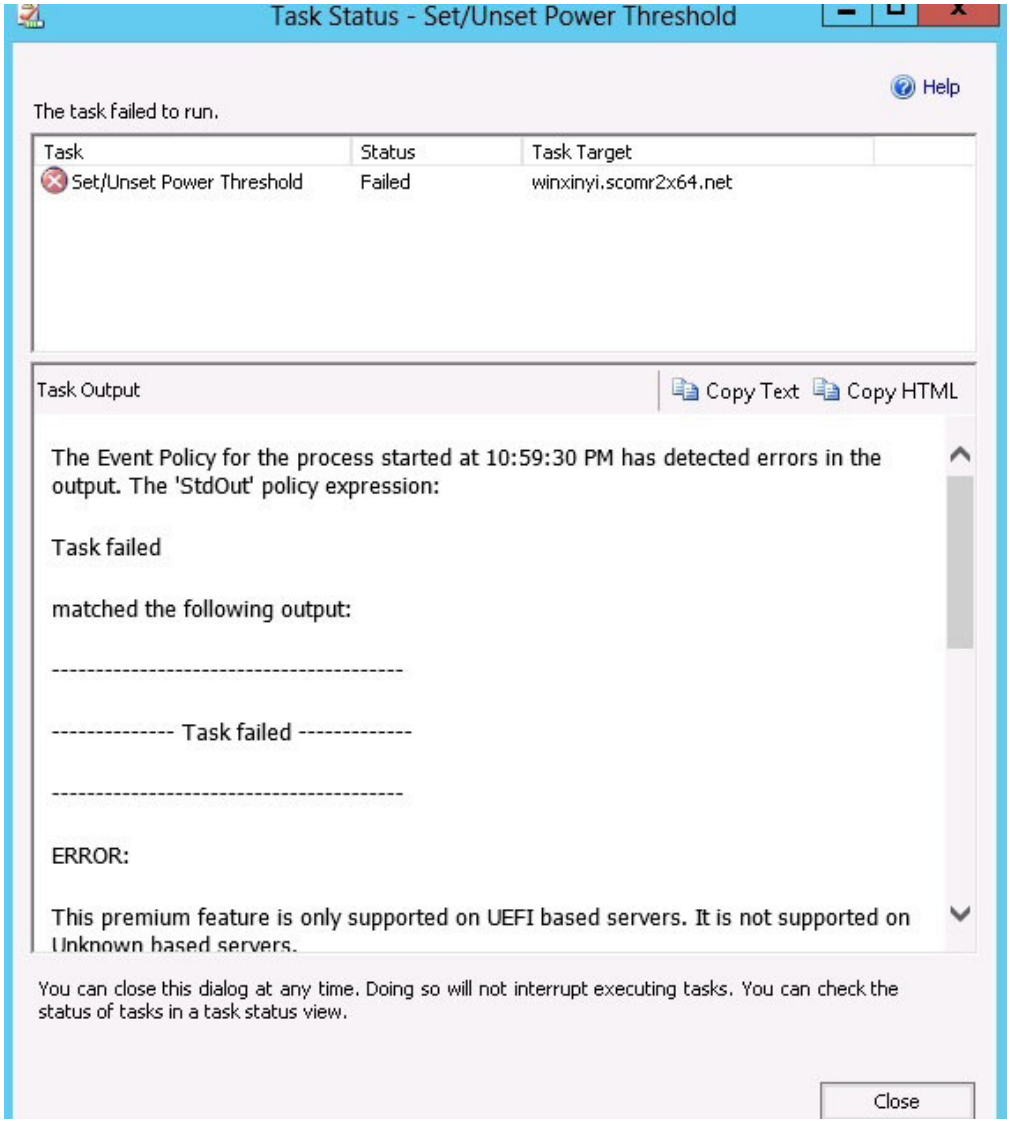

Figure 65. Task Status indicating the Set/Unset Power Threshold task has been sent to the target server

A message is displayed in the Task Output pane indicating whether the task succeeded or failed.

10. Click **Close**.

Enabling and setting power capping

Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 provides the ability to enable and set maximum power consumption wattage. The following procedure provides instructions and an example for enabling and setting power capping.

Before you begin

Ensure that the target system is capable of power capping before starting this procedure. This task also requires that the **User Access Control (UAC)** be turned off on the target system. To see the current *CappingCapable*, *CappingEnabled*,

PowerMax, *PowerMin*, and *PowerCap* values of a system under the **Lenovo Licensed Systems Group**, refer to the Detail View.

About this task

This task is performed from the Operations Manager Console.

You must specify values for power capping for **PowerMin** and **PowerMax**.

Procedure

1. Click **Monitoring** > **Lenovo Hardware** > **Lenovo Licensed System Group**.
2. In the **Lenovo Licensed System Group** view located in the center pane, click **Server**.
3. Click **Set Power Capping**.

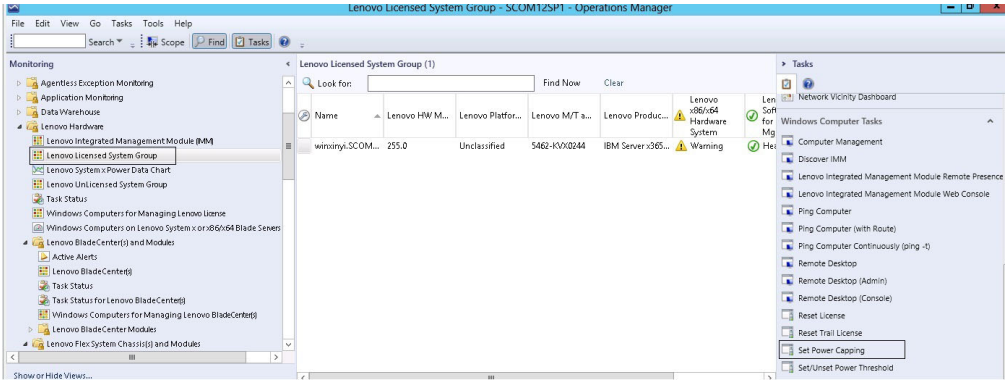

Figure 66. Example of Set Power Capping task

4. Verify the task targets are displayed in the Run the task on these targets pane.

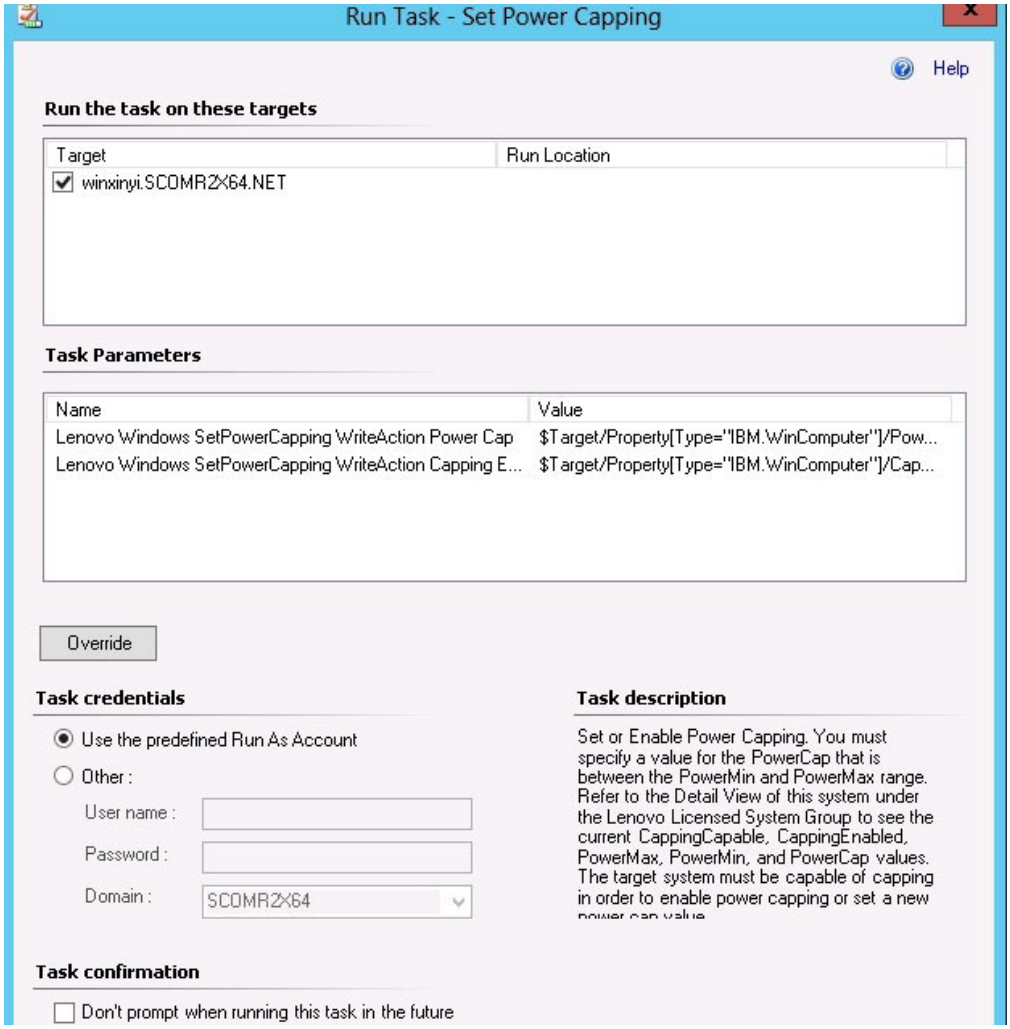

Figure 67. Target and task parameters of the Set Power Capping task

5. Click **Override** to override the power threshold values.

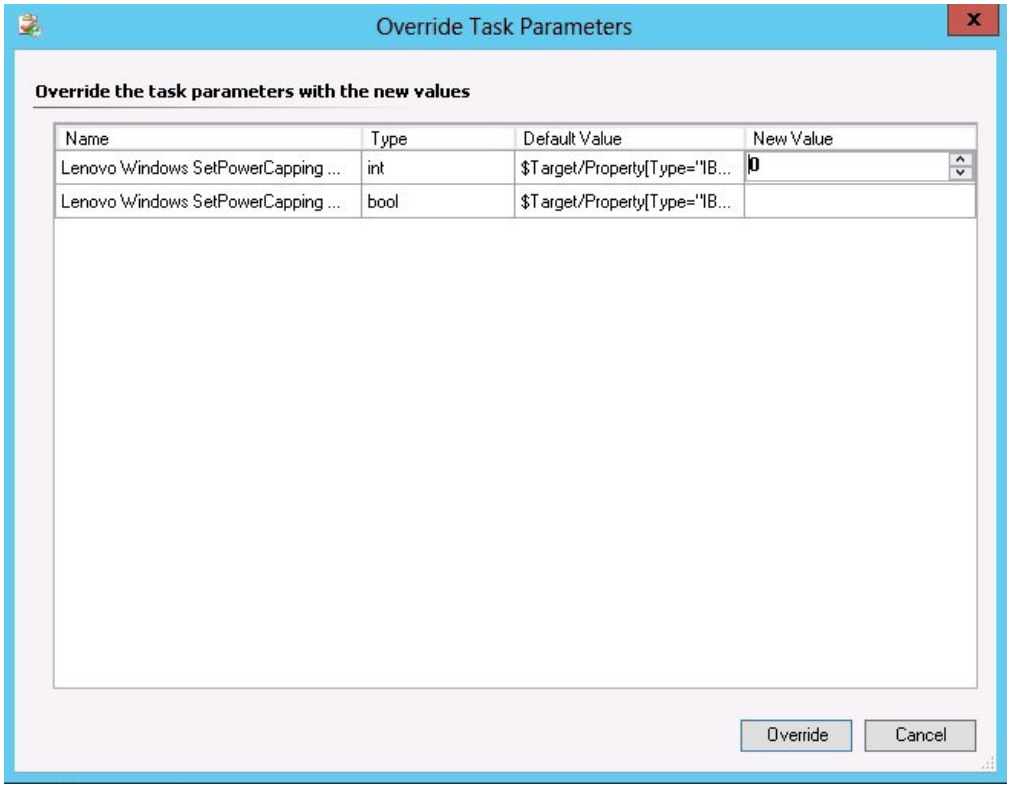

Figure 68. Override the Task Parameters of Set Power Capping task

6. Enter new values for the power capping parameters and click **Override**.
7. Verify the values that you just set in the Task Parameters pane.

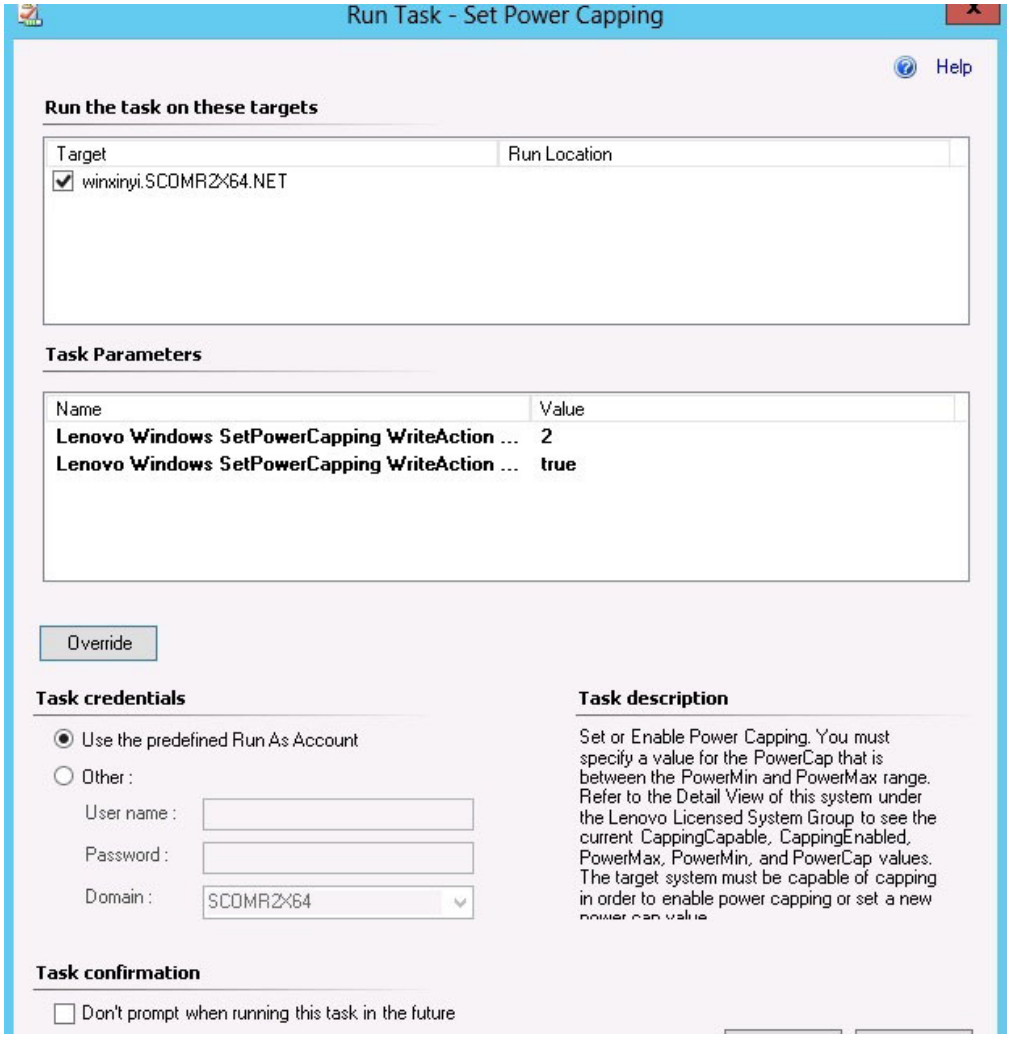

Figure 69. New values of the Task Parameters of Set Power Capping task

8. After entering the new values, click **Run**. The task status window indicates the task has been sent to the target server.

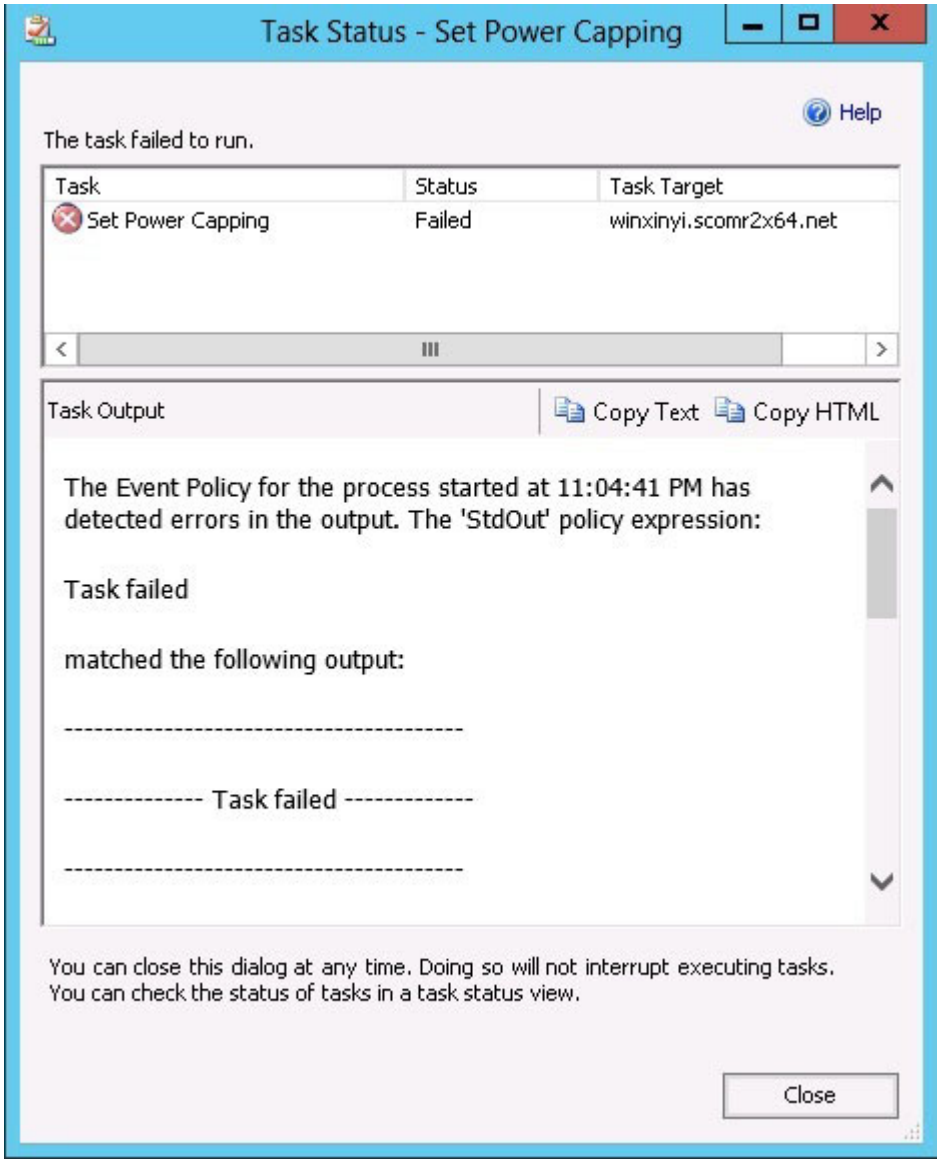

Figure 70. Task Status indicating the Set Power Capping task has been sent to the target server

A message is displayed in the Task Output section indicating whether the task succeeded or failed.

9. Click **Close**.

Setting the Predictive Failure Alert (PFA) Policy

Lenovo Hardware Management Pack for Microsoft System Center Operations Manager, v6.0 provides an automatic virtual machine (VM) evacuation method if a hardware failure occurs on a host server. The following procedure provides instructions and an example of how to set the Predictive Failure Alert (PFA) Policy.

Before you begin

To execute this task, the target system must be capable of predictive failure alerts. Currently, only Brickland-based systems support this task. To determine whether a machine supports predictive failure alert settings, check the *IMM RAS Supported*

property found in the Lenovo Integrated Management Module (IMM) section of the Operations Manager Console. If a machine supports the PFA Policy, the automatic virtual machine evacuation is based on the hardware failure alerts selected in the following procedure.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** > **Lenovo Hardware** > **Lenovo Integrated Management Module (IMM)**.
2. In the **Lenovo Integrated Management Module (IMM)** view located in the top center pane, select a server that indicates it is *IMM RAS Supported* as shown in the following figure.

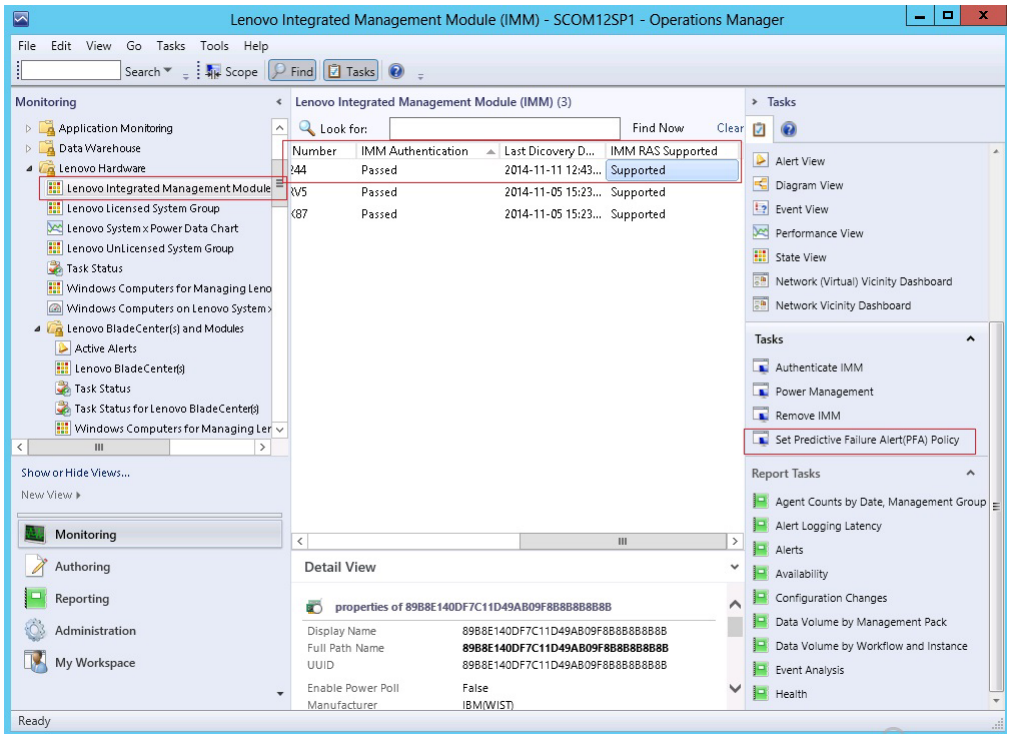

Figure 71. Set Predictive Failure Alerts Policy task example

3. In the Tasks pane, select **Set Predictive Failure Alert (PFA) Policy** . The PFA Policy Configuration window opens.

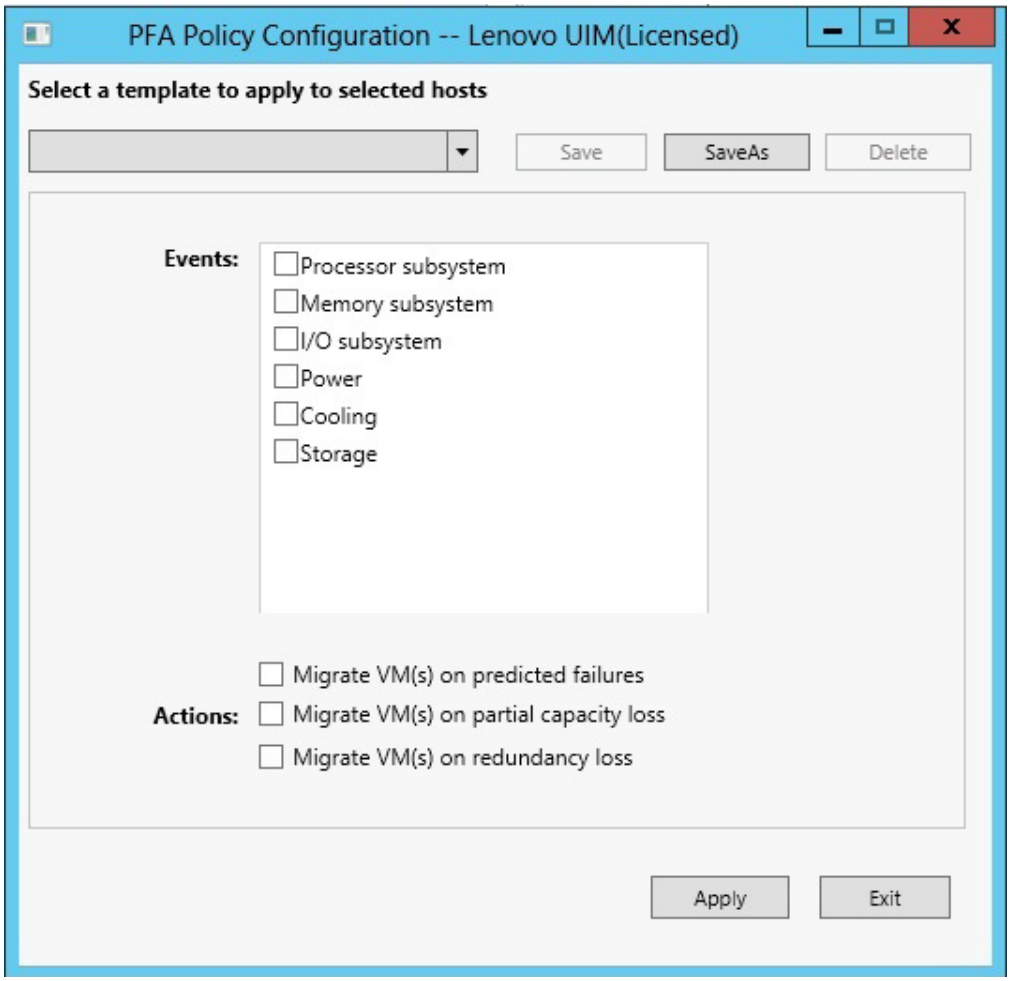

Figure 72. PFA Policy Configuration window

4. In the PFA Policy Configuration window, complete the following applicable steps:
   - To create a new template:
     a. From the **Select a template to apply to selected hosts** list, select a template.
     b. From the **Events** list, select the applicable hardware failure alert events.

        Note: The **Events** list is dependent on what types of alert events are supported by the target server. For example, LenovoSystem x3650 M5 supports the following alert events:
        - Processor subsystem
        - Memory subsystem
        - I/O subsystem
        - Power
        - Cooling
        - Storage

     c. Set actions for alert events:
        - Migrate VM(s) on predicted failures
        - Migrate VM(s) on partial capacity loss

– Migrate VM(s) on redundancy loss

d. Click **Save As**.

- To modify an existing template:
  a. From the **Select a template to apply to selected hosts** list, select an existing template.
  b. In the **Events** list, make any necessary changes, by selecting and deselecting events.
  c. If applicable, modify the severity level for the alert.
  d. If applicable, select or deselect the **Virtual machine migration** option.
  e. Click **Save**.
- Click **Delete** to remove an existing template.

Viewing the power data for client System x servers

The Lenovo System x Power Data Chart feature offers you the ability to view the power data of client System x servers in an intuitive chart. The Power Data Chart feature is only available on System x servers and is not available on Chassis and Flex Systems.

Before you begin

Before you view the Power Data Chart, you should have at least one managed System x server with the Windows operating system installed on it.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** > **Lenovo Hardware** > **Lenovo System x Power Data Chart**.
2. Select the server check box. The Lenovo System x Power Data Chart is displayed.

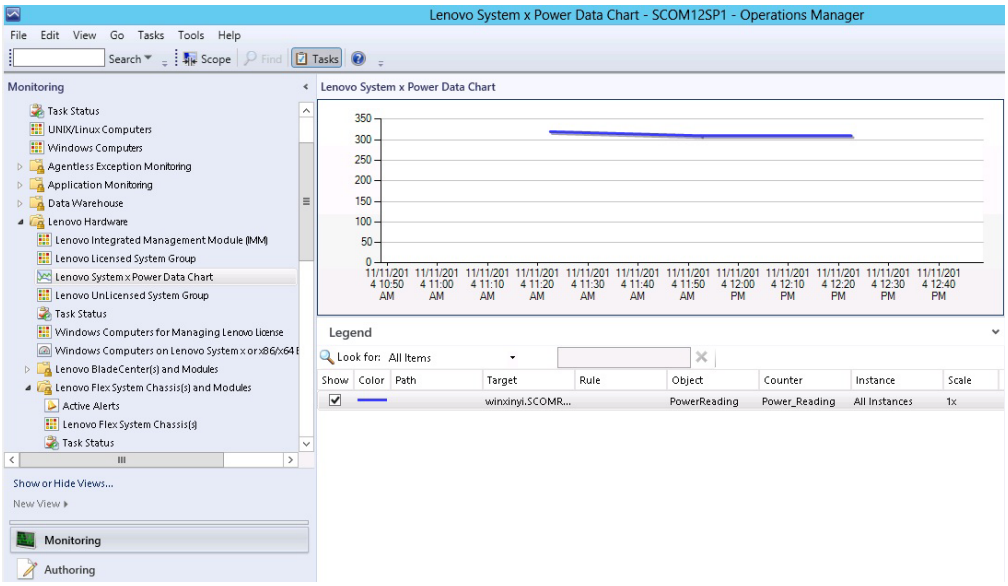

Figure 73. Lenovo System x Power Data Chart

Unless there are power fluctuations, the power usage is displayed as a straight line.

Remotely controlling Flex Systems

The Lenovo Flex System remote power on and off premium feature allows you to remotely control the Flex System to power on, power off, or shutdown the operating system. When this feature is enabled, the options are listed in the Actions pane of the Operations Manager Console.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** > **Lenovo Hardware** > **Lenovo Flex System Chassis(s) and Modules** > **Lenovo Flex System Chassis Modules** > **Lenovo Flex System Chassis Compute Nodes**.
2. In the Actions pane, select one of the following options for the selected Flex System:
   - Lenovo Flex Chassis: Power On this Computer Node
   - Lenovo Flex Chassis: Power Off this Computer Node
   - Lenovo Flex Chassis: Shutdown Operating System on this Computer Node

   The following figure provides an example of remote power options using Lenovo Flex System Chassis Compute Nodes.

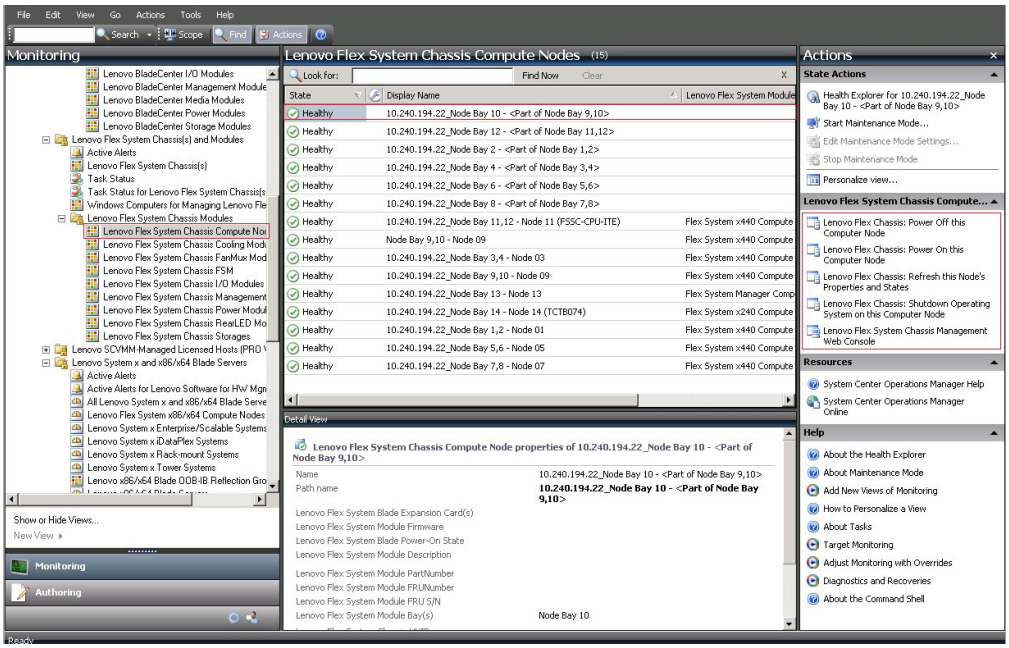

Figure 74. Example of remote power options for Lenovo Flex System Chassis Compute Nodes

3. Optional: To use the power on option, from the **Lenovo Flex System Chassis Compute Node Task** list located in the lower right corner of the window, select **Lenovo Flex Chassis: Power on this Computer Node**. The Run Task - Lenovo Flex Chassis: Power On this Computer Node window is displayed. By default, the target server and account are selected.

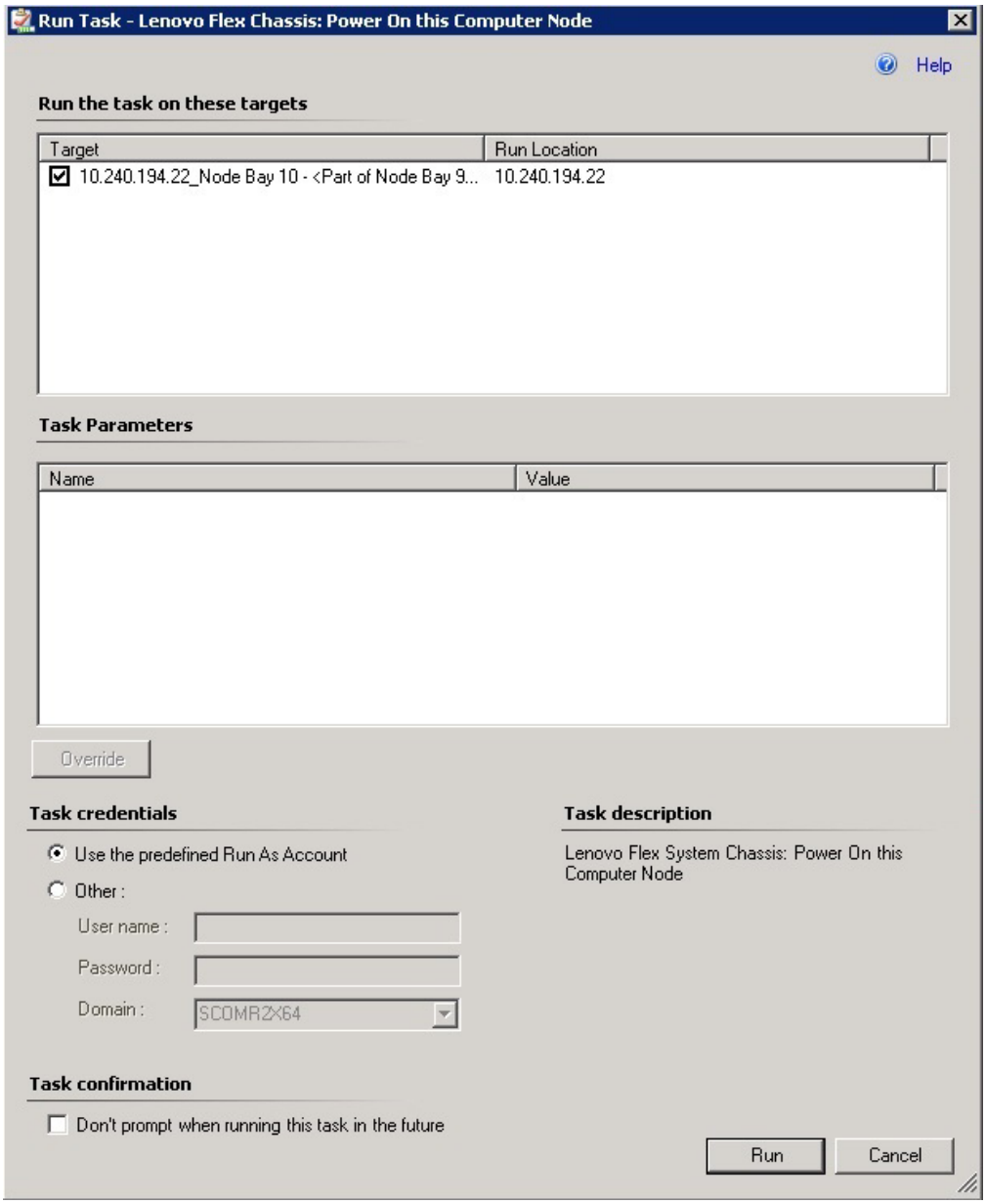

Figure 75. Run Task - Lenovo Flex System Chassis: Power On this Computer Node

4. Click **Run** to launch the task.
   After the power on task is finished, the task status is displayed.

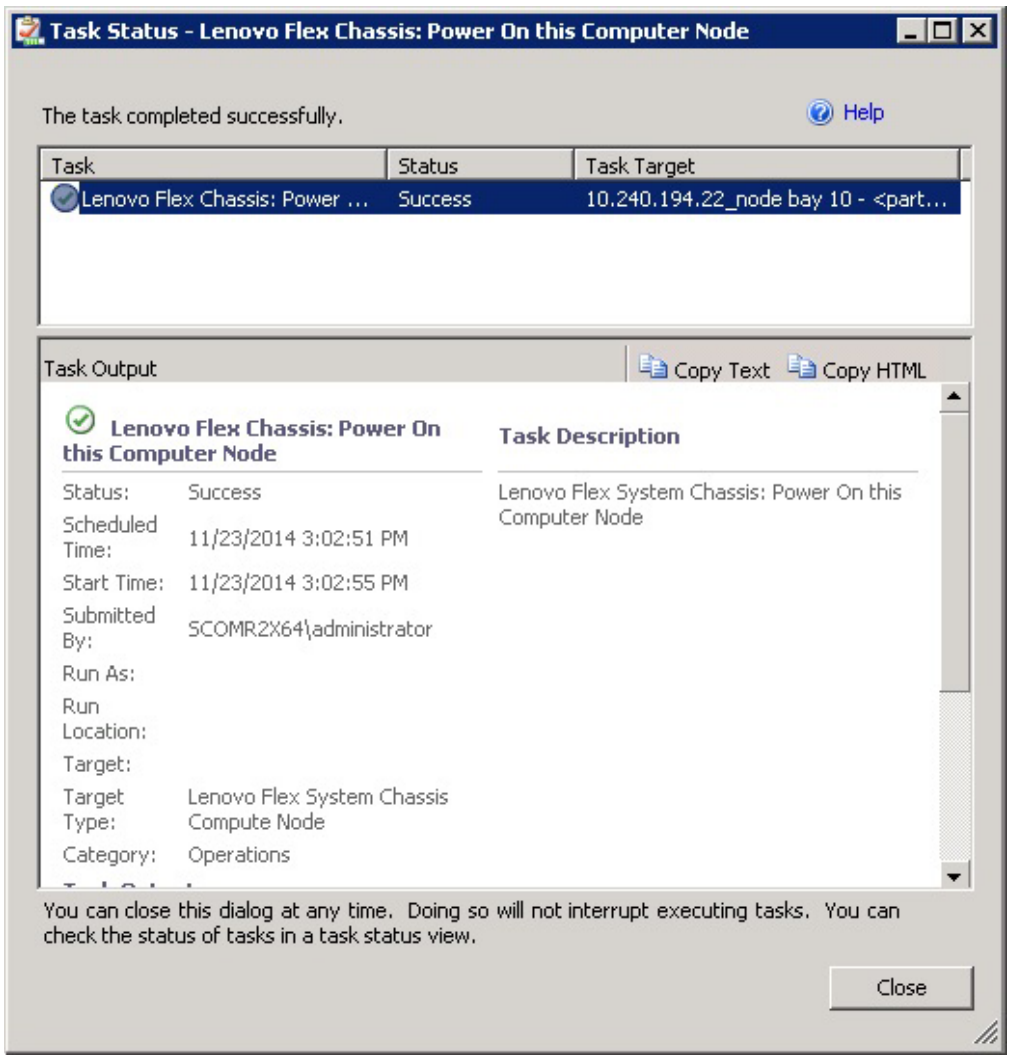

Figure 76. Task status for remote power on

Note: When the premium feature is not enabled, the task fails. A message is displayed in the Task Output pane indicating that the free version of Hardware Management Pack is being used, as shown in the following figure.

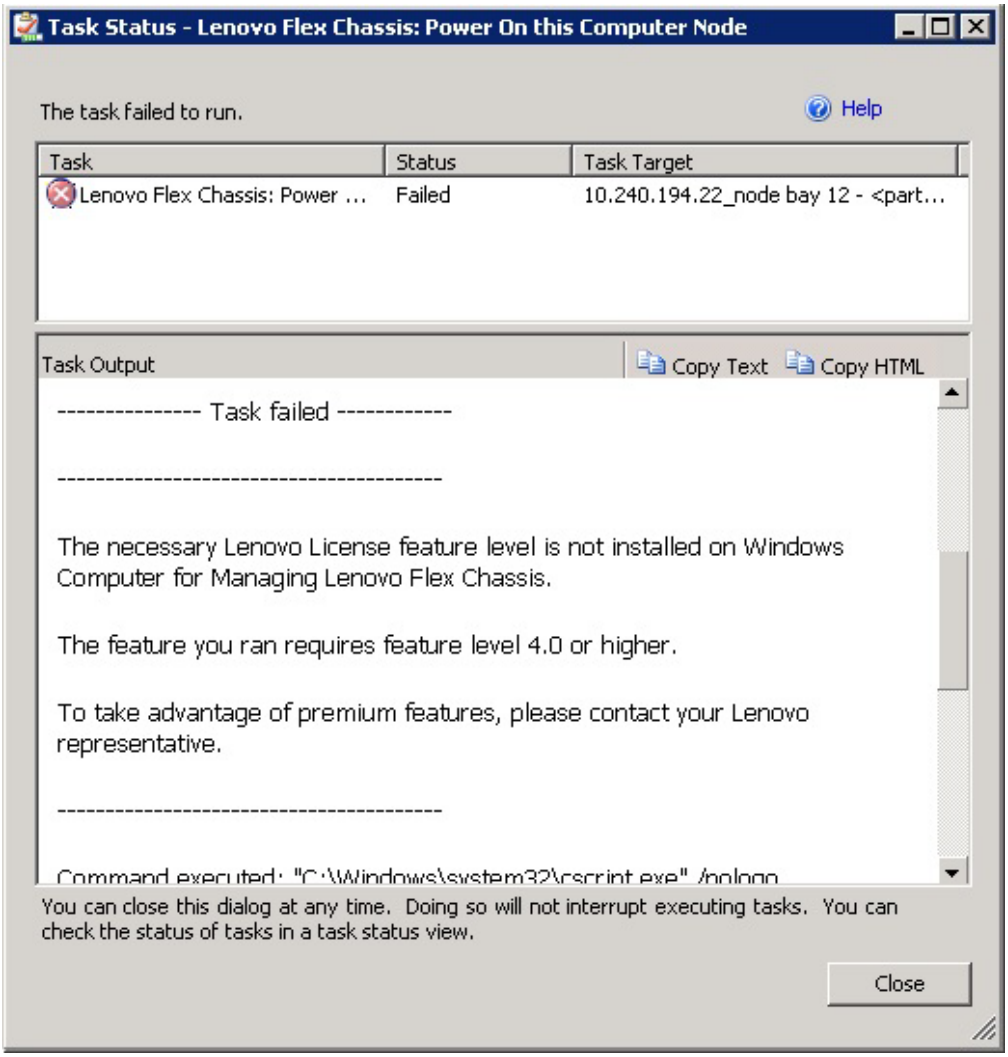

Figure 77. Task Status indicating power on failed because no license is installed

5. Click **Close** to exit the task status window.

Launching the Lenovo Flex System Chassis Web Console

When the premium feature for launching the Lenovo Flex System Chassis Web Console is enabled, this task is available in the Actions pane of the Operations Manager Console. This feature allows you to launch the Lenovo Flex System Chassis Web Console by using links inside of the Operations Manager Console.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** > **Lenovo Flex System Chassis(s) and Modules** > **Lenovo Flex System Chassis(s)**.
2. Click **Target Flex System Chassis**.

3. From the Node Tasks pane located in the lower right corner of the window, click **Lenovo Flex System Chassis Management Web Console**.

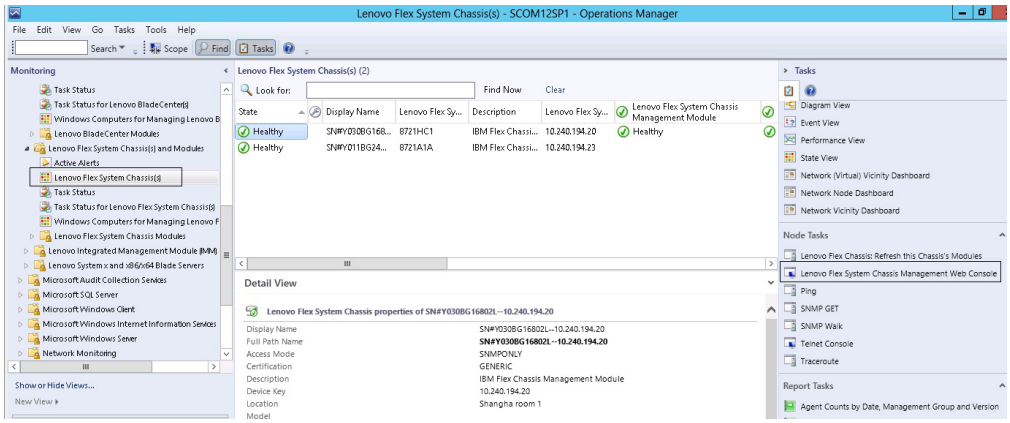

Figure 78. Example of launching the Lenovo Flex System Chassis Web Console

4. Click **Continue to this website** and trust the website.

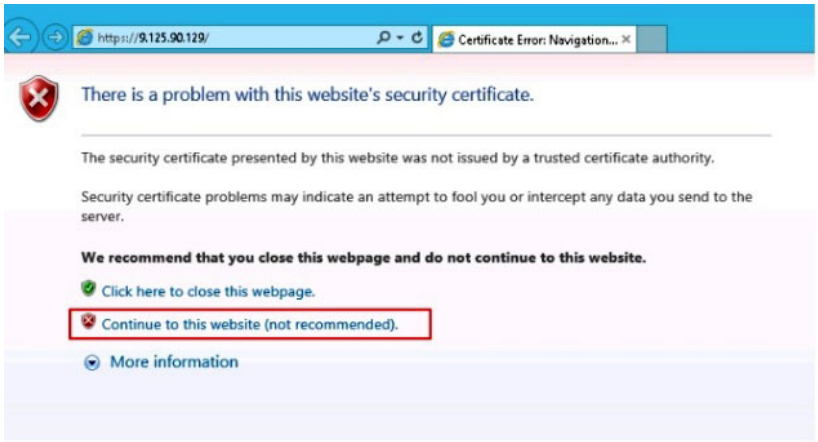

Figure 79. Certificate error when opening the Lenovo Flex System Chassis Web Console

If the Flex System Chassis web page is not trusted by your browser, and if the CMM configuration is correct, this page will disappear and the CMM Web Console will open in your default browser.

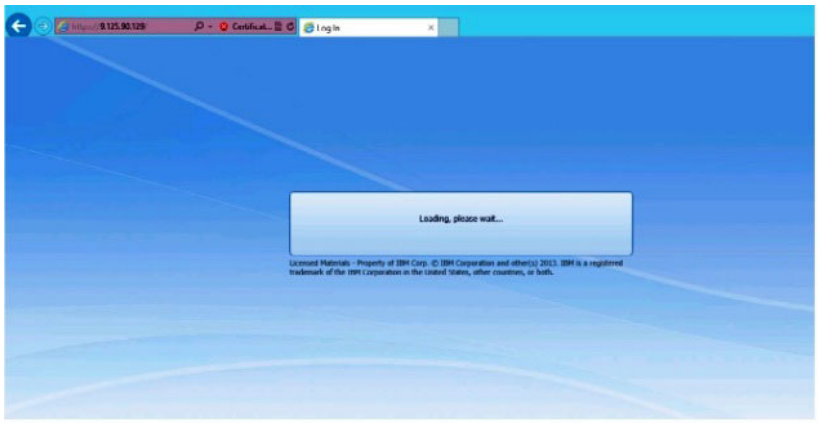

Figure 80. Loading CMM Web Console

When the CMM Web Console has successfully loaded, the following window is displayed.

Figure 81. CMM Web Console

5. To log in to the CMM Console, complete the following steps
   - Enter the `User name` and `Password`.
   - From the **Inactive session timeout interval** list select a value or use the default value of *no timeout*.
   - From the **Select an automatic refresh** list, select a refresh value or use the default value of *no refresh*.
   - Click **Log In**.

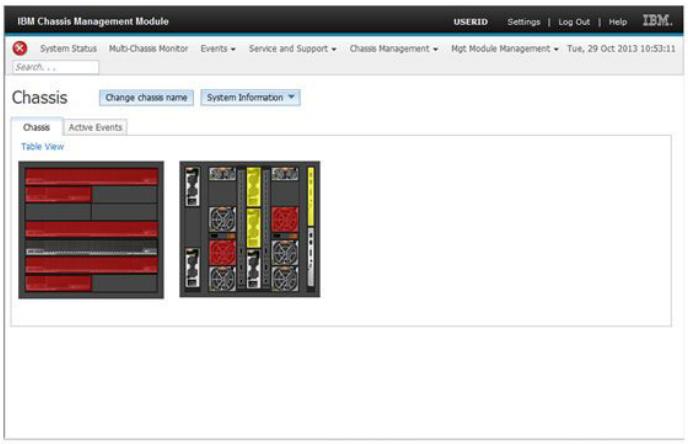

Figure 82. CMM Console

Discovering a Lenovo Flex System Chassis Flex System Manager

When the premium feature for discovering a Flex System Manager (FSM) system is enabled, the **Discovering a Lenovo Flex System Chassis FSM** task is available in the navigation pane of the Operations Manager Console. This feature allows you to discover and manage an FSM system in the Operations Manager Console.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** > **Lenovo Flex System Chassis Modules** > **Lenovo Flex System Chassis FSM**. In the results pane, a list of all the Lenovo Flex System Chassis FSMs is displayed.

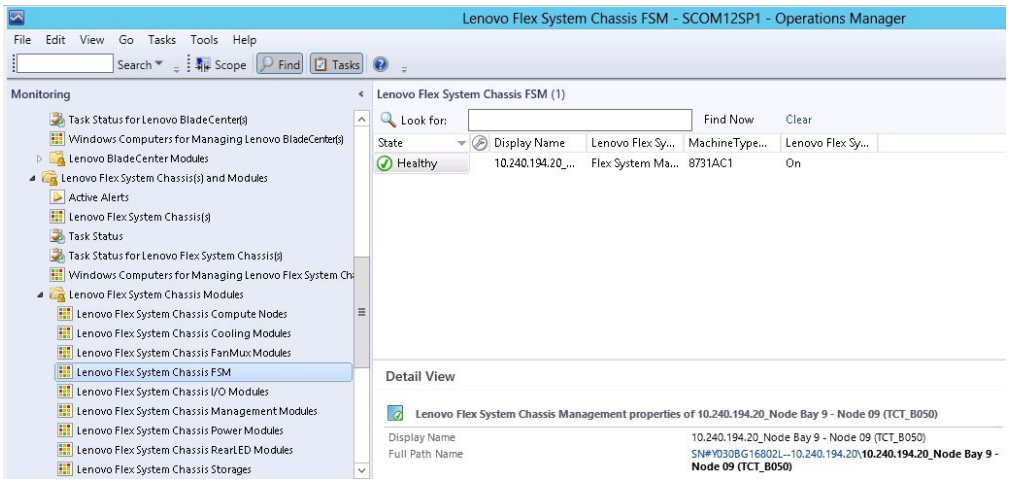

Figure 83. Example of a Lenovo Flex System Chassis FSM

2. Verify the target FSM is included in the list. If the target FSM is not included in the list, verify that the Flex System Chassis containing the FSM has been discovered by completing the following steps.
   a. Click **Monitoring** > **Lenovo Flex System Chassis(s) and Modules** > **Lenovo Flex System Chassis(s)** > **Lenovo Flex System Chassis**. The results pane displays the Lenovo Flex System Chassis and their status.
   b. In the Actions pane, select an **Lenovo Flex System Chassis** and run the Node task: **Lenovo Flex Chassis: Refresh this Chassis' Modules**. The target FSM system is discovered and displayed in Lenovo Flex System Chassis FSM list.

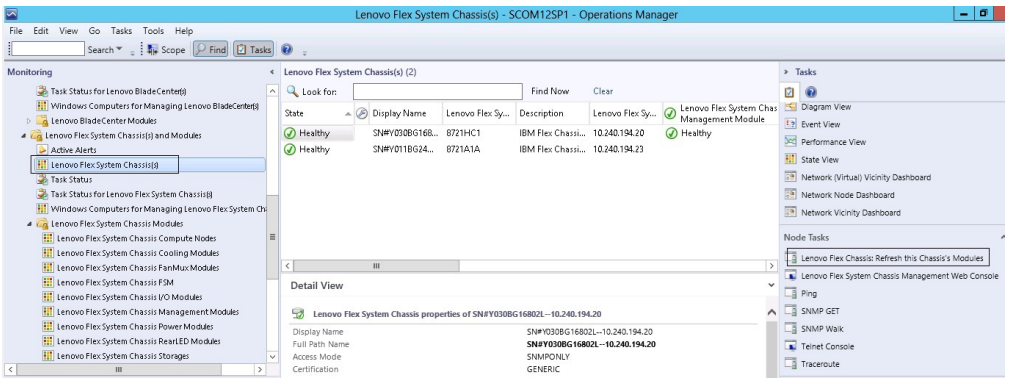

Figure 84. Refreshing the Chassis Module

Launching the Flex System Manager Web Console

When the premium feature for launching the Flex System Manager Web Console is enabled, this task is available in the Operations Manager Console. This feature allows you to launch the Flex System ChassisFlex System Manager (FSM) Web Console by using links inside the Operations Manager Console.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** > **Lenovo Flex System Chassis Modules** > **Lenovo Flex System Chassis FSM**.
2. In the results pane, select the target **Lenovo Flex System Chassis FSM**, and then in the **Tasks** list in the Actions pane, select the **Set FSM IP Address**.

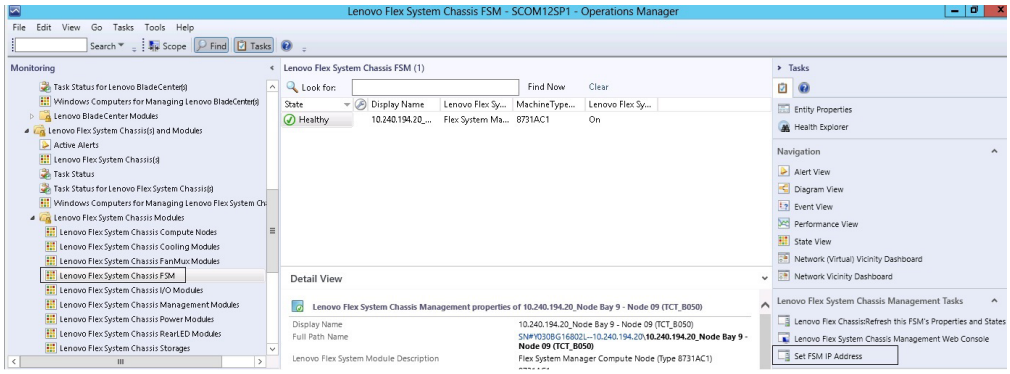

Figure 85. Example of setting the FSM IP address from the SCOM console

3. In the Run Task - Set FSM IP Address window, click **Override**. The Override Task Parameters page is displayed.

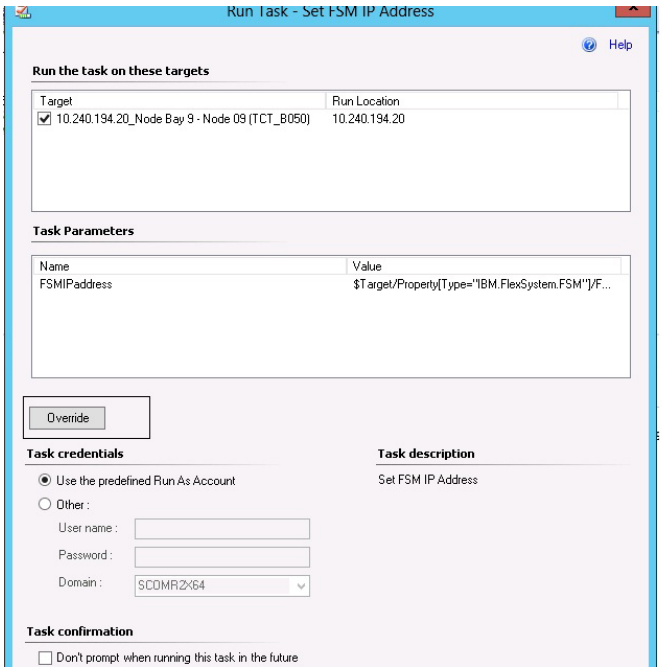

Figure 86. Run Task - Set FSM IP Address window

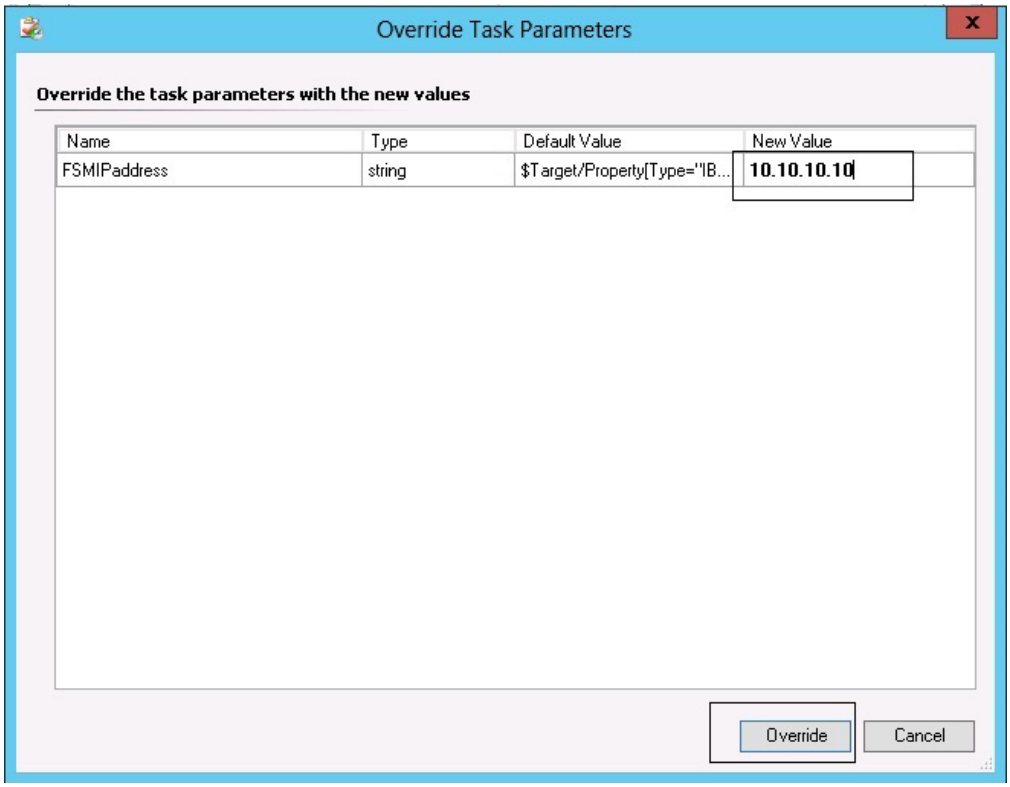

Figure 87. Example of overriding FSM IP address

4. In the **New Value** field, enter the correct IP address of the target FSM and click **Override**. You can get the FSM IP address from the Flex System Chassis Web Console.
5. In the Task - Set FSM IP Address window, click **Run**. The Set FSM IP Address window is displayed indicating the task status.

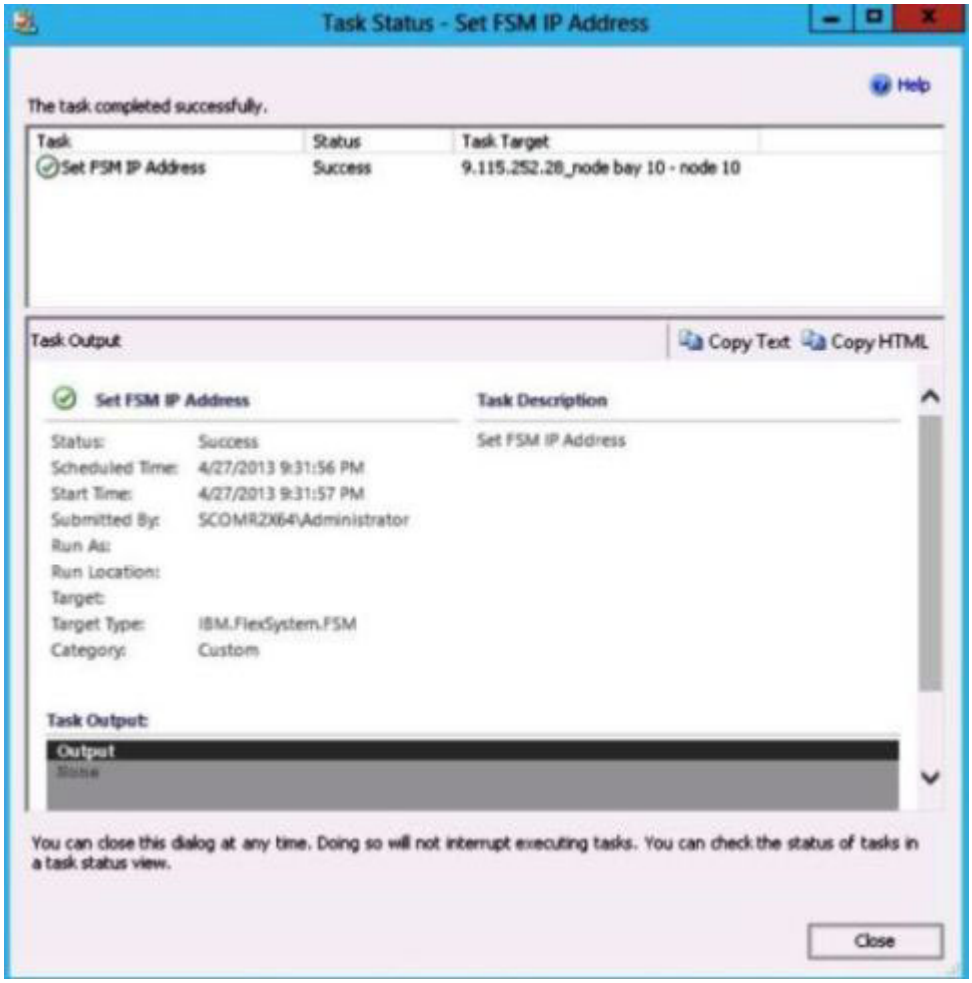

Figure 88. Task Status of Setting FSM IP Address indicating the task successfully completed

6. Click **Close**.

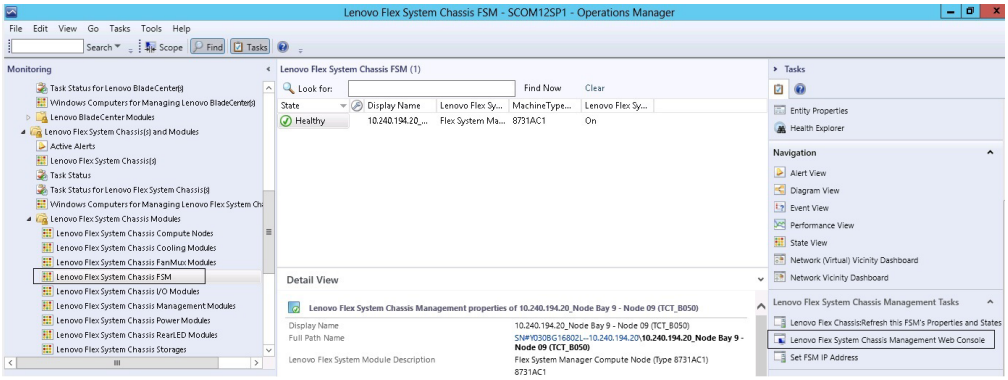

Figure 89. Example of launching an FSM Web Console from the SCOM console

7. In the Actions pane, select **Lenovo Flex System Chassis Management Web Console**.

   Operations Manager opens the FSM Web Console in your default browser.

Figure 90. LenovoFlex System Manager Web Console log in window

Appendix A. Best practices

The topics in this section provide suggested methods for completing tasks.

Best practice: Determining the cause of an error

Use the following diagnostic procedure to identify and solve problems that might occur in a managed environment.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Monitoring** to open the Monitoring navigation pane.
2. To quickly view the status of all of your managed systems that have Windows operating systems, click **Lenovo Hardware** > **Windows Computers on Lenovo System x or x86/x64 Blade Servers** .
3. Check the health of the systems displayed in the top results pane. All newly discovered objects are in a healthy state by default. The Health check monitoring task updates the status of an object at regular intervals, according to the default interval setting. You can configure the monitoring frequency by using the **override-controlled** parameters. Refer to Microsoft System Center Operations Manager documentation for more information about the **override-controlled** parameter.
4. Select a system that shows a *Critical* or *Warning* state.

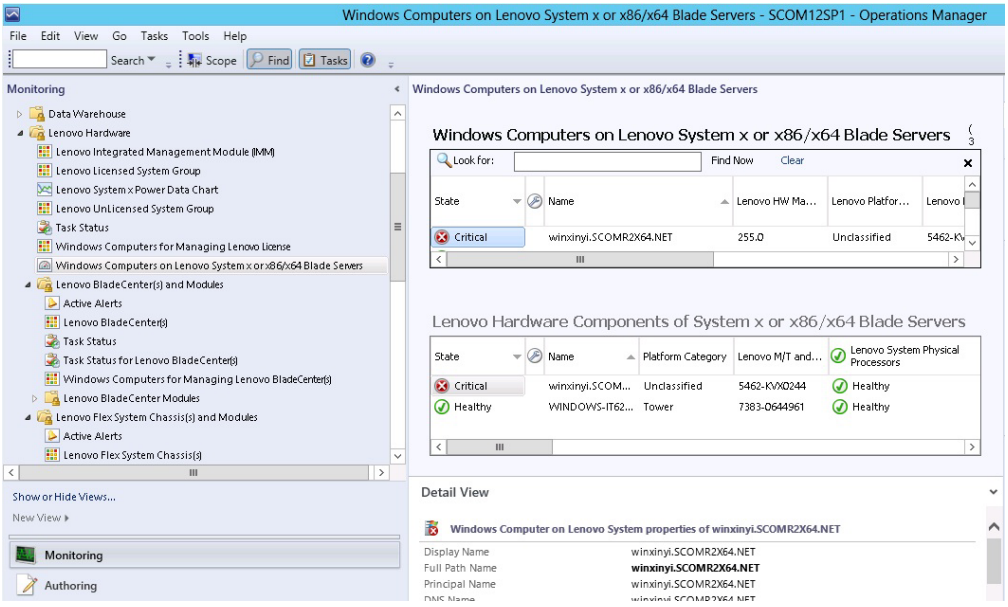

Figure 91. Example of selecting a system with a critical state

5. Determine whether the error is related to the hardware or software.

- **Hardware-related failures**: Check the Lenovo Hardware Components of System x or x86/x64 Blade Servers pane to select the system. Scroll to the right to view all of the component status and data. You can personalize this view.

  This pane contains state views based on the class of the hardware component basis. The purpose of this view is to provide access to detailed properties of each component instance. Look for additional system information in the Detail View pane.
- **Software-related failures**: Check the Windows Computer on System x or x86/x64 Blade Servers pane. This pane contains state views and information on a per-software-component-class basis. Select a system that has either a *Critical* or *Warning* health state.

  The purpose of these views is to provide access to detailed properties of each component instance. The Detail View shows all instances of the system software with a health state for each of the four health aspects.

6. To obtain more information and details about a failure, access the hardware information of the desired BladeCenter module or hardware system component by clicking **Lenovo BladeCenter Modules**.
7. Optional: If you already know that a power supply component failed, for example, select the related view, **Lenovo BladeCenter Power Modules**, to determine the problem with the power supply.
8. Click a **Critical** power module and review its related data.
9. Review the information and data presented in the Detail View pane. Check all instances of the module type and each of its four health aspects.
10. Right-click the selected module and click **open** > **Health Explorer**.
11. Select the alert and look at the information on the State Change Events page.
12. Depending on the type of alert you have, you can click **View Alert** for more information.
13. Click the **Knowledge** tab to read the Knowledge Page and one or more Knowledge Articles that relate to your alert.

    Important: In addition to the health information available for each object, related information might be available from other objects that are health-related from different perspectives. For example, a blade that is monitored in-band through its platform agent shows a health state, but the BladeCenter chassis management module also shows a health state for the blade.

    Other BladeCenter chassis modules might affect the blade health, such as a power supply that provides power to the blade server. Similarly, the health of a blade from the management module perspective might include the health and other information about the operating system running on the blade.

    For instance, the following BladeCenter simple network management protocol (SNMP) alert has an event description field of *1.3.6.1.4.1.2.6.158.3.1.1.8* and an event ID of *1.3.6.1.4.1.2.6.158.3.1.1.14*. Convert the decimal event ID value to a hexadecimal number to look up the message in the *Advanced Management Module Message Guide*.

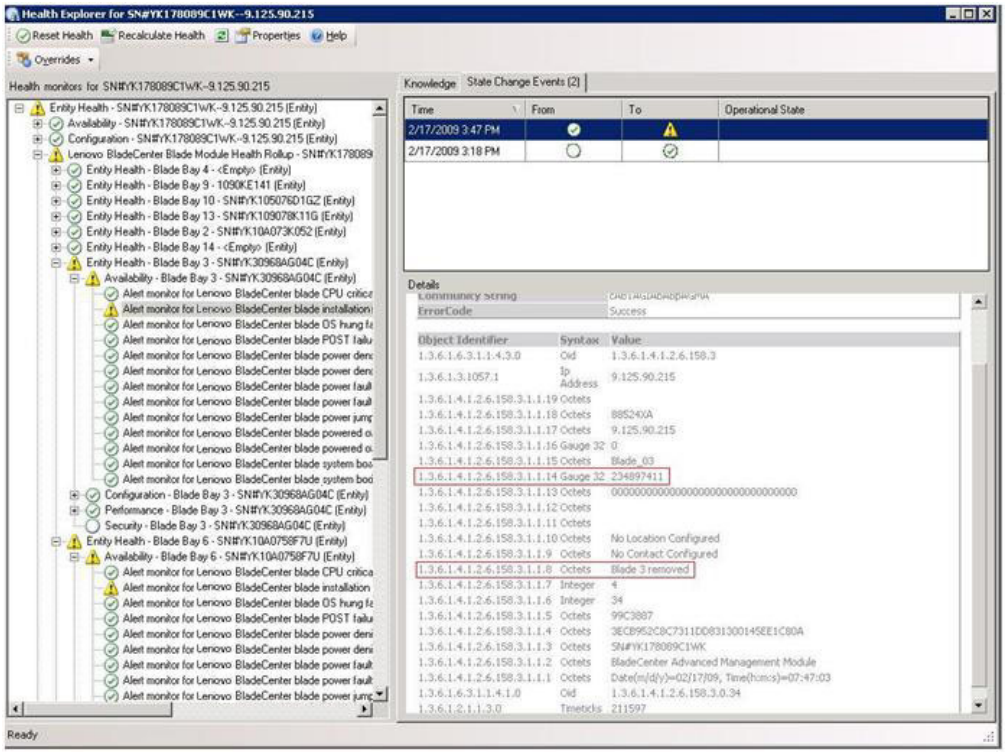

Figure 92. System x® Windows Management Instrumentation (WMI) event

For a System x WMI event, the Details pane includes the event ID and a description.

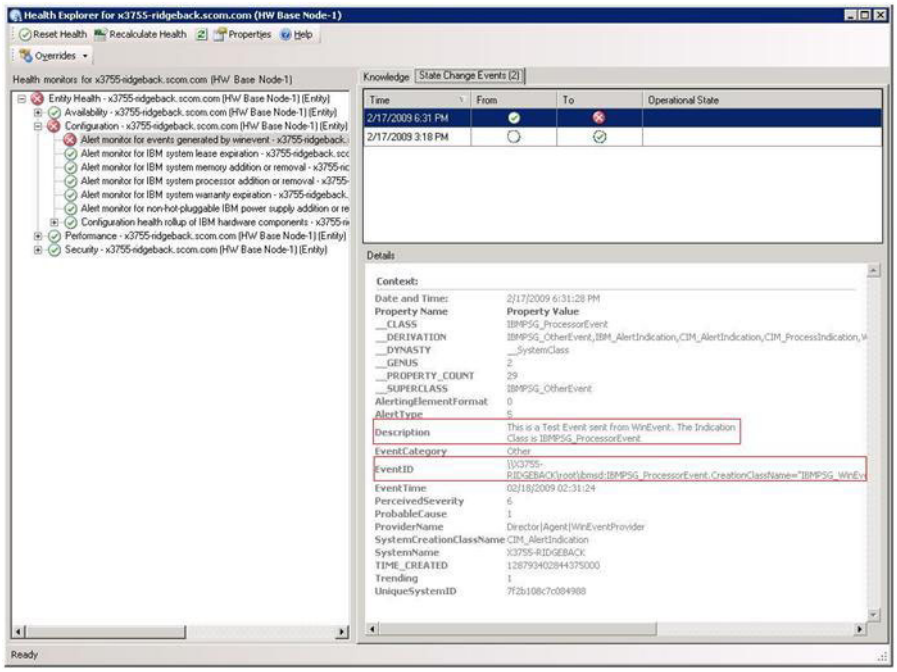

Figure 93. Example of the State Change Events tab detail information

Best practice: Rediscovering all BladeCenters

The BladeCenter monitor stalls when the same version of Lenovo Hardware Management Pack is deleted and re-imported.

About this task

This task is performed from the Operations Manager Console.

Procedure

1. Click **Administration** > **Device Management** > **Network Devices**.
2. Note the IP addresses listed in the Network Devices view of the results pane. You will need this information for the discovery network device information later.
3. Select the **IP Address** of the BladeCenter you want to rediscover, and in the Actions pane, select **Delete**.
4. Using the noted IP address to limit the scope of Network Devices, follow the instructions in "Discovering a BladeCenter in Microsoft System Center Operations Manager 2007" on page 30 to rediscover the BladeCenter.

Best practice: Rediscovering a renamed server

When a Windows server is renamed, the Windows server instance entry monitored by the Operations Manager becomes grayed out. This is an indication that the Windows server is no longer being monitored by the Operations Manager.

About this task

This task is performed from the Operations Manager Console.

To rediscover and monitor a renamed server, first delete the original server name from the **Operations Manager Agent Managed server** list, and then rediscover the renamed server by using the following procedure.

Procedure

1. Click **Administration** > **Device Management** > **Agent Managed**.

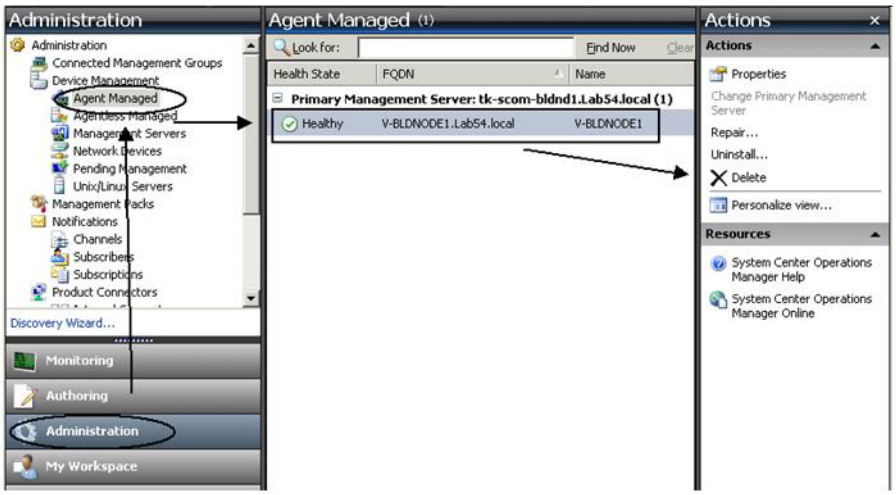

Figure 94. Deleting a renamed server

2. Select the original name listed in the Agent Managed view of the results pane. This entry has the original name before it was renamed.
3. Select **Delete** in the Actions pane located on the right side of the Operations Manager Console. This action removes the renamed server from the view.
4. Add the new server name by following the instructions in "Adding a system that will be managed by Operations Manager" on page 59.

Appendix B. Troubleshooting

The topics in this section provide information to assist you with troubleshooting issues that you may have with Lenovo Hardware Management Pack. The recommended actions often start with you verifying that you have performed certain tasks. The symptoms of a problem often provide a clue to the underlying issue.

Troubleshooting errors returned from the IBM Power CIM Provider

This topic describes how to troubleshoot errors returned from the IBM Power CIM Provider.

There are two possible reasons why **Capping Capable** is reported as `False`:

- The system firmware is reporting that a platform or firmware subcomponent does not support `power capping`.
- The system type does not support the `power capping` feature.

For more information about power management, see the IBM Systems Director Active Energy Manager Information Center.

Troubleshooting the installation of the IBM Power CIM Provider

The topics in this section describe how to troubleshoot the installation of the IBM Power CIM Provider. The first step in troubleshooting the installation of the IBM Power CIM Provider is to verify that the installation successfully finished.

For more information, see "Verifying a IBM Power CIM Provider installation finished successfully."

Verifying a IBM Power CIM Provider installation finished successfully

The following procedure describes how to verify whether an installation of the IBM Power CIM Provider finished successfully.

About this task

Perform the following steps from an Administrator Command window.

Procedure

1. Execute the following commands:
   a. **`cimprovider -l -m IBMPowerCIM`**

      The result of this command should be a line with the provider name, for example, IBMPowerCIM, and a status of `OK`.
   b. **`cimcli ei -n root/ibmsd IBMPSG_AveragePowerUsageValue`**
   c. **`cimcli ei -n root/ibmsd IBMPSG_AveragePowerUsageSensor`**
   d. **`cimcli ei -n root/ibmsd IBMPSG_PowerCappingInformation`**
2. Verify the output generated when these commands are run. The output should indicate appropriate numbers for the sensor readings and lower threshold values, and *Pmin*/*Pmax* for the `PowerCappingInformation` class. If a command

indicates that it partially failed, the command to generate the appropriate numbers did not successfully run, therefore, the command run failed.

3. Optional: If any of the commands for verifying the IBM Power CIM Provider installation failed or provided some improper values, see "How to fix a failed IBM Power CIM Provider installation."

How to fix a failed IBM Power CIM Provider installation

The following procedure describes how to fix a failed IBM Power CIM Provider installation.

About this task

If any of the commands for verifying the IBM Power CIM Provider installation failed or provided some improper values, complete the following steps:

Procedure

1. Verify that the registry key exists and contains the appropriate values.

   The key is located in `HKLM\SOFTWARE\IBM\Systems Management Integrations\IBM Power CIM Provider`. It should contain a **`REG_SZ`** parameter named *Path*, which lists the installation directory of the provider. This directory should be writeable.

   Note: On 64-bit machines, this key can be found in: `HKLM\SOFTWARE\Wow6432Node\IBM\Systems Management Integrations\IBM Power CIM Provider`.

2. In the installation directory, open the `IBMPowerCIMRegistration.mof` file and verify that the **`Location`** line lists the proper path: `\IBMPowerCIM`. The default installation path is `%ProgramFiles%\IBM\IBM Power CIM Provider`.
3. Select one of the following options:
   - Stop here if there are no reports of failure or improper values after verifying that the location line lists the proper path.
   - Complete steps 4 through 8 if the provider is still reporting failure or improper values.
4. Review the log files located in the installation directory. The file called `RegIBMPowerCIM.log` shows the results of the registration (and deregistration) scripts that are executed during the Windows Installer installation and uninstallation processes. If an error occurred while running these installation scripts, the results of that error is shown in the `RegIBMPowerCIM.log` file

   There can be two possible causes:

   - **`Response length = 256`**

     The most common cause for this error is that SMBIOS Type 38 is not recognized on the system. This is because the system's firmware does not support SMBIOS Type 38 or the IPMI libraries are not properly recognizing it. Try restarting the cimserver (as noted below) or try restarting the computer.

   - **`cmdComplete = false`**

     Another common cause for this error is that the registry key path is incorrect.

5. Reinstall the IBM Power CIM Provider by using the provided installer and completing the following steps.
   a. Remove the IBM Power CIM Provider by selecting **Uninstall** in **Add/Remove Programs** (Windows 2003) or **Programs and Features** (Windows 2008 and later).

b. Wait several minutes for the Director CIM server, *wmicimserver*, to come back online.
c. Reinstall the IBM Power CIM Provider using the provided installation file.

6. To manually reregister the IBM Power CIM Provider with the Director CIM server, enter the following commands from an Administrator Command window:
   a. **cimprovider -r -m IBMPowerCIM**
   b. **net stop wmicimserver**
   c. **taskkill /F /IM wmicpa.exe**
   d. **net start wmicimserver**
   e. **mofcomp IBMPowerCIM.mof** (from the provider installation directory)
   f. **mofcomp IBMPowerCIMRegistration.mof** (from the provider installation directory)
   - For optimal results, wait a few minutes between the **net start wmicimserver** command and the **mofcomp** command.

   Note: *wmicimserver* sometimes takes a minute to become properly responsive to new providers being loaded.
7. Verify the server's firmware supports **SMBIOS Type 38**. If it does not, update to a firmware version that it does support. Computers with a Unified Extensible Firmware Interface should not be a problem.
8. In the registry key path `HKLM\SOFTWARE\[Wow6432Node]\IBM\Systems Management Integrations\IBM Power CIM Provider`:
   a. Add a **REG_SZ** named *Debug* and set the value to 1.
   b. Uninstall and reinstall the IBM Power CIM Provider as described above. The logs are now more verbose, which may provide further insight into the issue.
9. Restart the server.

How to remove a chassis in Network Devices Pending Management on Windows Server 2012

The following procedure describes how to resolve the issue of a BladeCenter or a Flex System Chassis being discovered but displaying in the **Network Devices Pending Management** view.

About this task

If any of the BladeCenter or Flex System chassis is displayed in the **Network Devices Pending Management** view, complete the following steps.

Procedure

1. Open the firewall settings and use the inbound and outbound rules for starting with the Operations Manager on a Windows machine belonging to the management server(s). Some rules may be disabled by default.
2. Enable the appropriate rules and then rerun the discovery rule, or wait for it to occur as a scheduled task on the Operations Manager Console. The network device you discovered is now listed under the **Network Devices** view and is no longer under the **Network Devices Pending Management** view.

How to fix the failed task of opening an IMM/AMM/CMM Web Console on an SCOM Console using Windows Server 2012

If you try to run the **Lenovo IMM/AMM/CMM Web Console** task on a Systems Center Operations Manager Console, which is on a managed system running Windows Server 2012 with the SSL server for web console enabled and it fails, complete the following procedure to fix this problem. This is a Windows Server 2012 Internet Explorer security configuration problem.

About this task

The following procedure describes how to change the Internet Explorer (IE) security configuration to allow IE to open the web console.

Procedure

1. If your server is running Windows Server 2012, click **Server Manager** and then click **Configure this local server** to open the Local Server configuration page.
2. In the Properties area, next to IE Enhanced Security Configuration, click **On** to open the Internet Explorer Enhanced Security Configuration dialog box.
3. To use Internet Explorer Enhanced Configuration when members of the local Administrators group are logged in under Administrators, click **Off**. This allows you to use the Internet Explorer Enhanced Configuration when members of the local Administrators group are also logged in.
4. Click **OK** to apply the changes.

Appendix C. Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products successfully.

Lenovo strives to provide products with usable access for everyone, regardless of age or ability.

Lenovo Hardware Management Pack, version v6.0 supports the accessibility features of the systems-management software in which it is integrated. Refer to your system management software documentation for specific information about accessibility features and keyboard navigation.

Tip: Lenovo Hardware Management Pack, version v6.0 topic collection and its related publications are accessibility-enabled for the Lenovo Home Page Reader. You can operate all features using the keyboard instead of the mouse.

You can view the publications for Lenovo Hardware Management Pack, version v6.0 in Adobe Portable Document Format (PDF) using the Adobe Acrobat Reader. You can access the PDFs from Lenovo Hardware Management Pack, version v6.0 download site.

Lenovo and accessibility

See Lenovo Accessibility Features website for more information about the commitment that Lenovo has to accessibility.

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

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Index

T

U

V

W

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