

Dell™ OpenManage™
Installation and Security

User's Guide
Version 6.1



Notes and Cautions



NOTE: A NOTE indicates important information that helps you make better use of your computer.



CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.

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Introduction

Overview

This guide contains information to help you install Dell™ OpenManage™ software on management stations and their managed systems. A *managed system* is a system that has supported instrumentation or agents installed that allow the system to be discovered and polled for status. A *management station* is used to remotely manage one or more managed systems from a central location. In addition, this guide provides information and instructions for configuring your systems before and during a deployment or upgrade. The following topics are covered in this document:



NOTE: This document contains information on installing and using the **Remote Enablement** feature of Dell™ OpenManage™ Server Administrator. It also contains information on using the Dell OpenManage Server Administrator Web Server to manage remote nodes. The **Remote Enablement** feature is currently supported only on Microsoft® Windows®, Microsoft Hyper-V™, Hyper-V Server, VMware® ESXi, and Citrix™ XenServer™ 5.5 operating systems.

- Dell OpenManage Security
- Using Unified Server Configurator to Install an Operating System
- Using Systems Build and Update Tools to Install an Operating System
- Setup and Administration
- Deployment Scenarios for Server Administrator
- Installing Managed System Software on Microsoft Windows Operating Systems
- Installing Dell OpenManage Software On Microsoft Windows Server 2008 Core and Microsoft Hyper-V Server
- Installing Managed System Software on Supported Linux and VMware ESX Server Operating Systems
- Dell OpenManage on VMware ESXi Software
- Installing Management Station Software
- Using Microsoft Active Directory

- Prerequisite Checker
- Frequently Asked Questions

Systems Management Software Overview

Dell OpenManage systems management software is a suite of applications for your Dell systems. This software enables you to manage your systems with proactive monitoring, diagnosis, notification, and remote access.

Each system managed by the Dell OpenManage systems management software is called a managed system. You can manage a managed system either locally or remotely. Software applications that you can install on the managed systems include Dell OpenManage Server Administrator (which includes the Storage Management Service, and the Server Administrator Web server), SNMP agents for Intel® or Broadcom® network interface cards (NICs), and remote access controller (RAC) software.

A management station can be used to remotely configure and manage one or more managed systems from a remote location. Software applications that you can install on the management station include IT Assistant, BMU, and the RAC console.

Dell OpenManage IT Assistant enables you to manage up to five thousand devices from a suitably configured system. A management station can also be used to deploy images of physical media to virtual media on many managed systems.



NOTE: On IT Assistant, CPU-intensive tasks like the performance monitoring can be performed only on a hundred systems and software deployment can be attempted only on about 20 systems at a time.



NOTE: If you install management station and managed system software on the same system, install identical software versions to avoid system conflicts.

Dell OpenManage Systems Management Software

The Dell OpenManage systems management software kit is available in the form of the *Dell Systems Management Tools and Documentation* DVD.

Deployment Software

From Dell OpenManage version 6.0.1 onwards, you can install an operating system using either the Dell Unified Server Configurator or the Systems Build and Update Utility.

The Dell Unified Server Configurator (USC) is an embedded utility that enables systems and storage management tasks from an embedded environment throughout the system's lifecycle.

USC resides on an embedded flash memory card, can be started during the boot sequence, and functions independently of the operating system.

The Dell Systems Build and Update Utility is a media-based utility and provides streamlined operating system installation, reducing the time required for the installation of Windows, Red Hat Enterprise Linux, and SUSE Linux Enterprise Server operating systems by guiding you through an easy-to-follow, step-by-step process.

In addition, Systems Build and Update Utility provides the necessary tools for discovery and configuration of Dell-provided RAID controllers and network adapters.

Dell Systems Management Tools and Documentation DVD

From the purpose of using the *Dell Systems Management Tools and Documentation* DVD, a system can be classified into:

- Managed System

A managed system is any system that is monitored and managed using Dell OpenManage Server Administrator (one of the systems management tools on the DVD). You can manage systems running Server Administrator locally or remotely through a supported Web browser. For more information on Server Administrator, see "Dell OpenManage Server Administrator".

- Management Station

A management station can be any computer (laptop, desktop, or server) that you can use to remotely manage one or more managed systems from a central location.

The *Dell Systems Management Tools and Documentation* DVD contains the following products:

Dell Systems Build and Update Utility

Functionality

You can use the Dell Systems Build and Update Utility to:

- Update your system firmware and install an operating system. See "Using Systems Build and Update Tools to Install an Operating System".
- Update the firmware and BIOS in a pre-operating system environment on multiple systems.
- Configure your system hardware.
- Customize the Server Update Utility (SUU) and use it to update your system.

For information on performing these tasks and details on the Dell Systems Build and Update Utility, see the *Dell Systems Build and Update Utility Quick Reference Guide* in the `docs` directory or on the Dell Support site at support.dell.com.

Location on the DVD

`<DVD root>`

Dell OpenManage Server Administrator

Functionality

Dell OpenManage Server Administrator provides a comprehensive, one-to-one systems management solution, designed for system administrators to manage systems locally and remotely on a network.

For information on installing Server Administrator, see "Installing Managed System Software on Microsoft Windows Operating Systems" or "Installing Managed System Software on Supported Linux and VMware ESX Server Operating Systems".

For details on using Server Administrator, see the *Dell OpenManage Server Administrator User's Guide* in the `docs` directory or on the Dell Support site at support.dell.com.

The Storage Management Service provides enhanced features for managing a system's locally-attached RAID and non-RAID disk storage.

The Storage Management Service provides the following features:

- Enables you to view the status of local and remote storage attached to a monitored system
- Supports SAS, SCSI, SATA, and ATA, but does not support Fibre Channel
- Allows you to perform controller and enclosure functions for all supported RAID and non-RAID controllers and enclosures from a single graphical interface or a CLI, without the use of the controller BIOS utilities
- Protects your data by configuring data redundancy, assigning hot spares, or rebuilding failed drives

Location on the DVD

```
<DVD_drive>\SYSMGMT\sradmin
```

Remote Access Service

Functionality

The Remote Access Service provides a complete, remote system management solution for systems equipped with a Dell Remote Access Controller (DRAC) solution. The Remote Access Service provides remote access to an inoperable system, allowing you to get the system up and running as quickly as possible. The Remote Access Service also provides alert notification when a system is down and allows you to remotely restart a system. Additionally, the Remote Access Service logs the probable cause of system crashes and saves the most recent crash screen.

You can install Remote Access Service either on the managed system or on the management station.

For information on installing the Remote Access Service on the managed system, see "Installing Managed System Software on Microsoft Windows Operating Systems" or "Installing Managed System Software on Supported Linux and VMware ESX Server Operating Systems". For information on installing the Remote Access Service on the management station, see "Installing Management Station Software".

For more information on Remote Access Controller, see the *Dell Remote Access Controller Firmware User's Guide* in the docs directory or on the Dell Support site at support.dell.com.

Location on the DVD

For managed systems: <DVD_drive>\SYSMGMT\srvadmin

For management stations:

<DVD_drive>\SYSMGMT\ManagementStation

BMC Management Utility

Functionality

The BMC Management Utility provides a command line based remote management application to manage all supported BMC functions. Use the BMC Management Utility to manage a BMC or iDRAC from a remote management station, and as a managed system's emergency management console. This utility gives you the option of using a command line interface (either Intelligent Platform Management Interface [IPMI shell] or a Serial-Over-LAN proxy [SOL Proxy]) to access and manage the BMC.

The BMC monitors the system for critical events by communicating with various sensors on the system board and sending alerts and logs events when certain parameters exceed their preset thresholds. The BMC supports the industry-standard IPMI specification, enabling you to configure, monitor, and recover systems remotely.

The BMC provides the following features:

- Management access through the system's serial port and integrated NIC
- Fault logging and SNMP alerting
- Access to the system event log (SEL) and sensor status
- System function controls, including power on and off
- Support that is independent of the system's power or operating state
- Text console redirection for system setup, text-based utilities, and operating system consoles
- Access to Red Hat Enterprise Linux and SUSE Linux Enterprise Server serial console interfaces using SOL

IPMItool: The ipmitool program provides a simple command-line interface to BMC and features the ability to read the sensor data repository (SDR) and print sensor values, display the contents of the System Event Log (SEL), print Field Replaceable Unit (FRU) inventory information, read and set LAN configuration parameters, and perform remote chassis power control.

For information on installing the BMU, see "Installing Management Station Software".

For more information on BMU, see the *Dell OpenManage Baseboard Management Controller Utilities User's Guide* in the **docs** directory or on the Dell Support site at support.dell.com.

Location on the DVD

```
<DVD_drive>\SYSMGMT\ManagementStation
```

Active Directory Snap-In Utility

Functionality

The Active Directory Snap-in Utility provides an extension snap-in to the Microsoft Active Directory. This allows you to manage Dell-specific Active Directory objects. The Dell-specific schema class definitions and their installation are also included on the DVD. You can use this option when the Dell-specific schema classes have been added to the Active Directory schema. You must install the Active Directory Snap-in Utility on a management station.

For information on installing the Active Directory Snap-in Utility, see the *Dell OpenManage Installation and Security User's Guide* in the **docs** directory or on the Dell Support site at support.dell.com.

Location on the DVD

```
<DVD_drive>\SYSMGMT\ManagementStation
```

Dell Systems Service and Diagnostics Tools

Functionality

Dell Systems Service and Diagnostics Tools delivers the latest Dell-optimized drivers, utilities, and operating system-based diagnostics that you can use to update your system.

For more information on the Dell Systems Service and Diagnostics Tools, see the *Dell Systems Service and Diagnostics Tools Quick Installation Guide* in the docs directory or on the Dell Support site at support.dell.com.

Location on the DVD

<DVD_drive>\SERVICE

Dell Online Diagnostics

Functionality

Dell Online Diagnostics runs operating system-based diagnostics to check the health of your Dell system.

For more information on Dell Online Diagnostics, see the *Dell Online Diagnostics* in the docs directory or on the Dell Support site at support.dell.com.

Location on the DVD

<DVD_drive>\SERVICE

IT Assistant

Functionality

Dell OpenManage IT Assistant provides a central point of access to monitor and manage systems on a network. By allowing an administrator a comprehensive view across the enterprise, IT Assistant can increase system uptime, automate repetitive tasks, and prevent interruption in critical business operations.

IT Assistant is an update only and is available as an independent MSI on the Dell Support site at support.dell.com.

You can use IT Assistant to:

- Monitor the performance of systems on your network
- Monitor power and energy consumption of Dell systems
- Identify the groups of systems that you want to manage remotely

For information on installing and using IT Assistant, see the *Dell OpenManage IT Assistant User's Guide* on the Dell Support site at support.dell.com.

Dell Server Updates DVD

The Dell OpenManage subscription service kit is a collection of two DVDs:

- *Dell Systems Management Tools and Documentation* DVD
- *Dell Server Updates* DVD

The *Dell Server Updates* DVD is available only to those customers who have subscribed to the subscription service.

The *Dell Server Updates* DVD contains Dell Update Packages (DUPs) and Dell OpenManage Server Update Utility (SUU). DUPs allow administrators to update a wide range of system components simultaneously and apply scripts to similar sets of Dell systems to bring system software components up to the same version levels.

SUU is an application that identifies and applies updates to your system. You can use SUU to update your Dell system or to view the updates available for any system supported by SUU.

In addition to helping you install, configure, and update programs and operating systems, the *Dell Server Updates* DVD also provides newer versions of software for your system.

For more information on DUPs and SUU, see the *Dell Update Packages User's Guide* and the *Dell OpenManage Server Update Utility User's Guide* in the **docs** directory or on the Dell Support site at support.dell.com.

For more information on the subscription service, see www.dell.com/openmanagesubscription or contact your sales representative.

Dell Management Console DVD

The Dell Management Console is a Web-based systems management software that enables you to discover and inventory devices on your network. It also provides advanced functions, such as health and performance monitoring of networked devices and patch management capabilities for Dell systems.

The *Dell Management Console* DVD is available with all Dell xx0x and later systems. You can also download the Dell Management Console from www.dell.com/openmanage.

Other Documents You Might Need

Besides this guide, you can find the following guides either on the Dell Support website at support.dell.com or on the *Dell Systems Management Tools and Documentation* DVD:

- *The Dell Unified Server Configurator User's Guide* provides information on using Unified Server Configurator.
- *The Dell Management Console User's Guide* has information about installing, configuring, and using Dell Management Console. Dell Management Console is a Web-based systems management software that enables you to discover and inventory devices on your network. It also provides advanced functions, such as health and performance monitoring of networked devices and patch management capabilities for Dell systems.
- *The Dell Systems Build and Update Utility User's Guide* provides information on using the Systems Build and Update Utility.
- *The Dell OpenManage Software Quick Installation Guide* provides an overview of applications that you can install on your management station, and managed systems. It also has procedures for installing your managed system and management station applications.
- *The Dell Systems Software Support Matrix* provides information about the various Dell systems, the operating systems supported by these systems, and the Dell OpenManage components that can be installed on these systems.
- *The Dell OpenManage Server Administrator User's Guide* describes the installation and use of Server Administrator. Server Administrator provides easy-to-use management and administration of local and remote systems through a comprehensive set of integrated management services.
- *The Dell OpenManage Server Administrator Compatibility Guide* provides compatibility information about Server Administrator installation and operation on various hardware platforms (or systems) running supported Microsoft Windows, Red Hat Enterprise Linux, and SUSE Linux Enterprise Server operating systems.

- The *Dell OpenManage Server Administrator SNMP Reference Guide* documents the Simple Network Management Protocol (SNMP) management information base (MIB). The SNMP MIB defines variables that extend the standard MIB to cover the capabilities of systems management agents.
- The *Dell OpenManage Server Administrator CIM Reference Guide* documents the Common Information Model (CIM) provider, which is an extension of the standard management object format (MOF) file. This guide explains the supported classes of management objects.
- The *Dell OpenManage Server Administrator Messages Reference Guide* lists the messages that are displayed in the Server Administrator home page Alert log, or on your operating system's event viewer. This guide explains the text, severity, and cause of each alert message that Server Administrator issues.
- The *Dell OpenManage Server Administrator Command Line Interface User's Guide* documents the complete command line interface for Server Administrator, including an explanation of CLI commands to view system status, access logs, create reports, configure various component parameters, and set critical thresholds.
- The *Dell OpenManage IT Assistant User's Guide* has information about installing, configuring, and using IT Assistant. IT Assistant provides a central point of access to monitor and manage systems on a local area network (LAN) or wide area network (WAN). By allowing an administrator a comprehensive view across the enterprise, IT Assistant can increase system uptime, automate repetitive tasks, and prevent interruption in critical business operations.
- The *Dell Remote Access Controller 4 User's Guide* provides complete information about installing and configuring a DRAC 4 controller and using DRAC 4 to remotely access an inoperable system.
- The *Dell Remote Access Controller 5 User's Guide* provides complete information about installing and configuring a DRAC 5 controller and using DRAC 5 to remotely access an inoperable system.
- The *Dell Remote Access Controller/MC User's Guide* provides complete information about installing and configuring a DRAC/MC controller and using DRAC/MC to remotely access an inoperable system.

- The *Dell Remote Access Controller Installation and Setup Guide* provides complete information about installing and configuring a DRAC III, DRAC III/XT, or ERA/O controller, configuring an ERA controller, and using a RAC to remotely access an inoperable system.
- The *Dell Remote Access Controller Racadm User's Guide* provides information about using the racadm command line utility to manage DRAC III, DRAC III/XT, ERA, and ERA/O controllers.
- The *Dell Embedded Remote Access/MC Controller User's Guide* provides complete information about configuring and using an ERA/MC controller to remotely manage and monitor your modular system and its shared resources through a network.
- The *Integrated Dell Remote Access Controller User's Guide* provides complete information about configuring and using an Integrated Dell Remote Access Controller to remotely manage and monitor your system and its shared resources through a network.
- The *Dell Update Packages User's Guide* provides information about obtaining and using Dell Update Packages for Windows and Linux as part of your system update strategy.
- The *Dell OpenManage Server Update Utility User's Guide* provides information on using the Dell OpenManage Server Update Utility.
- The software kit (DVD) contain readme files for applications found on the media.

Obtaining Technical Assistance


If at any time you do not understand a procedure described in this guide, or if your product does not perform as expected, different types of help are available. For more information, see "Getting Help" in your system's *Hardware Owner's Manual*.

Additionally, Dell Enterprise Training and Certification is available; see www.dell.com/training for more information. This service might not be offered in all locations.

Dell OpenManage Security

Security Features


The Dell™ OpenManage™ systems management software components provide the following security features:

- Authentication for users through hardware-stored user IDs and passwords, or by using the optional Microsoft® Active Directory®.
 - Support for Network Information Services (NIS), Winbind, Kerberos, and Lightweight Directory Access Protocol (LDAP) authentication protocols for Linux operating systems.
 - Role-based authority that allows specific privileges to be configured for each user.
 - User ID and password configuration through the Web-based interface or the command line interface (CLI), in most cases.
 - SSL encryption of 128-bit and 40-bit (for countries where 128-bit is not acceptable).
-  **NOTE:** Telnet does not support SSL encryption.
- Session time-out configuration (in minutes) through the Web-based interface or Command Line Interface (CLI).
 - Port Configuration

Built-in Security Features

Ports

Table 2-1 lists the ports used by the Dell OpenManage systems management software, standard operating system services, and other agent applications.

 **NOTE:** Correctly configured ports are necessary to allow Dell OpenManage systems management software to connect to a remote device through firewalls.


 **NOTE:** The version of the systems management software mentioned in Table 2-1 indicate the minimum version of the product required to use that port.

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
Dell OpenManage Storage Management							
5554	TCP	TCP	4.x	None	In/Out	Personal agent to transfer data between LSI IDE solution server and client	No
Dell OpenManage Baseboard Management Controller - PowerEdge™ x8xx systems							
623	RMCP	UDP	PowerEdge x8xx systems only	None	In/Out	IPMI access through LAN	No
Dell OpenManage Baseboard Management Utility							
623	Telnet	TCP	1.x	None	In/Out	Accepts incoming Telnet connections	Yes
623	RMCP	UDP	1.x	None	In/Out	Basic BMC commands: server status, power up/down, and so on.	No
623	RMCP	UDP	1.x	None	In/Out	Basic BMC commands and console redirection	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
Dell OpenManage Client Connector							
135	RPC	TCP/ UDP	2.0	None	In/Out	Viewing of client management data	No
389	LDAP	TCP	2.0	128-bit	In/Out	Domain authentication	No
4995	HTTPS	TCP	2.0	128-bit SSL	In/Out	Web GUI	Yes
1024 - 65535 (Dynamically assigned)	DCOM	TCP/ UDP	2.0	None	In/Out	Viewing of client management data	Port range can be restricted.
Dell OpenManage Client Instrumentation							
20	HTTP and FTP	TCP	7.x	None	In/Out	Flash BIOS communication	No
21	HTTP and FTP	TCP	7.x	None	In/Out	Flash BIOS communication	No
80	HTTP and FTP	TCP	7.x	None	In/Out	Flash BIOS communication	No
135	DCOM	TCP/ UDP	7.x	None	In/Out	Monitoring and configuration through WMI	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
135	DCOM	TCP	7.x	None	Out	Event transmission through WMI	No
1024-65535 (Dynamically assigned)	DCOM	TCP/UDP	7.x	None	In/Out	Monitoring and configuration through WMI	
Dell OpenManage IT Assistant							
For information on Dell OpenManage IT Assistant UDP/TCP Ports default location, see the <i>Dell OpenManage IT Assistant User's Guide</i> .							
Dell OpenManage Server Administrator							
22	SSH	TCP	2.0	128-bit	In/Out	Remote Server Administrator or Command Line (for IT Assistant). Remote Software Update feature (for Linux operating systems).	Yes
25	SMTP	TCP	2.0	None	In/Out	Optional e-mail alert messages from Server Administrator	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
135	RPC	TCP/ UDP	2.0	None	In/Out	CIM management queries	No
135	RPC	TCP/ UDP	2.0	None	In/Out	Remote Server Administrator Command Line (for IT Assistant). Remote software update feature (for Windows operating systems).	No
139	NetBIOS	TCP	2.0	None	In/Out	Remote Server Administrator Command Line (for IT Assistant). Remote Software Update (for Windows operating systems).	No
161	SNMP	UDP	1.x, 2.0	None	In/Out	SNMP query management	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
162	SNMP	UDP	1.x, 2.0	None	Out	SNMP trap event	No
445	NetBIOS	TCP	2.0	None	In/Out	Remote software updates to Server Administrator (for Windows operating systems)	No
1311	HTTPS	TCP	1.x	128-bit SSL	In/Out	Web GUI	Yes
11487	Proprietary	UDP	1.x	None	In	Remote Flash BIOS update initiation from IT Assistant	Yes
11489	Proprietary	TCP	1.x	None	In	Remote Flash BIOS update file transfer from IT Assistant	Yes
1024 - 65535	DCOM	TCP/UDP	2.0	None	In/Out	CIM/WMI query management	Yes

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
Dell Remote Access Controller (DRAC): DRAC III, DRAC III/XT, ERA, and ERA/O							
NOTE: Only iDRAC6 is supported on xx1x systems. For information on iDRAC UDP/TCP Ports default location, see the <i>Integrated Dell Remote Access Controller User's Guide</i> .							
21	FTP	TCP	1.0	None	In/Out	Firmware update through FTP and certificate upload/download	No
23	Telnet	TCP	1.0	None	In/Out	Optional Telnet-based CLI management	No
25	SMTP	TCP	1.0	None	In/Out	Optional e-mail alert messages	No
68	DHCP	UDP	1.2	None	In/Out	DHCP assigned IP address	No
69	TFTP	UDP	1.0	None	In/Out	Firmware update through Trivial FTP. Remote floppy boot through TFTP	No
80	HTTP	TCP	1.0	None	In/Out	Web GUI redirected to HTTPS	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
162	SNMP	UDP	1.0	None	Out	SNMP trap event	No
443	HTTPS	TCP	1.0	128-bit SSL	In/Out	Web management GUI	No
443	HTTPS	TCP	3.2	128-bit SSL	In/Out	Remote racadm CLI utility	No
5869	Proprietary	TCP	1.0	None	In/Out	Remote racadm CLI utility	No
5900	VNC	TCP	1.0	56 bit DES	In/Out	Video redirection	Yes
5900	VNC	TCP	3.2	128-bit RC	In/Out	Video redirection	Yes
5981	VNC	TCP	1.0	None	In/Out	Video redirection	Yes
random and > 32768	Proprietary	TCP	1.0	None	In/Out	Firmware update from the Web GUI	No
DRAC 4							
22	SSHv2	TCP	1.30	128-bit	In/Out	Optional Secure Shell (SSH) CLI management	Yes
23	Telnet	TCP	1.0	None	In/Out	Optional Telnet CLI management	Yes

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
25	SMTP	TCP	1.0	None	In/Out	Optional e-mail alert messages	No
53	DNS	UDP	1.20	None	In/Out	Dynamic Domain name server (DNS) registration of the host name assigned within DRAC	No
68	DHCP	UDP	1.0	None	In/Out	DHCP assigned IP address	No
69	TFTP	UDP	1.0	None	In/Out	Firmware update through Trivial FTP	No
80	HTTP	TCP	1.0	None	In/Out	Web GUI redirected to HTTPS	Yes
161	SNMP	UDP	1.0	None	In/Out	SNMP query management	No
162	SNMP	UDP	1.0	None	Out	SNMP trap event	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations *(continued)*

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
443	HTTPS	TCP	1.0	128-bit SSL	In/Out	Web management GUI and remote racadm CLI utility	Yes
636	LDAPS	TCP	1.0	128-bit SSL	In/Out	Optional Active Directory Services (ADS) authentication	No
3269	LDAPS	TCP	1.0	128-bit SSL	In/Out	Optional ADS authentication	No
3668	Proprietary	TCP	1.0	None	In/Out	CD/diskette virtual media service	Yes
5869	Proprietary	TCP	1.0	None	In/Out	Remote racadm	No
5900	Proprietary	TCP	1.0	128bit RC4, Keyboard/mouse traffic only	In/Out	Video redirection	Yes

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
DRAC/MC							
23	Telnet	TCP	1.0	None	In/Out	Optional Telnet CLI management	Yes
25	SMTP	TCP	1.0	None	In/Out	Optional e-mail alert messages	No
53	DNS	UDP	1.0	None	In/Out	Dynamic DNS registration of host name assigned within DRAC	No
68	DHCP	UDP	1.0	None	In/Out	DHCP assigned IP address	No
69	TFTP	UDP	1.0	None	In/Out	Firmware update through Trivial FTP	No
80	HTTP	TCP	1.0	None	In/Out	Web GUI redirected to HTTPS	Yes
161	SNMP	UDP	1.0	None	In/Out	SNMP query management	No
162	SNMP	UDP	1.0	None	Out	SNMP trap event	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
389	LDAP	TCP	1.0	None	In/Out	Optional ADS authentication	No
443	HTTPS	TCP	1.0	128-bit SSL	In/Out	Web management GUI and remote racadm CLI utility	No
636	LDAPS	TCP	1.0	128-bit SSL	In/Out	Optional ADS authentication	No
3269	LDAPS	TCP	1.0	128-bit SSL	In/Out	Optional ADS authentication	No
DRAC 5							
22	SSHv2	TCP	1.30	128-bit SSL	In/Out	Optional Secure Shell (SSH) CLI management	Yes
23	Telnet	TCP	1.0	None	In/Out	Optional Telnet CLI management	Yes
25	SMTP	TCP	1.0	None	In/Out	Optional e-mail alert messages	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
53	DNS	UDP	1.0	None	In/Out	Dynamic DNS registration of host name assigned within DRAC	No
68	DHCP	UDP	1.0	None	In/Out	DHCP assigned IP address	No
69	TFTP	UDP	1.0	None	In/Out	Firmware update through Trivial FTP	No
80	HTTP	TCP	1.0	None	In/Out	Web GUI redirected to HTTPS	Yes
161	SNMP	UDP	1.0	None	In/Out	SNMP query management	No
162	SNMP	UDP	1.0	None	Out	SNMP trap event	No
443	HTTPS	TCP	1.0	128-bit SSL	In/Out	Web management GUI and remote racadm CLI utility	No
623	RMCP/RMCP+	UDP	1.0	128-bit SSL	In/Out	IPMI over LAN	No

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
636	LDAPS	TCP	1.0	128-bit SSL	In/Out	Optional ADS authentication	No
3269	LDAPS	TCP	1.0	128-bit SSL	In/Out	Optional ADS authentication	No
3668	Proprietary	TCP	1.0	None	In/Out	Virtual Media Service	Yes
3669	Proprietary	TCP	1.0	128-bit SSL	In/Out	Virtual Media Secure Service	Yes
5900		TCP	1.0	128-bit SSL	Out	Console Redirection: Video	Yes
5901		TCP	1.0	128-bit SSL	In	Console Redirection: keyboard/mouse	Yes

Table 2-1. Dell OpenManage UDP/TCP Ports Default Locations (continued)

Port #	Protocol	Port Type	Version	Maximum Encryption Level	Direction	Usage	Configurable
Digital KVM							
2068	Proprietary	TCP	1.0	128-bit SSL	In/Out	Video Redirection — Keyboard/Mouse	No
3668	Proprietary	TCP	1.0	None	In/Out	Virtual Media	No
8192	Proprietary	TCP	1.0	None	In/Out	Video redirection to client viewer	No



NOTE: CIM ports are dynamic. See the Microsoft knowledge base at support.microsoft.com for information on CIM port usage.



NOTE: If you are using a firewall, you must open all ports listed in Table 2-1 to ensure that IT Assistant and other Dell OpenManage applications function properly.

Security Management

Dell provides security and access administration through role-based access control (RBAC), authentication, and encryption, or through Active Directory (or through Winbind, Kerberos, LDAP, or NIS on Linux operating systems) for both the Web-based and command line interfaces.

RBAC

RBAC manages security by determining the operations that can be executed by users in specific roles. Each user is assigned one or more roles, and each role is assigned one or more user privileges that are permitted to users in that role. With RBAC, security administration can correspond closely to an organization's structure. For information about setting up users, see your operating system documentation.

User Privileges

Server Administrator grants different access rights based on the user's assigned group privileges. The three user levels are *User*, *Power User*, and *Administrator*.

Users can view most information.

Power Users can set warning threshold values and configure which alert actions are to be taken when a warning or failure event occurs.

Administrators can configure and perform shutdown actions, configure Auto Recovery actions in case a system has a non-responsive operating system, and clear hardware, event, and command logs. Administrators can configure alert actions, including sending e-mail messages when an alert is generated.

Server Administrator grants read-only access to users logged in with User privileges; read and write access to users logged in with Power User privileges; and read, write, and administrator access to users logged in with Administrator privileges. See Table 2-2.

Table 2-2. User Privileges

User Privileges	Access Type		
	Admin	Write	Read
User			X
Power User		X	X
Administrator	X	X	X

Admin access allows you to shut down the managed system.

Write access allows you to modify or set the values on the managed system.

Read access allows you to view the data reported by Server Administrator. Read access does not allow you to change or set the values on the managed system.

Privilege Levels to Access Server Administrator Services

Table 2-3 summarizes which user levels have privileges to access and manage Server Administrator Services.

Table 2-3. Server Administrator User Privilege Levels

Service	User Privilege Level Required	
	View	Manage
Instrumentation	U, P, A	P, A
Remote Access	U, P, A	A
Update	U, P, A	A
Storage Management	U, P, A	A

Table 2-4 defines the user privilege level abbreviations used in Table 2-3.

Table 2-4. Legend for Server Administrator User Privilege Levels

U	User
P	Power User
A	Administrator

Authentication

The Server Administrator authentication scheme ensures that the access types are assigned to the correct user privileges. Additionally, when you invoke the CLI, the Server Administrator authentication scheme validates the context within which the current process is running. This authentication scheme ensures that all Server Administrator functions, whether accessed through the Server Administrator home page or CLI, are properly authenticated.

Microsoft Windows Authentication

For supported Windows operating systems, Server Administrator authentication uses Integrated Windows Authentication (formerly called NTLM) to authenticate. This authentication system allows Server Administrator security to be incorporated in an overall security scheme for your network.

Red Hat Enterprise Linux and SUSE Linux Enterprise Server Authentication

For supported Red Hat® Enterprise Linux® and SUSE® Linux Enterprise Server operating systems, Server Administrator authentication is based on the Pluggable Authentication Modules (PAM) library. This documented library of functions allows an administrator to determine how individual applications authenticate users.

Encryption

Access to Server Administrator is enabled over a secure HTTPS connection using secure socket layer (SSL) technology to ensure and protect the identity of the system being managed. Java Secure Socket Extension (JSSE) is used by supported Windows, Red Hat Enterprise Linux, and SUSE Linux Enterprise Server operating systems to protect the user credentials and other sensitive data that is transmitted over the socket connection when a user accesses the Server Administrator.

Microsoft Active Directory

The Active Directory Service (ADS) software acts as the central authority for network security. ADS allows the operating system to verify a user's identity and control that user's access to network resources. For Dell OpenManage applications running on supported Windows platforms, Dell provides schema extensions for customers to modify their Active Directory database to support remote management authentication and authorization. IT Assistant, Server Administrator, and Dell Remote Access Controllers can interface with Active Directory to add and control users and privileges from one central database. For information about using Active Directory, see "Using Microsoft Active Directory."

Authentication Protocols for Linux Operating Systems

Dell OpenManage applications (version 5.2 and later) support Network Information Services (NIS), Winbind, Kerberos, and Lightweight Directory Access Protocol (LDAP) authentication protocols for Linux operating systems.

Using Unified Server Configurator to Install an Operating System

Overview

You can use either Dell™ Unified Server Configurator (USC) or the Dell Systems Build and Update Utility (SBUU) to install an operating system. For information on installing an operating system using SBUU, see "Using Systems Build and Update Tools to Install an Operating System".

USC is an embedded utility that enables systems and storage management tasks from an embedded environment throughout the server's life cycle.

Residing on an embedded flash memory card, USC is similar to a BIOS utility in that it can be started during the boot sequence and function independently of the operating system (OS).

Using USC, you can quickly identify, download, and apply system updates without needing to search the Dell Support site (support.dell.com). You can also deploy an operating system, configure Redundant Array of Independent Disks (RAID), and run diagnostics to validate the system and attached hardware.

Starting the Unified Server Configurator

The first time you boot the system, USC starts with the **User Settings** wizard displayed so that you can configure your preferred language and network settings. For more information, see *Dell Unified Server Configurator User's Guide*.

When rebooting the system, press the <F10> key within 10 seconds of the Dell logo being displayed to start USC again. USC starts with the **Welcome** screen displayed in the right-hand pane.

Updating Unified Server Configurator

You can update to the next version of USC using the **Platform Update** wizard. It is recommended that you run the **Platform Update** wizard on a regular basis to access updates as they become available. For more information on updating USC, see *Dell Unified Server Configurator User's Guide*.



NOTE: In Version 1.0 of USC, the only available updates are for USC, diagnostics, and drivers. Additional updates (such as device firmware) will be available in later versions of USC.

Installing the Operating System

- 1 Start USC by booting the system and pressing the <F10> key within ten seconds of the Dell logo being displayed.
- 2 Click **OS Deployment** in the left-hand pane.
- 3 Click **Deploy OS** in the right-hand pane.
- 4 If your system has a RAID controller, you have the option of launching the **RAID Configuration** wizard and configuring a virtual disk as the boot device. If your system does not have a RAID controller, the **Operating System Deployment** wizard bypasses the RAID configuration option and goes directly to step 5. To configure RAID controller on your system using USC, see *Dell Unified Server Configurator User's Guide*.
- 5 Select the operating system you want to install and click **Next**.

This may take some time as driver pack extraction and copy process are in progress.



NOTE: All drivers copied by the OS Deployment wizard are removed after 18 hours. You need to complete the OS install within 18 hours in order for the copied drivers to be available. To remove the drivers before the 18 hour period is over, reboot the system and press the <F10> key. Using the <F10> key to cancel the OS installation or to re-enter USC upon reboot also removes the drivers during the 18 hours period.

- 6 Insert the OS installation media and click **Next**.

USC verifies that the installation media is appropriate for the operating system you selected. If the inserted installation media does not match the operating system selection, it will be ejected.

- 7 Click **Finish** to reboot the system and continue with the OS installation. Upon reboot, the system boots to the OS installation media.



NOTE: In the event that the OS install is interrupted and the system reboots before the install completes, you need to specify that the system boot to the install media. Watch the prompts during the reboot and select **Yes** when asked whether the system should boot to the install media.



NOTE: You can cancel the OS install by pressing the F10 key. Be aware that pressing the <F10> key at any point during the install process or while rebooting causes any drivers provided by the OS Deployment wizard to be removed.

For more information on setting up USC, updating the platform, RAID configuration, deploying the operating system, running diagnostics, and performing administrative tasks, see *Dell Unified Server Configurator User's Guide*.

Using Systems Build and Update Tools to Install an Operating System

Overview

The Dell™ Systems Build and Update Utility provides a streamlined and time-saving installation procedure by guiding you through an easy-to-follow, step-by-step process to install the Microsoft® Windows®, Red Hat® Enterprise Linux®, and SUSE® Linux Enterprise Server operating systems. Systems Build and Update Utility is used to install operating systems for systems being installed as managed systems.



NOTE: On a system running a Red Hat Enterprise Linux or SUSE Linux Enterprise Server operating system, you will be prompted to install Server Administrator on first boot after the operating system is installed.

Before You Begin

Installation Requirements

The following sections describe the managed system general requirements. Operating system-specific installation prerequisites are listed as part of the installation procedures.

Supported Operating Systems

For a list of the operating systems that the Systems Build and Update Utility supports, see the *Dell Systems Software Support Matrix* located at docs directory on the Dell-provided media or on the Dell Support website at support.dell.com.

Installing Your Operating System

Perform the following steps to determine if an operating system has been installed on your system:

- 1 Ensure that the keyboard, mouse, and monitor are connected to your system, and turn on your system.
- 2 Read and accept the software license agreement to continue.

If a message stating that bootable drives do not exist or that an operating system was not found appears, then an operating system has not been installed on your system. Have your operating system CD available and continue with the procedure below.

If an operating system is pre-installed on your system, it is not necessary to continue with this process. See your operating system's installation document and follow those instructions to complete the installation process.

Perform the following steps to install an operating system on your system:

- 1 Insert the *Dell Systems Management Tools and Documentation DVD* into the DVD drive.
- 2 Restart your system and boot from the DVD.
The **Boot Menu** appears.
- 3 Select **Dell Systems Build and Update Utility** to go to the **Dell Systems Build and Update Utility Home** screen.
- 4 Click **Configure** against **Server OS Installation** or click **Server OS Installation** on the left-hand pane.
- 5 Follow the step-by-step instructions to configure your hardware and to install your operating system.

For additional information about installing RAID, see *Getting Started With RAID* on the *Dell Systems Management Tools and Documentation DVD*.

When you use Dell Systems Build and Update Utility to install an operating system, Dell Systems Build and Update Utility allows you to copy the relevant systems management software installation files onto the hard drive and places the **Install Server Administrator** and **Delete Server Administrator Installation Files** icons on the desktop. These icons are created only if you are using Windows Server 2003 and Red Hat Enterprise Linux and are not available on the Windows Server 2008 and SUSE Linux Enterprise Server operating systems.

Setup and Administration

Before You Begin

- Read the Installation Requirements to ensure that your system meets or exceeds the minimum requirements.
- Read the applicable Dell OpenManage readme files and the *Dell Systems Software Support Matrix* located on the Dell Support website at support.dell.com. These files contain the latest information about software, firmware, and driver versions, in addition to information about known issues.
- If you are running any application on the media, close the application before installing Server Administrator applications.
- Read the installation instructions for your operating system.
- On Linux operating systems, ensure that all operating system RPM packages that the Server Administrator RPMs require are installed.

Installation Requirements


This section describes the general requirements of the Dell OpenManage systems management software and includes information on:


- "Supported Operating Systems and Web Browsers "
- "System Requirements"

Prerequisites specific to an operating system are listed as part of the installation procedures.

Supported Operating Systems and Web Browsers

For supported operating systems and Web browsers, see the *Dell Systems Software Support Matrix* located on the Dell Support website at support.dell.com.

 **NOTE:** The Dell OpenManage installer offers Multilingual User Interface support on Windows Storage Server 2003 R2, Microsoft Windows Storage Server 2003 R2, Express x64 Edition with Unified Storage, Microsoft Windows Storage Server 2003 R2, Workgroup x64 Edition with Unified Storage, and Windows Server 2008 (x86 and x64) operating systems. The Multilingual User Interface Pack is a set of language specific resource files that can be added to the English version of a supported Windows operating system. However, the Dell OpenManage 6.1 installer supports only five languages: German, Spanish, French, Simplified Chinese, and Japanese.

 **NOTE:** When Multilingual User Interface (MUI) is set to non-Unicode languages like Simplified Chinese or Japanese, set the system locale to Simplified Chinese or Japanese. This enables the Prerequisite Checker messages to be displayed. This is because any non-Unicode application will run only when the system locale (also called **Language for non-Unicode Programs** on XP) is set to match the application's language.

System Requirements

Dell OpenManage Server Administrator software must be installed on each system to be managed. You can then manage each system running Server Administrator locally or remotely through a supported Web browser.

Managed System Requirements

- One of the "Supported Operating Systems and Web Browsers"
- A minimum of 2 GB of RAM
- A minimum of 512 MB of free hard drive space
- Administrator rights
- A TCP/IP connection on the managed system and the remote system to facilitate remote system management
- One of the supported systems management protocol standards (see "Supported Systems Management Protocol Standards")
- A mouse, keyboard, and monitor to manage a system locally. The monitor requires a minimum screen resolution of 800 x 600. The recommended screen resolution is 1024 x 768

- The Server Administrator Remote Access Controller service requires that a remote access controller (RAC) be installed on the system to be managed. See the relevant Dell Remote Access Controller User's Guide for complete software and hardware requirements



NOTE: The RAC software is installed as part of the **Typical Setup** installation option, when installing managed system software, provided that the managed system meets all of the RAC installation prerequisites. See "Remote Access Service" and the relevant Dell Remote Access Controller User's Guide for complete software and hardware requirements.

- The Server Administrator Storage Management Service requires that Dell OpenManage Server Administrator be installed on the system in order to be properly managed. See the *Dell OpenManage Server Administrator Storage Management User's Guide* for complete software and hardware requirements.
- Microsoft Software Installer (MSI) version 3.1 or later



NOTE: Dell OpenManage software detects the MSI version on your system. If the version is lower than 3.1, the Prerequisite Checker prompts you to upgrade to MSI version 3.1. After upgrading the MSI to version 3.1, you may have to reboot the system in order to install other software applications such as Microsoft SQL Server.

Remote Management System Requirements

- One of the supported Web browsers to manage a system remotely from a graphical user interface (GUI)
- A TCP/IP connection on the managed system and the remote system to facilitate remote system management
- A minimum screen resolution of 800 x 600. The recommended screen resolution setting is 1024 x 768

Supported Systems Management Protocol Standards

A supported systems management protocol must be installed on the managed system before installing your management station or managed system software. On supported Windows operating systems, Dell OpenManage software supports: Common Information Model/Windows Management Instrumentation (CIM/WMI) and Simple Network Management Protocol (SNMP). On supported Red Hat Enterprise Linux and SUSE Linux

Enterprise Server operating systems, Dell OpenManage software supports the SNMP systems management standard. You must install the SNMP package provided with the operating system. CIM and WMI are unsupported.


 **NOTE:** For information about installing a supported systems management protocol standard on your managed system, see your operating system documentation.

Table 5-1 shows the availability of the systems management standards for each supported operating system.


Table 5-1. Availability of Systems Management Protocol by Operating Systems

Operating System	SNMP	CIM/WMI
Supported Microsoft Windows operating systems.	Available from the operating system installation media.	Always installed
Supported Red Hat Enterprise Linux operating systems.	You must install the SNMP package provided with the operating system.	Unavailable
Supported SUSE Linux Enterprise Server operating systems.	You must install the SNMP package provided with the operating system.	Unavailable

Windows Server 2003 R2 and the R2 IPMI Device Driver

The information in this section is applicable only to PowerEdge x8xx, x9xx, xx0x, xx1x, and PowerVault x00 systems.

Windows Server 2003 R2 and Windows Storage Server R2 contain an optional component called Hardware Management. This component contains an IPMI driver. During installation, the component installs and enables its IPMI driver.

 **NOTE:** On PowerEdge x8xx systems, after you install the Hardware Management component, you must perform an additional step to get the R2 IPMI driver installed.

When you launch Server Administrator, it first determines if the Windows Server 2003 R2 IPMI driver is enabled. If the driver is enabled, Server Administrator uses the Windows Server 2003 R2 IPMI driver to provide its IPMI-based functionality. If the Windows Server 2003 R2 IPMI driver is not enabled, Server Administrator uses its own internal IPMI support to provide its IPMI-based functionality. For Server Administrator, it is recommended that you use the Windows Server 2003 R2 IPMI driver instead of the internal IPMI

support. If your system is running Windows Server 2003 R2 or Windows Storage Server R2, it is recommended that after you install Server Administrator, you also install the optional Hardware Management component of R2.

To install the Windows Server 2003 R2 IPMI driver on PowerEdge x8xx and PowerVault x00 systems, perform the following additional step:

- From a command shell, execute the following command:

```
Rundll132 ipmisetp.dll, AddTheDevice
```



NOTE: This step is not required on PowerEdge x9xx systems.

After you install the Hardware Management component of Windows Server 2003 R2 operating system and perform the additional step to install the Windows Server 2003 R2 IPMI driver (on PowerEdge x8xx systems), restart the **DSM SA Data Manager** service so that Server Administrator can switch over from using its own internal IPMI support to using the Windows Server 2003 R2 IPMI driver. To restart the service, you can either manually restart the service or reboot the system.

If you uninstall the Windows Server 2003 R2 IPMI driver later, either by manually uninstalling it or by uninstalling the Hardware Management component (which will uninstall the driver), restart the **DSM SA Data Manager** service so that Server Administrator can switch over from using the Windows Server 2003 R2 IPMI driver to using its own internal IPMI support. To restart the service, you can either manually restart the service or reboot the system.

Digital Certificates

All Server Administrator packages for Microsoft are digitally signed with a Dell certificate that helps guarantee the integrity of the installation packages. If these packages are repackaged, edited, or manipulated in other ways, the digital signature will be invalidated. This manipulation results in an unsupported installation package and the Prerequisite Checker will not allow you to install the software.

Configuring a Supported Web Browser

For a list of supported Web browsers, see "Supported Operating Systems and Web Browsers."

If you are connecting to a Web-based interface from a management station that connects to a network through a proxy server, configure the Web browser to connect properly. See your Web browser's documentation for more information.



NOTE: Ensure that the Web browser is set to bypass the proxy server for local addresses.

Viewing Localized Versions of the Web-Based Interface

Use **Regional and Language Options** in the **Windows Control Panel** to view localized versions of the Web-based interface, on systems running Windows operating systems.


Microsoft Active Directory


If you use Active Directory service software, you can configure it to control access to your network. Dell has modified the Active Directory database to support remote management authentication and authorization. Dell OpenManage IT Assistant and Server Administrator, as well as Dell remote access controllers, can interface with Active Directory. With this tool, you can add and control users and privileges from one central database. If you use Active Directory to control user access to your network, see "Using Microsoft Active Directory."

Configuring the SNMP Agent

Dell OpenManage software supports the SNMP systems management standard on all supported operating systems. The SNMP support may or may not be installed depending on your operating system and how the operating system was installed. An installed supported systems management protocol standard, such as SNMP, is required before installing Dell OpenManage software. See "Installation Requirements" for more information.

You can configure the SNMP agent to change the community name, enable Set operations, and send traps to a management station. To configure your SNMP agent for proper interaction with management applications such as IT Assistant, perform the procedures described in the following sections.

 **NOTE:** The default SNMP agent configuration usually includes an SNMP community name such as public. For security reasons, change the default SNMP community names. For information about changing SNMP community names, see the appropriate section below for your operating system. For additional guidelines, see the **Securing an SNMP Environment** article, dated May 2003, in the Dell Power Solutions magazine. This magazine is also available at www.dell.com/powersolutions.


 **NOTE:** For IT Assistant to retrieve systems management information from a system running Server Administrator, the community name used by IT Assistant must match a community name on the system running Server Administrator. For IT Administrator, the community name used by IT Assistant must match a community name that allows Set operations on the system running Server Administrator. For IT Assistant to receive traps (asynchronous event notifications) from a system running Server Administrator, the system running Server Administrator must be configured to send traps to the system running IT Assistant. For more information, see the *Dell OpenManage IT Assistant User's Guide*.

The following sections provide step-by-step instructions for configuring the SNMP agent for each supported operating system:

- Configuring the SNMP Agent for Systems Running Supported Windows Operating Systems
- Configuring the SNMP Agent on Systems Running Supported Red Hat Enterprise Linux Operating Systems
- Configuring the SNMP Agent on Systems Running Supported SUSE Linux Enterprise Server Operating Systems

Configuring the SNMP Agent for Systems Running Supported Windows Operating Systems

The Dell OpenManage software uses the SNMP services provided by the Windows SNMP agent. SNMP is one of the two supported ways of connecting to a System Administrator session; the other is CIM/WMI. You can configure the SNMP agent to change the community name, enable Set operations, and send traps to a management station. To configure your SNMP agent for proper interaction with management applications such as IT Assistant, perform the procedures described in the following sections.

 **NOTE:** See your operating system documentation for additional details on SNMP configuration.

Enabling SNMP Access By Remote Hosts on Windows Server 2003

Windows Server 2003, by default, does not accept SNMP packets from remote hosts. For systems running Windows Server 2003, you must configure the SNMP service to accept SNMP packets from remote hosts if you plan to manage the system by using SNMP management applications from remote hosts. To enable remote shutdown of a system from IT Assistant, SNMP Set operations must be enabled.



NOTE: Rebooting your system for change management functionality does not require SNMP Set operations.

To enable a system running the Windows Server 2003 operating system to receive SNMP packets from a remote host, perform the following steps:

- 1 Open the **Computer Management** window.
- 2 Expand the **Computer Management** icon in the window, if necessary.
- 3 Expand the **Services and Applications** icon and click **Services**.
- 4 Scroll down the list of services until you find **SNMP Service**, right-click **SNMP Service**, and then click **Properties**.

The **SNMP Service Properties** window appears.

- 5 Click the **Security** tab.
- 6 Select **Accept SNMP packets from any host**, or add the IT Assistant host to the **Accept SNMP packets from these hosts** list.

Changing the SNMP Community Name

Configuring the SNMP community names determines which systems are able to manage your system through SNMP. The SNMP community name used by management station applications must match the SNMP community name configured on the Dell OpenManage software system so that the management applications can retrieve systems management information from the Dell OpenManage software.

- 1 Open the **Computer Management** window.
- 2 Expand the **Computer Management** icon in the window, if necessary.
- 3 Expand the **Services and Applications** icon and click **Services**.

- 4 Scroll down the list of services to **SNMP Service**, right-click **SNMP Service**, and click **Properties**.

The **SNMP Service Properties** window appears.

- 5 Click the **Security** tab to add or edit a community name.

- a To add a community name, click **Add** under the **Accepted Community Names** list.

The **SNMP Service Configuration** window appears.

- b Type the community name of the management station (the default is public) in the **Community Name** text box and click **Add**.

The **SNMP Service Properties** window appears.

- c To change a community name, select a community name in the **Accepted Community Names** list and click **Edit**.

The **SNMP Service Configuration** window appears.

- d Edit the community name of the management station in the **Community Name** text box, and click **OK**.

The **SNMP Service Properties** window appears.

- 6 Click **OK** to save the changes.

Enabling SNMP Set Operations

Enable SNMP Set operations on the system running Dell OpenManage software, to change Dell OpenManage software attributes using IT Assistant. To enable remote shutdown of a system from IT Assistant, enable SNMP Set operations.



NOTE: Rebooting your system for change management functionality does not require SNMP Set operations.

- 1 Open the **Computer Management** window.
- 2 Expand the **Computer Management** icon in the window, if necessary.
- 3 Expand the **Services and Applications** icon, and click **Services**.
- 4 Scroll down the list of services to **SNMP Service**, right-click **SNMP Service**, and click **Properties**.

The **SNMP Service Properties** window appears.

- 5 Click the **Security** tab to change the access rights for a community.
- 6 Select a community name in the **Accepted Community Names** list, and then click **Edit**.

The **SNMP Service Configuration** window appears.

- 7 Set the **Community Rights** to **READ WRITE** or **READ CREATE**, and click **OK**.

The **SNMP Service Properties** window appears.

- 8 Click **OK** to save the changes.



NOTE: In Dell OpenManage Server Administrator version 5.3 and later, SNMP Set Operations are disabled by default in Server Administrator. Server Administrator provides support to enable or disable SNMP Set operations. You can use the Server Administrator **SNMP Configuration** page under **Preferences** or the Server Administrator command line interface (CLI) to enable or disable SNMP Set Operations. For more information on enabling or disabling SNMP Set operations in Server Administrator, see the *Dell OpenManage Server Administrator User's Guide* or the *Dell OpenManage Server Administrator Command Line Interface User's Guide*.

Configuring Your System to Send SNMP Traps to a Management Station

The Dell OpenManage software generates SNMP traps in response to changes in the status of sensors and other monitored parameters. You must configure one or more trap destinations on the Dell OpenManage software system for SNMP traps to be sent to a management station.

- 1 Open the **Computer Management** window.
- 2 Expand the **Computer Management** icon in the window, if necessary.
- 3 Expand the **Services and Applications** icon and click **Services**.
- 4 Scroll down the list of services to **SNMP Service**, right-click **SNMP Service**, and click **Properties**.

The **SNMP Service Properties** window appears.

- 5 Click the **Traps** tab to add a community for traps or to add a trap destination for a trap community.
 - a To add a community for traps, type the community name in the **Community Name** box and click **Add to list**, which is located next to the **Community Name** box.
 - b To add a trap destination for a trap community, select the community name from the **Community Name** drop-down box and click **Add** under the **Trap Destinations** box.

The **SNMP Service Configuration** window appears.
 - c Type the trap destination and click **Add**.

The **SNMP Service Properties** window appears.
- 6 Click **OK** to save the changes.

Configuring the SNMP Agent on Systems Running Supported Red Hat Enterprise Linux Operating Systems

Server Administrator uses the SNMP services provided by the `ucd-snmp` or `net-snmp` agent. You can configure the SNMP agent to change the community name, enable Set operations, and send traps to a management station. To configure your SNMP agent for proper interaction with management applications such as IT Assistant, perform the procedures described in the following sections.



NOTE: See your operating system documentation for additional details about SNMP configuration.

SNMP Agent Access Control Configuration

The management information base (MIB) branch implemented by Server Administrator is identified by the 1.3.6.1.4.1.674 OID. Management station applications must have access to this branch of the MIB tree to manage systems running Server Administrator.

For supported Red Hat Enterprise Linux operating systems, the default SNMP agent configuration gives read-only access for the *public* community only to the MIB-II *system* branch (identified by the 1.3.6.1.2.1.1 OID) of the MIB tree. This configuration does not allow management applications to retrieve or change Server Administrator or other systems management information outside of the MIB-II **system** branch.

Server Administrator SNMP Agent Install Actions

If Server Administrator detects the default SNMP configuration during installation, it attempts to modify the SNMP agent configuration to give read-only access to the entire MIB tree for the *public* community. Server Administrator modifies the `/etc/snmp/snmpd.conf` SNMP agent configuration file in two ways.

The first change is to create a view to the entire MIB tree by adding the following line if it does not exist:

```
view all included .1
```

The second change is to modify the default *access* line to give read-only access to the entire MIB tree for the *public* community. Server Administrator looks for the following line:

```
access notConfigGroup "" any noauth exact systemview  
none none
```

If Server Administrator encounters this line, it modifies the line as follows:

```
access notConfigGroup "" any noauth exact all none  
none
```

These changes to the default SNMP agent configuration give read-only access to the entire MIB tree for the *public* community.



NOTE: To ensure that Server Administrator is able to modify the SNMP agent configuration to provide proper access to systems management data, it is recommended that any other SNMP agent configuration changes be made after installing Server Administrator.

Server Administrator SNMP communicates with the SNMP agent using the SNMP Multiplexing (SMUX) protocol. When Server Administrator SNMP connects to the SNMP agent, it sends an object identifier to the SNMP agent to identify itself as a SMUX peer. Because that object identifier must be configured with the SNMP agent, Server Administrator adds the following line to the SNMP agent configuration file, `/etc/snmp/snmpd.conf`, during installation if it does not exist:

```
smuxpeer .1.3.6.1.4.1.674.10892.1
```

Changing the SNMP Community Name

Configuring the SNMP community names determines which systems are able to manage your system through SNMP. The SNMP community name used by systems management applications must match an SNMP community name configured on the Server Administrator software system, so the systems management applications can retrieve management information from Server Administrator.

To change the SNMP community name used for retrieving management information from a system running Server Administrator, edit the SNMP agent configuration file, `/etc/snmp/snmpd.conf`, and perform the following steps:

- 1 Find the line that reads:

```
com2sec publicsec default public
```

or

```
com2sec notConfigUser default public
```

- 2 Edit this line, replacing `public` with the new SNMP community name. When edited, the new line should read:

```
com2sec publicsec default community_name
```

or

```
com2sec notConfigUser default community_name
```

- 3 To enable SNMP configuration changes, restart the SNMP agent by typing:

```
service snmpd restart
```

Enabling SNMP Set Operations

Enable SNMP Set operations on the system running Server Administrator in order to change Server Administrator software attributes using IT Assistant. To enable remote shutdown of a system from IT Assistant, enable SNMP Set operations.



NOTE: Rebooting your system for change management functionality does not require SNMP Set operations.

To enable SNMP Set operations on the system running Server Administrator, edit the `/etc/snmp/snmpd.conf` SNMP agent configuration file and perform the following steps:

- 1 Find the line that reads:

```
access publicgroup "" any noauth exact all none
none
```

or

```
access notConfigGroup "" any noauth exact all none
none
```

- 2 Edit this line, replacing the first none with all. When edited, the new line should read:

```
access publicgroup "" any noauth exact all all
none
```

or

```
access notConfigGroup "" any noauth exact all all
none
```

- 3 To enable SNMP configuration changes, restart the SNMP agent by typing:

```
service snmpd restart
```

Configuring Your System to Send Traps to a Management Station

Server Administrator generates SNMP traps in response to changes in the status of sensors and other monitored parameters. One or more trap destinations must be configured on the system running Server Administrator for SNMP traps to be sent to a management station.

To configure your system running Server Administrator to send traps to a management station, edit the `/etc/snmp/snmpd.conf` SNMP agent configuration file and perform the following steps:

- 1 Add the following line to the file:

```
trapsink IP_address community_name
```

where *IP_address* is the IP address of the management station and *community_name* is the SNMP community name

- 2 To enable SNMP configuration changes, restart the SNMP agent by typing:

```
service snmpd restart
```

Firewall Configuration on Systems Running Supported Red Hat Enterprise Linux Operating Systems

If you enable firewall security when installing Red Hat Enterprise Linux, the SNMP port on all external network interfaces is closed by default.

To enable SNMP management applications such as IT Assistant to discover and retrieve information from Server Administrator, the SNMP port on at least one external network interface must be open. If Server Administrator detects that the SNMP port is not open in the firewall for any external network interface, Server Administrator displays a warning message and logs a message to the system log. See "Ports" for additional information.

You can open the SNMP port by disabling the firewall, opening an entire external network interface in the firewall, or opening the SNMP port for at least one external network interface in the firewall. You can perform this action before or after Server Administrator is started.

To open the SNMP port using one of the previously described methods, perform the following steps:

- 1 At the Red Hat Enterprise Linux command prompt, type `setup` and press <Enter> to start the Text Mode Setup Utility.



NOTE: This command is available only if you have performed a default installation of the operating system.

The **Choose a Tool** menu appears.

- 2 Select **Firewall Configuration** using the down arrow and press <Enter>. The **Firewall Configuration** screen appears.
- 3 Select the **Security Level**. The selected **Security Level** is indicated by an asterisk.



NOTE: Press <F1> for more information about the firewall security levels.

The default SNMP port number is **161**. If you are using the X Windows GUI, pressing <F1> may not provide information about firewall security levels on newer versions of the Red Hat Enterprise Linux operating system.

- a To disable the firewall, select **No firewall** or **Disabled** and go to step 7.
 - b To open an entire network interface or the SNMP port, select **High**, **Medium**, or **Enabled**.
- 4 Select **Customize** and press <Enter>.

The **Firewall Configuration - Customize** screen appears.

- 5 Select whether to open an entire network interface or just the SNMP port on all network interfaces.
 - a To open an entire network interface, select one of the **Trusted Devices** and press the spacebar. An asterisk in the box to the left of the device name indicates that the entire interface will be opened.
 - b To open the SNMP port on all network interfaces, select **Other ports** and type `snmp:udp`.
- 6 Select **OK** and press <Enter>. The **Firewall Configuration** screen appears.
- 7 Select **OK** and press <Enter>. The **Choose a Tool** menu appears.
- 8 Select **Quit** and press <Enter>.

Configuring the SNMP Agent on Systems Running Supported SUSE Linux Enterprise Server Operating Systems

Server Administrator uses the SNMP services provided by the `ucd-snmp` or `net-snmp` agent. You can configure the SNMP agent to enable SNMP access from remote hosts, change the community name, enable Set operations, and send traps to a management station. To configure your SNMP agent for proper interaction with systems management applications such as IT Assistant, perform the procedures described in the following sections.



NOTE: On SUSE Linux Enterprise Server (version 10), the SNMP agent configuration file is located at `/etc/snmp/snmpd.conf`.



NOTE: See your operating system documentation for additional details about SNMP configuration.

Server Administrator SNMP Install Actions

Server Administrator SNMP communicates with the SNMP agent using the SNMP Multiplexing (SMUX) protocol. When Server Administrator SNMP connects to the SNMP agent, it sends an object identifier to the SNMP agent to identify itself as a SMUX peer. Since the object identifier must be configured with the SNMP agent, Server Administrator adds the following line to the SNMP agent configuration file, `/etc/snmpd.conf` or `/etc/snmp/snmpd.conf`, during installation if it does not exist:

```
smuxpeer .1.3.6.1.4.1.674.10892.1
```

Enabling SNMP Access From Remote Hosts

The default SNMP agent configuration on SUSE Linux Enterprise Server operating systems gives read-only access to the entire MIB tree for the *public* community from the local host only. This configuration does not allow SNMP management applications such as IT Assistant running on other hosts to discover and manage Server Administrator systems properly. If Server Administrator detects this configuration during installation, it logs a message to the operating system log file, `/var/log/messages`, to indicate that SNMP access is restricted to the local host. You must configure the SNMP agent to enable SNMP access from remote hosts if you plan to manage the system by using SNMP management applications from remote hosts.



NOTE: For security reasons, it is advisable to restrict SNMP access to specific remote hosts if possible.

To enable SNMP access from a specific remote host to a system running Server Administrator, edit the SNMP agent configuration file, `/etc/snmpd.conf` or `/etc/snmp/snmpd.conf`, and perform the following steps:

- 1 Find the line that reads:

```
rocommunity public 127.0.0.1
```

- 2 Edit or copy this line, replacing 127.0.0.1 with the remote host IP address. When edited, the new line should read:

```
rocommunity public IP_address
```



NOTE: You can enable SNMP access from multiple specific remote hosts by adding a `rocommunity` directive for each remote host.

- 3 To enable SNMP configuration changes, restart the SNMP agent by typing:
`/etc/init.d/snmpd restart`

To enable SNMP access from all remote hosts to a system running Server Administrator, edit the SNMP agent configuration file, `/etc/snmpd.conf` or `/etc/snmp/snmpd.conf`, and perform the following steps:

- 1 Find the line that reads:
`rocommunity public 127.0.0.1`
- 2 Edit this line by removing `127.0.0.1`. When edited, the new line should read:
`rocommunity public`
- 3 To enable SNMP configuration changes, restart the SNMP agent by typing:
`/etc/init.d/snmpd restart`

Changing the SNMP Community Name

Configuring the SNMP community name determines which systems are able to manage your system through SNMP. The SNMP community name used by management applications must match an SNMP community name configured on the Server Administrator system, so the management applications can retrieve management information from Server Administrator.

To change the default SNMP community name used for retrieving management information from a system running Server Administrator, edit the SNMP agent configuration file, `/etc/snmpd.conf` or `/etc/snmp/snmpd.conf`, and perform the following steps:

- 1 Find the line that reads:
`rocommunity public 127.0.0.1`
- 2 Edit this line by replacing `public` with the new SNMP community name. When edited, the new line should read:
`rocommunity community_name 127.0.0.1`
- 3 To enable SNMP configuration changes, restart the SNMP agent by typing:
`/etc/init.d/snmpd restart`

Enabling SNMP Set Operations

Enable SNMP Set operations on the system running Server Administrator in order to change Server Administrator attributes using IT Assistant. To enable remote shutdown of a system from IT Assistant, enable SNMP Set operations.



NOTE: Rebooting your system for change management functionality does not require SNMP Set operations.

To enable SNMP Set operations on the system running Server Administrator, edit the SNMP agent configuration file, `/etc/snmpd.conf` or `/etc/snmp/snmpd.conf`, and perform the following steps:

- 1 Find the line that reads:

```
rocommunity public 127.0.0.1
```
- 2 Edit this line by replacing `rocommunity` with `rwcommunity`. When edited, the new line should read:

```
rwcommunity public 127.0.0.1
```
- 3 To enable SNMP configuration changes, restart the SNMP agent by typing:

```
/etc/init.d/snmpd restart
```

Configuring Your System to Send Traps to a Management Station

Server Administrator generates SNMP traps in response to changes in the status of sensors and other monitored parameters. One or more trap destinations must be configured on the system running Server Administrator for SNMP traps to be sent to a management station.

To configure your system running Server Administrator to send traps to a management station, edit the SNMP agent configuration file, `/etc/snmpd.conf` or `/etc/snmp/snmpd.conf`, and perform the following steps:

- 1 Add the following line to the file:

```
trapsink IP_address community_name
```

where `IP_address` is the IP address of the management station and `community_name` is the SNMP community name.
- 2 To enable SNMP configuration changes, restart the SNMP agent by typing:

```
/etc/init.d/snmpd restart
```

Secure Port Server and Security Setup

This section contains the following topics:

- Setting User and Server Preferences
- X.509 Certificate Management

Setting User and Server Preferences

You can set user and secure port server preferences for Server Administrator and IT Assistant from the respective **Preferences** Web page. Click **General Settings** and click either the **User** tab or **Web Server** tab.



NOTE: You must be logged in with Administrator privileges to set or reset user or server preferences.

Perform the following steps to set up your user preferences:

- 1 Click **Preferences** on the global navigation bar.
The **Preferences** home page appears.
- 2 Click **General Settings**.
- 3 To add a preselected e-mail recipient, type the e-mail address of your designated service contact in the **Mail To:** field, and click **Apply Changes**.



NOTE: Clicking **Email** in any window sends an e-mail message with an attached HTML file of the window to the designated e-mail address.

- 4 To change the home page appearance, select an alternative value in the **skin** or **scheme** fields and click **Apply Changes**.

Perform the following steps to set up your secure port server preferences:

- 1 Click **Preferences** on the global navigation bar.
The **Preferences** home page appears.
- 2 Click **General Settings**, and the **Web Server** tab.
- 3 In the **Server Preferences** window, set options as necessary.
 - The **Session Timeout** feature can set a limit on the amount of time that a session can remain active. Select the **Enable** radio button to allow a time-out if there is no user interaction for a specified number of minutes. Users whose sessions time-out must log in again to continue. Select the **Disable** radio button to disable the Server Administrator session time-out feature.

- The **HTTPS Port** field specifies the secure port for Server Administrator. The default secure port for Server Administrator is 1311.
 - ✎ **NOTE:** Changing the port number to an invalid or in-use port number may prevent other applications or browsers from accessing Server Administrator on the managed system.
 - The **IP Address to Bind to** field specifies the IP address(es) for the managed system that Server Administrator binds to when starting a session. Select the **All** radio button to bind to all IP addresses applicable for your system. Select the **Specific** radio button to bind to a specific IP address.
 - ✎ **NOTE:** A user with Administrator privileges cannot use Server Administrator when logged into the system remotely.
 - ✎ **NOTE:** Changing the **IP Address to Bind to** value to a value other than **All** may prevent other applications or browsers from remotely accessing Server Administrator on the managed system.
 - The **SMTP Server name** and **DNS Suffix for SMTP Server** fields specify your organization's Simple Mail Transfer Protocol (SMTP) and domain name server (DNS) suffix. To enable Server Administrator to send e-mails, you must type the IP address and DNS suffix for the SMTP server for your organization in the appropriate fields.
 - ✎ **NOTE:** For security reasons, your organization might not allow e-mails to be sent through the SMTP server to outside accounts.
 - The **Command Log Size** field specifies the largest file size in MB for the command log file.
 - The **Support Link** field specifies the Web address for the business entity that provides support for your managed system.
 - The **Custom Delimiter** field specifies the character used to separate the data fields in the files created using the **Export** button. The ; character is the default delimiter. Other options are !, @, #, \$, %, ^, *, ~, ?, :, |, and ,.
- 4** When you finish setting options in the **Server Preferences** window, click **Apply Changes**.

X.509 Certificate Management

Web certificates are necessary to ensure the identity of a remote system and ensure that information exchanged with the remote system cannot be viewed or changed by others. To ensure system security, it is strongly recommended that you either generate a new X.509 certificate, reuse an existing X.509 certificate, or import a root certificate or certificate chain from a Certification Authority (CA).



NOTE: You must be logged in with Administrator privileges to perform certificate management.

You can manage X.509 certificates for Server Administrator and IT Assistant from the respective **Preferences** Web page. Click **General Settings**, select the **Web Server** tab, and click **X.509 Certificate**. Use the X.509 certificate tool to either generate a new X.509 certificate, reuse an existing X.509 certificate, or import a root certificate or certificate chain from a CA. Authorized CAs include Verisign, Entrust, and Thawte.

Best Practices for X.509 Certificate Management

To ensure that the security of your system is not compromised while using server administrator, you should keep in mind the following:

- **Unique host name:** All systems that have server administrator installed should have unique host names.
- **Change 'localhost' to unique:** All systems with host name set to 'localhost' should be changed to a unique host name.

Deployment Scenarios for Server Administrator

In Dell OpenManage version 6.1, you can:

- Install the Server Administrator Web Server and the Server Instrumentation on the same system
- Install the Server Administrator Web Server on any system (Dell PowerEdge system, laptop, or desktop) and the Server Instrumentation on another supported Dell PowerEdge system

Table 6-1 lists the deployment scenarios for installing and using Server Administrator and helps you make the right choice while selecting the various installation options:

Table 6-1. Deployment Scenarios

You want to	Select
Remotely manage and monitor your entire network of managed systems from your system (which maybe a laptop, desktop, or server).	Server Administrator Web Server. You must then install Server Instrumentation on the managed systems.
Manage and monitor your current system.	Server Administrator Web Server + Server Instrumentation.
Manage and monitor your current system using some other remote system.	Remote Enablement under the Server Instrumentation option. You must then install the Server Administrator Web Server on the remote system.

Table 6-1. Deployment Scenarios (continued)

You want to	Select
View the status of local and remote storage attached to a managed system and obtain storage management information in an integrated graphical view.	Storage Management.
Remotely access an inoperable system, receive alert notifications when a system is down, and remotely restart a system.	Remote Access Controller.



NOTE: Install the SNMP agent on your managed system using your operating system medium before installing the managed system software.

Server Administrator Components on Managed System

The setup program provides both, a **Custom Setup** option and a **Typical Setup** option.

The custom setup option enables you to select the software components you want to install. Table 6-2 lists the various managed system software components that you can install during a custom installation. For details about the custom setup option, see the "Custom Installation."

Table 6-2. Managed System Software Components

Component	What is Installed	Deployment Scenario	Systems on Which to be Installed
Server Administrator Web Server	Web-based systems management functionality that allows you to manage systems locally or remotely	Install only the Server Administrator Web Server if you want to remotely monitor the managed system from your system. You need not have physical access to the managed system.	Any system. For example, laptops, desktops, or Dell PowerEdge systems.

NOTE: If you want to remotely manage multiple systems running on Windows and Linux operating systems, it is recommended that you install the Server Administrator Web Sever on a Windows operating system.

Server Instrumentation	Server Administrator CLI + Instrumentation Service	Install Server Instrumentation to use your system as the managed system. Installing Server Instrumentation and the Server Administrator Web Server installs Server Administrator. You can use Server Administrator to monitor, configure, and manage your system. Note: If you choose to install only Server Instrumentation (without selecting Remote Enablement), you must also install the Server Administrator Web Server.	Supported Dell PowerEdge systems. For a list of supported Dell PowerEdge systems, see the <i>Dell Systems Software Support Matrix</i> on the Dell Support site at support.dell.com .
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Table 6-2. Managed System Software Components (continued)

Component	What is Installed	Deployment Scenario	Systems on Which to be Installed
Storage Management	Server Administrator Storage Management	Install the Storage Management to implement hardware RAID solutions and configure the storage components attached to your system. For more information on the Storage Management, see the <i>Dell OpenManage Server Administrator Storage Management User's Guide</i> in the docs directory or on the Dell Support site at support.dell.com .	Only those systems on which you have installed Server Instrumentation or Remote Enablement.
Remote Enablement	Server Administrator CLI + Instrumentation Service + CIM Provider	Install Remote Enablement to perform remote systems management tasks. You can install Remote Enablement on your system and install only the Server Administrator Web Server on another system (say, system X). You can then use system X to remotely monitor and manage your system. You can use system X to manage any number of systems on which Remote Enablement is installed.	Supported Dell PowerEdge systems. For a list of supported Dell PowerEdge systems, see the <i>Dell Systems Software Support Matrix</i> on the Dell Support site at support.dell.com .

Table 6-2. Managed System Software Components (continued)

Component	What is Installed	Deployment Scenario	Systems on Which to be Installed
Remote Access Controller	Server Administrator CLI + Instrumentation Service + iDRAC or DRAC 5, or DRAC 4 (depending on the type of your Dell PowerEdge system)	Install Remote Access Service to receive e-mail alerts for warnings or errors related to voltages, temperatures, and fan speeds. Remote Access Service also logs event data and the most recent crash screen (available only on systems running Microsoft Windows operating system) to help you diagnose the probable cause of a system crash.	Only those systems on which you have installed Server Instrumentation or Remote Enablement.
Intel SNMP Agent	Intel SNMP Agent	Install this SNMP agent to enable Server Administrator to obtain information about Network Interface Cards (NICs). This SNMP agent helps identify the NICs.	Only on Dell PowerEdge systems on which Server Instrumentation is installed and which are running on the Microsoft Windows operating system.
Broadcom SNMP Agent	Broadcom SNMP Agent	Install this SNMP agent to enable Server Administrator to obtain information about NICs. This SNMP agent helps identify the NICs.	Only on Dell PowerEdge systems on which Server Instrumentation is installed and which are running on the Microsoft Windows operating system.

Installing Managed System Software on Microsoft Windows Operating Systems

Overview

This section contains the procedure to install managed system software on systems running Microsoft® Windows® operating systems.

On Microsoft Windows operating systems, an autorun utility appears when you insert the *Dell Systems Management Tools and Documentation DVD*. This utility allows you to choose the systems management software you want to install on your system.


If the autorun program does not start automatically, use the setup program in the `SYSMGMT\svadmin\windows` directory on the *Dell Systems Management Tools and Documentation DVD*. You can uninstall the features through the operating system. See the *Dell Systems Software Support Matrix* for a list of operating systems currently supported.

Unattended and Scripted Silent Installation

You can use the *Dell Systems Management Tools and Documentation DVD* to perform an unattended and scripted silent installation of the managed system software. Additionally, you can install and uninstall the features from the command line.

Installation Procedures

This section explains how to install, upgrade, and uninstall Server Administrator on a system running a supported Windows operating system.

 **NOTE:** If you want to use supporting agents for the Simple Network Management Protocol (SNMP), you must install the operating system support for the SNMP standard before or after you install Server Administrator. For more information about installing SNMP, see the installation instructions for the operating system you are running on your system.

Before installation, ensure that you have read the "Setup and Administration" chapter for information on installation requirements.

Prerequisite Checker

The setup program (located at `\SYSMGMT\svadmin\windows`) starts the Prerequisite Checker program. The Prerequisite Checker program examines the prerequisites for software components without launching the actual installation. This program displays a status window that provides information about your system's hardware and software that may affect the installation and operation of software features.

The Prerequisite Checker displays three types of messages: informational, warning, and error.

An informational message describes a condition, but does not prevent a feature from being installed.

A warning message describes a condition that prevents a software product from being installed during a Typical installation. It is recommended that you resolve the condition causing the warning before proceeding with the installation of that software. If you decide to continue, you can select and install the software using the Custom installation. For example, if an Intel Network Interface Card (NIC) is not detected on the system, the following message is displayed:

```
An Intel(R) NIC was not detected on this system.  
This will disable the "Typical" installation of  
the Intel(R) SNMP Agent.
```

```
Use the "Custom" installation setup type later  
during installation to select this feature if you  
have an Intel(R) NIC installed.
```

An error message describes a condition that prevents the software feature from being installed. You must resolve the condition causing the error before proceeding with the installation of the software feature. If you do not resolve the issue, the software feature is not installed.

Use the `RunPreReqChecks.exe /s` command (at `\SYSMGMT\svadmin\windows\PreReqChecker`) to run the prerequisite check silently. For more information, see "Prerequisite Checker."

Remote Enablement Requirements

To install the Remote Enablement feature, the following must be configured on your system:

- Windows Remote Management (WinRM)
- CA/Self-Signed Certificate
- WinRM HTTPS Listener Port
- Authorization for WinRM and Windows Management Instrumentation (WMI) Servers

Installing WinRM

Install WinRM version 1.1 if you are using the Windows Server 2003 operating system. WinRM is not installed by default on this operating system.

- 1 Download the WinRM version 1.1 installer from <http://www.microsoft.com/downloads/details.aspx?familyid=845289ca-16cc-4c73-8934-dd46b5ed1d33&displaylang=en>.
- 2 Run the .exe file.
The **Software Update Installation Wizard** screen displays.
- 3 Click **Next**.
The **License Agreement** screen displays.
- 4 Select **I Agree** and click **Next**.
The **Updating Your System** screen displays.
- 5 Click **Finish**.

Certificate Authority - Signed/Self-Signed Certificate

You need a certificate signed by the Certificate Authority (CA) or a self-signed certificate to install and configure the Remote Enablement feature on your system. It is recommended that you use a certificate signed by the CA. You can also use the SelfSSL tool to generate self-signed certificates.

Creating a Certificate

- 1** Download IIS Resource Kit from <http://www.microsoft.com/downloads/details.aspx?FamilyID=56fc92ee-a71a-4c73-b628-ade629c89499&displaylang.>
- 2** Run `iis60rkt.exe`.
- 3** Click **Next**.
- 4** Select **I Agree** in the **End-User License Agreement** screen and click **Next**.
- 5** Click **Next**.
- 6** In the **Select Type** screen, select **Custom** and click **Next**.
- 7** Click **Next**.
- 8** In the **Select Features** screen, select **SelfSSL 1.0** and click **Next**.
- 9** Click **Next**.
- 10** Click **Finish**.
The SelfSSL is installed.
- 11** Click **Start -> Programs -> IIS Resource -> SelfSSL -> SelfSSL**.
- 12** Type
`selfssl /T /N:CN=<computer_name or domain_name>.`

Adding a Certificate and Taking a Thumbprint

- 1** Click **Start -> Run**.
- 2** Type `mmc` and click **OK**.
- 3** Click **File -> Add/Remove Snap-in**.
- 4** Click **Add**.
- 5** Choose **Certificates** and click **Add**.
- 6** Select **Computer account** option and click **Next**.
- 7** Select **Local Computer** and click **Finish**.

- 8 Click **Close**.
- 9 Click **OK**.
- 10 In the **Console** screen, expand **Certificates (Local Computer)** in the left navigation pane.
- 11 Expand **Personal**.
- 12 Select **Certificates**.
- 13 In the right-hand pane, double-click the required certificate.
The **Certificate** screen displays.
- 14 Click **Details** tab.
- 15 Select **Thumbprint**.
Copy the thumbprint to the clipboard. You can use this parameter while creating the HTTPS listener.
- 16 Click **OK**.

Creating the WinRM HTTPS Listener

To enable the HTTPS listener on WinRM, type the following command:

```
winrm create winrm/config/Listener?Address=
*+Transport=HTTPS @{Hostname=
"<host_name>";CertificateThumbprint=
"6e132c546767bf16a8acf4fe0e713d5b2da43013" }
```



NOTE: Ensure that the values of the `Hostname` and `CertificateThumbprint` are correct.

If Internet Information Service (IIS) is already installed on your system, then the value of `CertificateThumbprint` must be an empty string. For example:

```
winrm create winrm/config/Listener?Address=
*+Transport=HTTPS @{Hostname=
"<host_name>";CertificateThumbprint="" }
```

The HTTP listener is enabled by default and listens at port 80.

Configuring User Authorization for WinRM and WMI Servers

To provide access rights to WinRM and WMI services, users must be explicitly added with the appropriate access levels.



NOTE: You must login with administrator privileges to configure user authorization for WinRM and WMI Servers.



NOTE: The administrator is configured by default.

WinRM:

- 1 Click **Start** and click **Run**.
- 2 Type `winrm configsdcl` and click **OK**.
- 3 Click **Add** and add the required users (local/domain) to the list.
- 4 Provide the appropriate permission(s) to the respective users and click **OK**.

WMI:

- 1 Click **Start** and Click **Run**.
- 2 Type `wmimgmt.msc` and click **OK**.
The **Windows Management Infrastructure (WMI)** screen displays.
- 3 Right-click on the **WMI Control (Local)** node in the left pane and click **Properties**.
The **WMI Control (Local) Properties** screen displays.
- 4 Click **Security** and expand the **Root** node in the namespace tree.
- 5 Navigate to **Root -> DCIM -> sysman**.
- 6 Click **Security**.
The **Security** screen displays.
- 7 Click **Add** and add the required users (local/domain) to the list.
- 8 Provide the appropriate permission(s) to the respective users and click **OK**.
- 9 Click **OK**.
- 10 Close the **Windows Management Infrastructure (WMI)** screen.

Configuring the Windows Firewall for WinRM

- 1 Open the Control Panel.
- 2 Click **Windows Firewall**.
- 3 Click the **Exceptions** tab.
- 4 Select the **Windows Remote Management** check box. If you do not see the check box, click the **Add Program** button to add Windows Remote Management.

Configuring the Envelope Size for WinRM

- 1 Open a command prompt.
- 2 Type `winrm g winrm/config`.
- 3 Check the value of the `MaxEnvelopeSizekb` attribute. If the value is less than `4608`, type the following command:

```
winrm s winrm/config @{MaxEnvelopeSizekb="4608"}
```

Installing and Upgrading Server Administrator

This section explains how to install the Server Administrator using two installation options:


- Using the setup program at `\SYSMGMT\svadmin\windows` on the *Dell Systems Management Tools and Documentation* DVD to install Server Administrator and other managed system software.
- Using the unattended installation method through the Windows Installer Engine `msiexec.exe` (see Table 7-1) to install Server Administrator and other managed system software on multiple systems.




NOTE: Simple Network Management Protocol (SNMP) service will be stopped and started during Systems Management Installation and uninstallation. As a result, services like DSM IT Assistant Connection Service, DSM IT Assistant Network Monitor and other third party services, dependent on SNMP will stop. IT Assistant services will be started at the end of Systems Management Installation or uninstallation, if the third party services are stopped, these services needs to be manually restarted.



NOTE: For modular systems, you must install Server Administrator on each server module installed in the chassis.

 **NOTE:** After you have installed Server Administrator on PowerEdge 800, 830, 850, and 1800 systems, you may be prompted to reboot your system if you have chosen to install the Storage Management Service.

 **NOTE:** During installation of Server Administrator on supported Windows systems, if an **Out of Memory** error message displays, you must exit the installation and free up memory. Close other applications or perform any other task that will free up memory, before re-attempting Server Administrator installation.

The setup program invokes the Prerequisite Checker, which uses your system's PCI bus to search for installed hardware such as controller cards.

The Dell OpenManage installer features a **Typical Setup** option and a **Custom Setup** option for installing Server Administrator and other managed system software.

For information on the various components of Server Administrator available in Dell OpenManage version 6.1 and to help you choose the required components to install, see "Deployment Scenarios for Server Administrator."

Typical Installation

When you launch the Server Administrator installation from the Prerequisite Checker and select the **Typical Setup** option, the setup program installs following the managed system software features:

- Server Administrator Web Server
- Server Instrumentation
- Remote Access Controller
- Intel SNMP Agent
- Broadcom SNMP Agent.

For more information about how to perform a **Typical Setup**, see the *Quick Installation Guide*. You can access the *Quick Installation Guide* by clicking **Quick Install Guide** on the menu bar within the Prerequisite Checker user interface.

During a **Typical** installation, individual management station services are not installed on managed systems that do not meet the specific hardware and software requirements for that service. For example, the Dell OpenManage Server Administrator Remote Access Controller service software module will not be installed during a **Typical** installation unless the managed system has a

remote access controller installed on it. You can, however, go to **Custom Setup** and select the **Remote Access Controller** software module for installation.



NOTE: The Remote Enablement feature is available only through the **Custom Setup** option.



NOTE: Server Administrator installation also installs some of the required Visual C++ runtime components on your system.

Custom Installation

The sections that follow show how to install Server Administrator and other managed system software using the **Custom Setup** option.



NOTE: Management station and managed system services can be installed in the same or in different directories. You can select the directory for installation.

- 1 Log on with built-in administrator privileges to the system on which you want to install the system management software.
- 2 Close all open applications and disable any virus-scanning software.
- 3 Insert the *Dell Systems Management Tools and Documentation* DVD into your system's DVD drive. The autorun menu appears.
- 4 Select **Dell OpenManage Server Administrator** from the autorun menu and click **Install**.

If the autorun program does not start automatically, go to the `SYSMGMT\svadmin\windows` directory on the DVD, and run the `setup.exe` file.

The **Dell OpenManage Server Administrator** prerequisite status screen appears and runs the prerequisite checks for the managed system. Any relevant informational, warning, or error messages are displayed. Resolve all error and warning situations, if any.

- 5 Click the **Install, Modify, Repair, or Remove Server Administrator** option. The **Welcome to the Install Wizard for Dell OpenManage Server Administrator** screen appears.
- 6 Click **Next**. The **Dell Software License Agreement** appears.
- 7 Click **I accept the terms in the license agreement** and **Next** if you agree. The **Setup Type** dialog box appears.

- 8 Select **Custom** and click **Next**.

The **Custom Setup** dialog box appears.

See Table 6-1 and Table 6-2 to help you select the Server Administrator components for your system.

If you are installing Server Administrator on a non-Dell PowerEdge system, the installer displays only the **Server Administrator Web Server** option.

A selected feature has a hard drive icon depicted next to it. A deselected feature has a red **X** depicted next to it. By default, if the Prerequisite Checker finds a software feature with no supporting hardware, the checker deselects them.

To accept the default directory path to install managed system software, click **Next**. Otherwise, click **Change** and navigate to the directory where you want to install your managed system software, and click **OK**. You will return to the **Custom Setup** dialog box.

- 9 Click **Next** to accept the selected software features for installation.

The **Ready to Install the Program** dialog box appears.



NOTE: You can cancel the installation process by clicking **Cancel**.

The installation rolls back the changes that you made. If you click **Cancel** after a certain point in the installation process, the installation may not roll back properly, leaving the system with an incomplete installation. See "System Recovery on Failed Installation."


- 10 Click **Install** to install the selected software features.

The **Installing Dell OpenManage Server Administrator** screen appears and provides the status and progress of the software features being installed. After the selected features are installed, the **Install Wizard Completed** dialog box appears.

- 11 Click **Finish** to exit the Server Administrator installation.

If you are prompted to reboot your system, reboot it to make the installed managed system software services available for use. If you are prompted to reboot your system, select a reboot option:

- **Yes, reboot my system now.**
- **No, I will reboot my system later.**

 **NOTE:** If you have selected **Remote Enablement** during installation, an error message "A provider, WinTunnel, has been registered in the Windows Management Instrumentation namespace ROOT\dcim\sysman to use the LocalSystem account. This account is privileged and the provider may cause a security violation if it does not correctly impersonate user requests." is logged in Windows Event Log. You can safely ignore this message and continue with installation.

Server Administrator Installation With Citrix Application Server

Citrix remaps all your hard drive letters when installed. For example, if you install Server Administrator on drive **C:** and then install Citrix, it may change your drive letter **C:** to **M:**. Server Administrator may not work properly because of the remapping.

In order to avoid this problem, select one of these options:

Option 1:

- 1 Uninstall Server Administrator.
- 2 Install Citrix.
- 3 Reinstall Server Administrator.

Option 2:

After installing Citrix, type the following command:

```
msiexec.exe /fa SysMgmt.msi
```

Upgrading Managed System Software


The Dell OpenManage installer provides an **Upgrade** option for upgrading Server Administrator and other managed system software.

You can upgrade Server Administrator Web Server version 6.0.3 to version 6.1. You can also upgrade Server Administrator version 6.0.1 to version 6.1.

The setup program runs the **Prerequisite Checker**, which uses your system's PCI bus to search for installed hardware, such as controller cards.

The setup program installs or upgrades all of the managed system software features that are appropriate for your particular system's hardware configuration.

 **CAUTION:** Dell OpenManage Array Manager is no longer supported. If you are upgrading a system (installed with Dell OpenManage version 5.0 or later) with Array Manager installed, Array Manager is removed during the upgrade process. You can use the Storage Management Service instead.

 **NOTE:** All user settings are preserved during upgrades.

The following procedures show how to upgrade Server Administrator and other managed system software.

Upgrading Guidelines

- You cannot upgrade Server Administrator earlier than version 5.0 to version 6.1. You must upgrade to a Server Administrator version later than 5.0 and then upgrade to Server Administrator version 6.1.
- If you have installed Server Instrumentation on the managed system, ensure that you install Server Administrator Web Server version 6.1. Installing an earlier version of Server Administrator Web Server may display an error.
- If you have installed Server Administrator Web Server version 6.1, ensure that you install Server Instrumentation version 6.1 on your managed system. Accessing an earlier version of Server Administrator using Server Administrator Web Server version 6.1 may display an error.

Upgrade

- 1** Insert the *Dell Systems Management Tools and Documentation* DVD into your system's DVD drive. The autorun menu appears.
- 2** Select **Dell OpenManage Server Administrator** and click **Install**.
If the autorun program does not start automatically, go to the `SYSMGMT\srvadmin\windows` directory on the DVD, and run the `setup.exe` file.

The **Dell OpenManage Server Administrator prerequisite** status screen appears and runs the prerequisite checks for the managed station. Any relevant informational, warning, or error messages are displayed.

- 3** Click the **Install, Modify, Repair, or Remove Server Administrator** option.
The **Welcome to the Install Wizard for Dell OpenManage Server Administrator** screen appears.
- 4** Click **Next**.
The **Dell Software License Agreement** appears.
- 5** Click **I accept the terms in the license agreement** and **Next** if you agree.
The **Setup Type** dialog box appears.
- 6** Continue the installation as mentioned in the custom installation section from "step 8" onwards.

Modify

If you want to add/remove Server Administrator components:

- 1** Navigate to the Windows **Control Panel**.
- 2** Double-click **Add/Remove Programs**.
- 3** Click **Dell OpenManage Server Administrator** and click **Change**.
The **Welcome to the Install Wizard for Dell OpenManage Server Administrator** dialog box appears.
- 4** Click **Next**.
The **Program Maintenance** dialog box appears.
- 5** Select the **Modify** option and click **Next**.
The **Custom Setup** dialog box appears.
- 6** To select a specific managed system software application, click on the drop-down arrow beside the listed feature and select either **This feature will be installed...** to install the feature, or **This feature will not be available** to ignore the feature.

A selected feature has a hard drive icon depicted next to it. A deselected feature has a red **X** next to it. By default, if the Prerequisite Checker finds a software feature with no supporting hardware, the checker deselects the feature.
- 7** Click **Next** to accept the selected software features for installation.
The **Ready to Modify the Program** dialog box appears.
- 8** Click **Install** to install the selected software features.
The **Installing Dell OpenManage Server Administrator** screen appears. Messages give the status and progress of the software features being installed.

When the selected features are installed, the **Install Wizard Completed** dialog box appears.
- 9** Click **Finish** to exit the Server Administrator installation.

If you are prompted to reboot your system, you must do so to make the installed managed system software services available for use. If you are prompted to reboot your system, select a reboot option:
 - **Yes, reboot my system now.**
 - **No, I will reboot my system later.**

Repair

If you want to repair an installed Server Administrator component that may be damaged:

- 1** Navigate to the Windows Control Panel.
- 2** Double-click **Add/Remove Programs**.
- 3** Click **Dell Server Administrator** and click **Change**.

The **Welcome to the Install Wizard for Dell OpenManage Server Administrator** dialog box appears.

- 4** Click **Next**.

The **Program Maintenance** dialog box appears.

- 5** Select the **Repair** option and click **Next**.

The **Ready to Repair the Program** dialog box appears.

- 6** Click **Install** to install the selected software features.

The **Installing Dell OpenManage Server Administrator** screen appears. Messages provide the status and progress of the software features being installed.

When the selected features are installed, the **Install Wizard Completed** dialog box appears.

- 7** Click **Finish** to exit the Server Administrator installation.

If you are prompted to reboot your system, select a reboot option:

- **Yes, reboot my system now.**
- **No, I will reboot my system later.**

System Recovery on Failed Installation

The Microsoft Software Installer (MSI) provides the ability to return a system to its fully working condition after a failed installation. MSI does this by maintaining an undo operation for every Standard Action it performs during an install, upgrade, or uninstall. This operation includes restoration of deleted or overwritten files, registry keys, and other resources. Windows temporarily saves any files that it deletes or overwrites during the course of an installation

or removal, so they can be restored if necessary, which is a type of rollback. After a successful installation finishes, Windows deletes all of the temporary backup files.

In addition to the rollback of MSI Standard Actions, the Dell OpenManage library also has the ability to undo commands listed in the INI file for each application if a rollback occurs. All files that are modified by the Dell OpenManage installation actions will be restored to their original state if a rollback occurs.

When the MSI engine is going through the installation sequence, it ignores all actions that are scheduled as rollback actions. If a Custom Action, MSI Standard Action, or a Dell OpenManage installation action fails, then a rollback starts.

An installation cannot be rolled back once it has finished; transacted installation is only intended as a safety net that protects the system during an installation session. If you want to remove an installed application, for instance, you should simply uninstall that application.



NOTE: Driver installation and removal is not executed as part of the installation transaction and therefore cannot be rolled back if a fatal error occurs during execution.



NOTE: Installations, uninstallations, and upgrades that you cancel during installer cleanup, or after the installation transaction is completed, will not be rolled back.

Failed Updates

MSI patches and updates provided by vendors must be applied to the original vendor MSI packages provided. If you intentionally or accidentally repackage an MSI package, or make changes to it directly, patches and updates might fail. MSI packages must not be repackaged; doing so changes the feature structure and GUIDs, which break any provided patches or updates. When it is necessary to make any changes to a vendor-provided MSI package, a `.mst` transform file should always be used to do so.

Windows Installer Logging

Windows includes a registry-activated logging service to help diagnose Windows Installer issues. To enable this logging service during a silent install, open the registry editor and create the following path and keys:

```
HKEY_LOCAL_MACHINE\Software\Policies\Microsoft\Windows\Installer
```

```
Reg_SZ: Logging
```

```
Value: voicewarmup
```

The letters in the value field can be in any order. Each letter turns on a different logging mode. Each letter's actual function is as follows for MSI version 3.1:

v - Verbose output

o - Out-of-disk-space messages

i - Status messages

c - Initial UI parameters

e - All error messages

w - Non-fatal warnings

a - Startup of actions

r - Action-specific records

m - Out-of-memory or fatal exit information

u - User requests

p - Terminal properties

+ - Append to existing file

! - Flush each line to the log

"*" - Wildcard, log all information except for the v option. To include the v option, specify "/!*v".

Once activated, you can find the log files that are generated in your %TEMP% directory. Some log files generated in this directory are:

- **Managed System Installation**
 - SysMgmt.log
- **Management Station Installation**
 - MgmtSt.log

These particular log files are created by default if the Prerequisite Checker user interface (UI) is running.

Performing an Unattended Installation of Managed System Software

The Dell OpenManage installer features a **Typical Setup** option and a **Custom Setup** option for the unattended installation procedure.

Unattended installation enables you simultaneously to install Server Administrator on multiple systems. You can perform an unattended installation by creating an unattended installation package that contains all of the necessary managed system software files. The unattended installation option also provides several features that enable you to configure, verify, and view information about unattended installations.

The unattended installation package is distributed to the remote systems using a software distribution tool from an independent software vendor (ISV). When the package is distributed, the installation script executes to install the software.

Creating and Distributing the Typical Unattended Installation Package

The **Typical Setup** unattended installation option uses the *Dell Systems Management Tools and Documentation* DVD as the unattended installation package. The `msiexec.exe /i SysMgmt.msi /qb` command accesses the DVD to accept the software license agreement and install all required Server Administrator features on selected remote systems. The `msiexec.exe /i SysMgmt.msi /qb` command installs Server Administrator features on each remote system based on the system's hardware configuration.



NOTE: After an unattended installation has finished, in order to use the command line interface (CLI) feature of Server Administrator, you must open a new console window and execute CLI commands from there. Executing CLI commands from the same console window in which Server Administrator was installed will not work.

You can make the DVD image available to the remote system by either distributing the entire contents of the media, or by mapping a drive from the target system to the location of the DVD image.

Mapping a Drive to Act as the Typical Unattended Installation Package

- 1** Share an image of the *Dell Systems Management Tools and Documentation* DVD with each remote system on which you want to install Server Administrator.

You can accomplish this task by directly sharing the DVD or by copying the entire DVD to a drive and sharing the copy.

- 2** Create a script that maps a drive from the remote systems to the shared drive described in step 1. This script should execute `msiexec.exe /i Mapped Drive\SYSMGMT\sradmin\windows\SystemManagement\SysMgmt.msi /qb` after the drive has been mapped.
- 3** Configure your ISV distribution software to distribute and execute the script created in step 2.
- 4** Distribute this script to the target systems by using your ISV software distribution tools.

The script executes to install Server Administrator on each remote system.

- 5** Reboot each remote system to enable Server Administrator.

Distributing the Entire DVD as the Typical Unattended Installation Package

- 1** Distribute the entire image of the *Dell Systems Management Tools and Documentation* DVD to your target systems.
- 2** Configure your ISV distribution software to execute the `msiexec.exe /i DVD Drive\SYSMGMT\sradmin\windows\SystemManagement\SysMgmt.msi /qb` command from the DVD image.

The program executes to install Server Administrator on each remote system.

- 3** Reboot each remote system to enable Server Administrator.

Creating and Distributing Custom Unattended Installation Packages

To create a custom unattended installation package, perform the following steps:

- 1 Copy the `SYSMGMT\srvadmin\windows` directory from the DVD to the system hard drive.
- 2 Create a batch script that will execute the installation using the Windows Installer Engine (`msiexec.exe`).



NOTE: For Customized Unattended Installation, each required feature must be included as a command line interface (CLI) parameter for it to be installed.

An example is `msiexec.exe /i SysMgmt.msi ADDLOCAL=SA,IWS,BRCM /qb`. (See "Customization Parameters" for more details and available feature identifications.)

- 3 Place the batch script in the `windows` directory on the system hard drive.

Distributing Custom Unattended Installation Packages



NOTE: The `SysMgmt.msi` installation package for Server Administrator used in the Custom Setup unattended installation (see "Creating and Distributing Custom Unattended Installation Packages") is located in the `SYSMGMT\srvadmin\windows\SystemManagement` directory in the DVD.

- 1 Configure your ISV distribution software to execute the batch script once your installation package has been distributed.
- 2 Use your ISV distribution software to distribute the custom unattended installation package to the remote systems.
The batch script installs Server Administrator along with specified features on each remote system.
- 3 Reboot each remote system to enable Server Administrator.

Specifying Log File Locations

For managed system MSI installation, run the following command to perform an unattended installation while specifying the log file location:

```
msiexec.exe /i SysMgmt.msi /l*v  
"C:\openmanage\logs\SysMgmt.log"
```

Unattended Installation Features

Unattended installation provides the following features:

- A set of optional command line settings to customize an unattended installation
- Customization parameters to designate specific software features for installation
- A Prerequisite Checker program that examines the dependency status of selected software features without having to perform an actual installation

Optional Command Line Settings

Table 7-1 shows the optional settings available for the `msiexec.exe` MSI installer. Type the optional settings on the command line after `msiexec.exe` with a space between each setting.



NOTE: See support.microsoft.com for full details about all the command line switches for the Windows Installer Tool.

Table 7-1. Command Line Settings for MSI Installer

Setting	Result
<code>/i</code> <code><Package Product Code></code>	This command installs or configures a product. /i SysMgmt.msi – Installs the Server Administrator software.
<code>/i SysMgmt.msi</code> <code>/qn</code>	This command carries out a fresh installation of version 6.1.
<code>/x</code> <code><Package Product Code></code>	This command uninstalls a product. /x SysMgmt.msi – Uninstalls the Server Administrator software.

Table 7-1. Command Line Settings for MSI Installer (continued)

Setting	Result
/q[n b r f]	<p>This command sets the user interface (UI) level.</p> <p>/q or /qn – no UI. This option is used for silent and unattended installation.</p> <p>/qb – basic UI. This option is used for unattended but not silent installation.</p> <p>/qr – reduced UI. This option is used for unattended installation while displaying a modal dialog box showing install progress.</p> <p>/qf – full UI. This option is used for standard attended installation.</p>
/f[p o e d c a u m s v]<Package ProductCode>	<p>This command repairs a product.</p> <p>/fp – This option reinstalls a product only if a file is missing.</p> <p>/fo – This option reinstalls a product if a file is missing or if an older version of a file is installed.</p> <p>/fe – This option reinstalls a product if a file is missing or an equal or older version of a file is installed.</p> <p>/fd – This option reinstalls a product if a file is missing or a different version of a file is installed.</p> <p>/fc – This option reinstalls a product if a file is missing or the stored checksum value does not match the calculated value.</p> <p>/fa – This option forces all files to be reinstalled.</p> <p>/fu – This option rewrites all required user-specific registry entries.</p> <p>/fm – This option rewrites all required system-specific registry entries.</p> <p>/fs – This option overwrites all existing shortcuts.</p> <p>/fv – This option runs from the source and re-caches the local package. Do not use the /fv reinstall option for the first installation of an application or feature.</p>

Table 7-1. Command Line Settings for MSI Installer (continued)

Setting	Result
INSTALLDIR=<path>	This command installs a product to a specific location. If you specify an install directory with this switch, it must be created manually prior to executing the CLI install commands or they will fail with no error or message as to why they failed. <code>/i SysMgmt.msi INSTALLDIR=c:\OpenManage /qn</code> – installs a product to a specific location using <code>c:\OpenManage</code> as the install location.

For example, running `msiexec.exe /i SysMgmt.msi /qn` installs Server Administrator features on each remote system based on the system's hardware configuration. This installation is done silently and unattended.

Customization Parameters



NOTE: Type the ADDLOCAL, REINSTALL, and REMOVE CLI parameters in upper case, as they are case-sensitive.

ADDLOCAL, REINSTALL, and REMOVE customization CLI parameters provide a way to customize the exact software features to install, reinstall, or uninstall when running silently or unattended. With the customization parameters, you can selectively install, reinstall, or uninstall software features for different systems using the same unattended installation package. For example, you can choose to install Server Administrator, but not Remote Access Controller service on a specific group of servers, and choose to install Server Administrator, but not Storage Management Service, on another group of servers. You can also choose to uninstall one or multiple features on a specific group of servers.



NOTE: The software feature IDs mentioned in Table 7-2 are case-sensitive.

Table 7-2. Software Feature IDs

Feature ID	Description
BRCM	Broadcom NIC Agent
INTEL	Intel NIC Agent
IWS	Server Administrator Web Server

Table 7-2. Software Feature IDs (continued)

Feature ID	Description
OMSM	Storage Management
RmtMgmt	Remote Enablement
RAC4	Remote Access Controller (DRAC 4)
RAC5	Remote Access Controller (DRAC 5)
iDRAC	Integrated Dell Remote Access Controller
SA	Server Administrator



NOTE: Only iDRAC6 is supported on xx1x systems.

You can include the **ADDLOCAL** customization parameter on the command line, and assign the feature ID (or IDs) of the software feature that you would like to install. An example is

```
msiexec.exe /i SysMgmt.msi ADDLOCAL=BRCM /qb.
```

This command runs the installation for Dell OpenManage Systems Management, and installs only the Broadcom agent, in an unattended but not silent mode.

You can include the **REINSTALL** customization parameter on the command line and assign the feature ID (or IDs) of the software feature that you would like to reinstall. An example is

```
msiexec.exe /i SysMgmt.msi REINSTALL=BRCM /qb.
```

This command will run the installation for Dell OpenManage Systems Management and reinstall only the Broadcom agent, in an unattended but not silent mode.

You can include the **REMOVE** customization parameter on the command line and assign the feature ID (or IDs) of the software feature that you would like to uninstall. An example is


```
msiexec.exe /i SysMgmt.msi REMOVE=BRCM /qb.
```

This command runs the installation for Dell OpenManage Systems Management and uninstalls only the Broadcom agent, in an unattended but not silent mode.

You can also choose to install, reinstall, and uninstall features with one execution of the `msiexec.exe` program. An example is

```
msiexec.exe /i SysMgmt.msi ADDLOCAL=INTEL REMOVE=BRCM /qb
```

This command runs the installation for managed system software, and simultaneously installs the Intel agent, and uninstalls the Broadcom agent. This execution will be in an unattended but not silent mode.


 **NOTE:** A Globally Unique Identifier (GUID) is 128 bits long, and the algorithm used to generate a GUID guarantees each GUID to be unique. The product GUID uniquely identifies the application. In this case, the product GUID for Server Administrator is {54C04D53-C3C3-46EA-A75F-7AFF4BEB727C}.

MSI Return Code

An application event log entry is recorded in the `SysMgmt.log` file. Table 7-3 shows some of the error codes returned by the `msiexec.exe` Windows Installer Engine.

Table 7-3. Windows Installer Return Codes

Error Code	Value	Description
ERROR_SUCCESS	0	The action completed successfully.
ERROR_INVALID_PARAMETER	87	One of the parameters was invalid.
ERROR_INSTALL_USEREXIT	1602	The user canceled the installation.
ERROR_SUCCESS_REBOOT_REQUIRED	3010	A restart is required to complete the installation. This message is indicative of a successful installation.

 **NOTE:** See support.microsoft.com for full details on all the error codes returned by the `msiexec.exe` and `InstMsi.exe` Windows Installer functions.

Uninstalling Managed System Software

You can uninstall managed system software features by using the *Dell Systems Management Tools and Documentation* DVD, or your operating system. Additionally, you can simultaneously perform an unattended uninstallation on multiple systems.



NOTE: After you uninstall Server Administrator on PowerEdge 1650, 2650, 4600, 700, 750, 800, 830, 850, and 1800 systems, you may be prompted to reboot your system if you have chosen to uninstall Storage Management Service. You may also be prompted for a reboot if any of the files being upgraded are under use.

Uninstalling Managed System Software Using Dell-provided Media

- 1 Insert the *Dell Systems Management Tools and Documentation* DVD into your system's DVD drive.

If the setup program does not start automatically, run the **setup.exe** in the `SYSMGMT\srvadmin\windows` directory on the DVD.

The **Dell OpenManage Server Administrator prerequisite** status screen appears and runs the prerequisite checks for the managed system. Any relevant informational, warning, or error messages detected during checking are displayed.

- 2 Click the **Install, Modify, Repair, or Remove Server Administrator** option.

The **Welcome to the Install Wizard for Dell OpenManage Server Administrator** screen appears.

- 3 Click **Next**.

The **Program Maintenance** dialog box appears.

This dialog enables you to modify, repair, or remove the program.

- 4 Select the **Remove** option and click **Next**.

The **Remove the Program** dialog box appears.

5 Click **Remove**.

The **Uninstalling Dell OpenManage Server Administrator** screen appears and provides the status and progress of the software features being uninstalled.

When the selected features are uninstalled, the **Install Wizard Completed** dialog box appears.

6 Click **Finish** to exit the Server Administrator uninstallation.

If you are prompted to reboot your system, you must reboot your system in order for the uninstallation to be successful. If you are prompted to reboot your system, select a reboot option:

- **Yes, reboot my system now.**
- **No, I will reboot my system later.**

All Server Administrator features are uninstalled.

Uninstalling Managed System Software Features Using the Operating System

1 Navigate to the Windows Control Panel.

2 Double-click **Add/Remove Programs**.

3 Click **Dell OpenManage Server Administrator** and click **Remove**.

The **Add or Remove Programs** dialog box appears.

4 Click **Yes** to confirm uninstallation of Server Administrator.

The **Dell OpenManage Server Administrator** screen appears and provides the status and progress of the software features being uninstalled.

If you are prompted to reboot your system, you must do so in order for the uninstallation to be successful. If you are prompted to reboot your system, select a reboot option:

- **Yes, reboot my system now.**
- **No, I will reboot my system later.**

All Server Administrator features are uninstalled.

Unattended Uninstall Using the Product GUID

If you do not have the installation DVD or the MSI package available during an uninstallation, you can use the following command line to uninstall Dell OpenManage systems management software on managed systems or management stations running Windows. For these cases, you can use the package GUIDs to uninstall the product.

For managed systems, use this command:

```
msiexec.exe /x {54C04D53-C3C3-46EA-A75F-7AFF4BEB727C}
```

Performing an Unattended Uninstallation of Managed System Software

The Dell OpenManage installer features an unattended uninstallation procedure. Unattended uninstallation enables you simultaneously to uninstall managed systems software from multiple systems. The unattended uninstallation package is distributed to the remote systems using a software distribution tool from an ISV. When the package is distributed, the uninstallation script executes to uninstall the software.

Distributing the Unattended Uninstallation Package

The *Dell Systems Management Tools and Documentation* DVD is pre-configured to act as the unattended uninstallation package. To distribute the package to one or more systems, perform the following steps:

- 1** Configure your ISV distribution software to execute the `msiexec.exe /x DVD Drive\SYSMGMT\srvadmin\windows\SystemManagement\SystemMgmt.msi /qb` command, if you are using the DVD, after the unattended uninstallation package has been distributed.
- 2** Use your ISV distribution software to distribute the Typical unattended uninstallation package to the remote systems.
The program executes to uninstall managed systems software on each remote system.
- 3** Reboot each remote system to complete the uninstallation process.

Unattended Uninstall Command Line Settings

Table 7-1 shows the unattended uninstall command line settings available for unattended uninstallation. Type the optional settings on the command line after `msiexec.exe /x SysMgmt.msi` with a space between each setting.

For example, running `msiexec.exe /x SysMgmt.msi /qb` runs the unattended uninstallation, and displays the unattended installation status while it is running.

Running `msiexec.exe /x SysMgmt.msi /qn` runs the unattended uninstallation, but silently (without display windows).


Managed System Software Installation Using Third-Party Deployment Software


You can use third-party deployment software, such as Altiris Deployment Solution, to install managed systems software onto supported Dell systems. To distribute and install Server Administrator using Altiris, start your Altiris application and import **OpenManage_Jobs.bin** located at `SYSMGMT\svadmin\support\Altiris` on the *Dell Systems Management Tools and Documentation* DVD. Specify a job folder into which to import **OpenManage_Jobs.bin**. You might need to modify the **Run Script** and **Copy File** tasks to match your deployment environment. When complete, you can then schedule your job to run on the supported Dell systems that are managed from within your Altiris Deployment Solution.

Installing Dell OpenManage Software On Microsoft Windows Server 2008 Core and Microsoft Hyper-V Server

Introduction

The Server Core installation option of the Microsoft® Windows Server® 2008 and Hyper-V™ Server operating system provides a minimal environment for running specific server roles that reduces the maintenance and management requirements and the attack surface for those server roles. A Windows Server 2008 Core or Hyper-V Server installation installs only a subset of the binaries that are required by the supported server roles. For example, the Explorer shell is not installed as part of a Windows Server 2008 Core or Hyper-V Server installation. Instead, the default user interface for a Windows Server 2008 Core or Hyper-V Server installation is the command prompt.

 **NOTE:** Windows Server 2008 Core or Hyper-V Server operating system does not support a graphical user interface (GUI) based installation of Dell™ OpenManage™ software components. You need to install OpenManage software in the Command Line Interface (CLI) mode on Server Core. For more information on Server Core visit Microsoft website.

 **NOTE:** You have to be logged on as a built-in Administrator to install systems management software on Windows Server 2008 and Windows Vista®. See the Windows Server 2008 Help for information about the built-in Administrator account.

Installing Managed System and Management Station Software

This section provides instructions on installing managed system and management station software on Windows Server 2008 Core or Hyper-V Server operating system, in the CLI mode.

Running PreReqChecker In CLI Mode


Run the PreReqChecker before you install Dell OpenManage software. See "Prerequisite Checker" for more information on running Prerequisite Checker in the CLI mode.


On Windows Server 2008 Core or Hyper-V Server, as a GUI is not available, you need run the pre-requisite checker in the CLI mode.

- **Managed System Software:** Type `runprereqchecks.exe /s` in the command prompt. The file `runprereqchecks.exe` is located at `SYSMGMT\srvadmin\windows\prereqchecker` on the *Dell Systems Management Tools and Documentation DVD*.
- **Management Station Software:** Type `runprereqchecks.exe /s` in the command prompt. The file `runprereqchecks.exe` is located at `SYSMGMT\ManagementStation\windows\prereqchecker` on the *Dell Systems Management Tools and Documentation DVD*.
 - A return code of 0 indicates that there are no warning or failure conditions associated with the software components.
 - A return code of 1 indicates an informational event.
 - A return code of 2 indicates a warning condition; this will not prevent the installation of the software, but disables the Typical installation option. You can install disabled components using the Custom installation option.
 - A return code of 3 indicates a failure. One or more features are disabled and cannot be installed.



NOTE: A negative return code (-1 through -10) indicates a failure in running the prerequisite checker tool itself. Some probable causes for negative return codes include software policy restrictions, script restrictions, lack of folder permissions, and size constraints. See "Return Codes While Running the Prerequisite Check Silently," for more information on PreReqChecker return codes.

 **NOTE:** If you encounter a return value of 2 or 3, it is recommended that you inspect the `omprereq.htm` file in the windows temporary folder `%TEMP%`. To find `%TEMP%`, run the `echo %TEMP%` command.

 **NOTE:** `omprereq.htm` is an html file. Transfer this file to another computer with a browser installed to read this file.

Common causes for a return value of 2 from the prerequisite checker:

- One of your storage controllers or drivers has outdated firmware or driver. See `firmwaredriverversions_<lang>.html` (where `<lang>` stands for language) or `firmwaredriverversions.txt` found in the `%TEMP%` folder. To find `%TEMP%`, run the `echo %TEMP%` command.
- RAC component software version 4 is not selected for a default install unless the device is detected on the system. The prerequisite checker generates a warning message in this case.
- Intel[®] and Broadcom[®] agents are selected for a default install only if the corresponding devices are detected on the system. If the corresponding devices are not found, prerequisite checker generates a warning message.
- DNS or WINS server running on your system can cause a warning condition for RAC software. See the relevant section in Server Administrator readme for more information.
- Do not install managed system and management station RAC components on the same system. Install only the managed system RAC components, as it offers the required functionality.

Common causes for a return code of 3 (failure) from the prerequisite checker:

- You are not logged in with built-in Administrator privileges.
- The MSI package is corrupt or one of the required XML files are corrupt.
- Error during copying from a DVD and network access problems while copying from a network share.

- Prerequisite checker detects that another MSI package installation is currently running or that a reboot is pending:
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Installer\InProgress indicates another MSI package installation is in progress.
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\PendingFileRenameOperations indicates that a reboot is pending.
- Running the x64 edition of Windows 2008 Core, since some of the components are disabled from being installed.

Ensure that any error or warning situation is corrected before you proceed to install OpenManage software components.

Installing Management Station Software in CLI Mode

- 1 Ensure that all errors or warnings that PreReqChecker detects are corrected before you install management station components.
- 2 Launch the MSI file from the command prompt using the command `msiexec /i MgmtSt.msi`. The MSI file **MgmtSt.msi** is located at **SYSMGMT\ManagementStation\windows\ManagementStation** on the *Dell Systems Management Tools and Documentation DVD*.

To install the localized version of the management station software, type

```
msiexec /I MgmtSt.msi TRANSFORMS=
```

`<language_transform>.mst` in the command prompt. Replace `<language_transform>.mst` with the appropriate language file:

- 1031.mst (German)
- 1034.mst (Spanish)
- 1036.mst (French)
- 1041.mst (Japanese)
- 2052.mst (Simplified Chinese)



NOTE: IT Assistant is not supported on Windows Server 2008 Core and Hyper-V Server operating systems.



NOTE: See "Command Line Settings for MSI Installer," for more information on optional, command line settings for the MSI installer.

Installing Managed System Software In CLI Mode

- 1 Ensure that all errors or warnings that PreReqChecker detects are corrected before you install managed system components.
- 2 Launch the MSI file from the command prompt using the command `msiexec /i SysMgmt.msi`. The MSI file `SysMgmt.msi` is located at `SYSMGMT\sradmin\windows\SystemManagement` on the *Dell Systems Management Tools and Documentation DVD*.

To install the localized version of the managed system software, type `msiexec /I SysMgmt.msi TRANSFORMS=<language_transform>.mst` in the command prompt. Replace `<language_transform>.mst` with the appropriate language file:

- 1031.mst (German)
- 1034.mst (Spanish)
- 1036.mst (French)
- 1041.mst (Japanese)
- 2052.mst (Simplified Chinese)



NOTE: See "Command Line Settings for MSI Installer," for more information on optional, command line settings for the MSI installer.

Uninstalling Systems Management Software

- To uninstall managed system software, execute the `msiexec /x sysmgmt.msi` command in the command prompt.
- To uninstall management station software, execute the `msiexec /x mgmtst.msi` command in the command prompt.

Installing Managed System Software on Supported Linux and VMware ESX Server Operating Systems

Overview

The Dell™ OpenManage™ installer provides installation scripts and RPM packages to install and uninstall Dell OpenManage Server Administrator and other managed system software components on your managed system. Additionally, you can install Server Administrator on multiple systems through an unattended installation across a network.

The first installation method uses the custom install script `svadmin-install.sh`. This script allows unattended express installation and custom, unattended, or interactive installation. By including the `svadmin-install.sh` script in your Linux scripts you can install Server Administrator on single or multiple systems, in attended or unattended mode, and locally or across a network.

The second install method uses the Server Administrator RPM packages provided in the custom directories and the Linux `rpm` command. This allows custom interactive installation. You can write Linux scripts that install Server Administrator on a single or multiple systems through an unattended installation locally or across a network.

Using a combination of the two install methods is not recommended and may require that you manually install required Server Administrator RPM packages provided in the custom directories, using the Linux `rpm` command.

For information on supported platforms and supported operating systems, see the *Dell Systems Software Support Matrix* on the Dell Support site at support.dell.com.

Unattended and Scripted Silent Installation

You can use the *Dell Systems Management Tools and Documentation* DVD to perform an unattended and scripted silent installation of managed systems software through the command line (using RPM packages) on systems running supported Red Hat® Enterprise Linux®, SUSE® Linux Enterprise Server, and VMware® ESX operating systems.

Software License Agreement

The software license for the Red Hat Enterprise Linux and SUSE Linux Enterprise Server version of the Dell OpenManage software is located on the *Dell Systems Management Tools and Documentation* DVD. Read the `license.txt` file. By installing or copying any of the files on the Dell-provided media, you are agreeing to the terms found in this file. This file is also copied to the root of the software tree where you choose to install the Dell OpenManage software.

Dynamic Kernel Support

Server Administrator includes Dynamic Kernel Support (DKS), a feature that automatically builds a device driver for a running kernel if Server Administrator detects that none of its pre-built device drivers support that kernel.

Server Administrator provides precompiled device drivers for the kernels listed in the Server Administrator readme file found on the Dell-provided media. If the running kernel is not one of the kernels listed in the readme file, or if the running kernel is reconfigured and recompiled in such a way that none of the precompiled Server Administrator device drivers support the recompiled kernel, then Server Administrator may need to use the DKS feature to support the running kernel.

If you see the following message during Server Administrator Device Drivers startup, then Server Administrator has attempted to use its DKS feature, but was unable to use the feature because certain prerequisites were not met:

```
Building <driver> using DKS... [FAILED]
where <driver> is dcdbas or dell_rbu
```



NOTE: Server Administrator logs messages to the `/var/log/messages` log file.

To use DKS, identify which kernel is running on the managed system, and check the DKS prerequisites.

Determining the Running Kernel

- 1 Log in as `root`.
- 2 Type the following command at a console and press <Enter>:

```
uname -r
```

The system displays a message identifying the running kernel. If it is not one of those listed in the managed system software readme file, then the managed system software may need to use DKS to support it.

Dynamic Kernel Support Prerequisites

For managed system software to use DKS, the following dependencies must be met before starting Server Administrator.

- The running kernel must have loadable module support enabled.
- The source for building kernel modules for the running kernel must be available from `/lib/modules/`uname -r`/build`. On systems running SUSE Linux Enterprise Server (version 10), the `kernel-source` RPM provides the necessary kernel source. On systems running Red Hat Enterprise Linux (version 4), the `kernel-devel` RPMs provide the necessary kernel source for building kernel modules.
- The GNU make utility must be installed. The `make` RPM provides this utility.
- The GNU C compiler (`gcc`) must be installed. The `gcc` RPM provides this compiler.
- The GNU linker (`ld`) must be installed. The `binutils` RPM provides this linker.

When these prerequisites have been met, DKS will automatically build a device driver when needed during Server Administrator startup.

Using Dynamic Kernel Support After Server Administrator Installation



To enable Server Administrator to support a kernel that is not supported by a precompiled device driver and is loaded after Server Administrator has been installed, perform the following steps: Ensure that the DKS prerequisites are met on the system to be managed and boot the new kernel on the system.


Server Administrator builds a device driver for the kernel running on the system the first time that Server Administrator starts after the kernel is loaded. By default, Server Administrator starts during system startup.


Copying a Dynamically Built Device Driver to Systems Running the Same Kernel

When Server Administrator dynamically builds a device driver for the running kernel, it installs the device driver into the `/lib/modules/<kernel>/kernel/drivers/firmware` directory, where `<kernel>` is the kernel name (returned by typing `uname -r`). If you have a system running the same kernel for which a device driver was built, you can copy the newly built device driver to the `/var/omsa/dks/<kernel>` directory on the other system for use by Server Administrator. This action allows Server Administrator to use DKS on multiple systems without having to install the kernel source on every system.

An example is the following scenario: System A is running a kernel that is not supported by one of the Server Administrator precompiled device drivers. System B is running the same kernel. Perform the following steps to build a device driver on system A and copy the device driver to system B for use by Server Administrator:

- 1 Ensure that the DKS prerequisites are met on system A.
- 2 Start Server Administrator on system A.
Server Administrator builds a device driver for the kernel running on system A during startup.
- 3 Type `uname -r` on system A to determine the name of the running kernel.
- 4 Copy any `dcdbas.*` or `dell_rbu.*` files in the `/lib/modules/<kernel>/kernel/drivers/firmware` directory on system A to the `/var/omsa/dks/<kernel>` directory on system B, where `<kernel>` is the kernel name returned by typing `uname -r` in step 3.
 **NOTE:** The `/lib/modules/<kernel>/kernel/drivers/firmware` directory may contain one or more of the following files: `dcdbas.*` or `dell_rbu.*`
 **NOTE:** You might have to create the `/var/omsa/dks/<kernel>` directory on system B. For example, if the kernel name is `1.2.3-4smp`, you can create the directory by typing: `mkdir -p /var/omsa/dks/1.2.3-4smp`
- 5 Start Server Administrator on system B.
Server Administrator detects that the device driver you copied to the `/var/omsa/dks/<kernel>` directory supports the running kernel and uses that device driver.

 **NOTE:** You can also use this procedure when upgrading Server Administrator if the new version of Server Administrator does not support the running kernel with a precompiled device driver.

 **NOTE:** When you have uninstalled Server Administrator from system B, the `/var/omsa/dks/<kernel>/*.` files that you copied to system B are not removed. You must remove the files if they are no longer needed.

Forcing Dynamic Kernel Support on Red Hat Enterprise Linux Update Releases When Kernel is Tainted

Server Administrator provides precompiled device drivers for the "Gold" releases of supported Red Hat Enterprise Linux operating systems. Red Hat Enterprise Linux supports loading device drivers built for the "Gold" release, on the Update releases. This means Server Administrator does not have to ship precompiled device drivers for every Red Hat Enterprise Linux Update release and users are not forced to use DKS in order to run Server Administrator on every system that is running a Red Hat Enterprise Linux Update release. However, loading a device driver built for the "Gold" release of Red Hat Enterprise Linux (version 4) on an Update release may taint the kernel. If the kernel on a system running a Red Hat Enterprise Linux (version 4) Update release has been tainted by this device driver load process, Server Administrator's `init` script command `restart-forcekernelmatch` can be used to force DKS to be used in this situation. DKS will build device drivers that do not taint the running kernel.

Determining if the Running Kernel is Tainted

After Server Administrator services have been started, perform the following steps on Red Hat Enterprise Linux Update releases to determine if the kernel has been tainted:

- 1 Log in as `root`.
- 2 Execute the following command:

```
lsmod
```

If you see **Tainted: GF** in the first line of the output as in the following message, the running kernel is tainted:

```
Module Size Used by Tainted: GF
```

The "tainted" status may be caused by the Server Administrator device driver load process.

Forcing Dynamic Kernel Support on Red Hat Enterprise Linux Update Releases

After the installation of Server Administrator, perform the following steps to force DKS to be used on Red Hat Enterprise Linux Update releases to build device drivers for the running kernel, if needed, so that they do not taint the kernel:

- 1 Ensure that the prerequisites of DKS are met.
- 2 Execute the following command:

```
/etc/init.d/instsvcdrv restart-forcekernelmatch
```

This command will first stop the Server Administrator device drivers. It will then search for precompiled device drivers to load, by checking for precompiled device drivers built for a kernel whose name is an exact match as the name of the running kernel. If it fails to find an exact match, it will use DKS to build device drivers for the running kernel. Finally, the command will restart the Server Administrator device drivers.



NOTE: The system must be rebooted to clear the kernel "tainted" status.

OpenIPMI Device Driver

The Server Instrumentation feature of Server Administrator requires the OpenIPMI device driver that provides IPMI-based information and functionality.

All supported Linux systems contain the required version of IPMI module in the default kernel itself. You do not need to install the IPMI RPM. For more information on supported systems, see the *Dell Systems Software Support Matrix* available at Dell Support site at support.dell.com.

Degradation of Functionality When the Server Administrator Instrumentation Service is Started

After Server Administrator is installed, the Server Administrator Instrumentation Service will do a run-time check of the OpenIPMI device driver whenever it is started. The Server Administrator Instrumentation Service is started whenever you run either the `svradmin-services.sh start` or `svradmin-services.sh restart` commands, or you restart the system (during which the Server Administrator Instrumentation Service is started).

Server Administrator installation blocks the installation of Server Administrator packages if an appropriate version of the OpenIPMI device driver is not currently installed on the system. However, it is still possible, though not typical, that you can uninstall or replace a sufficient version of the OpenIPMI device driver after Server Administrator has been installed. Server Administrator cannot prevent this.

To account for a user uninstalling or replacing a sufficient version of the OpenIPMI device driver after Server Administrator has been installed, the Server Administrator Instrumentation Service checks the OpenIPMI device driver version whenever it is started. If a sufficient version of the OpenIPMI device driver is not found, the Server Administrator Instrumentation Service will degrade itself so that it does not provide any of its IPMI-based information or functionality. Primarily, this means that it will not provide any probe data (for example, fans, temperatures, and voltage probe data).

Installing Base RPMs

If you choose to install the Remote Enablement feature, you have to install certain base RPMs and configure these RPMs before installing the feature.

The base RPMs are available on the *Dell Systems Management Tools and Documentation* DVD at `srvadmin\linux\RPMS\supportRPMS`. Install the following base RPMs:

- `openwsman-server-2.1.0-26.1.i386.rpm`
- `openwsman-client-2.1.0-26.1.i386.rpm`
- `libwsman1-2.1.0-26.1.i386.rpm`
- `sblim-sfcb-1.3.2-17.1.i386.rpm`
- `sblim-sfcc-2.1.0-7.1.i386.rpm`

For example, if you are installing the base RPMs on Red Hat Enterprise Linux 5.3, then select the following files from `srvadmin\linux\RPMS\supportRPMS`:

- `sblim-sfcb-1.3.2-17.1.rhel5.i386.rpm`
- `sblim-sfcc-2.1.0-7.1.rhel5.i386.rpm`
- `libwsman1-2.1.0-26.1.rhel5.i386.rpm`
- `openwsman-client-2.1.0-26.1.rhel5.i386.rpm`
- `openwsman-server-2.1.0-26.1.rhel5.i386.rpm`

Installing Base RPMs

- 1 Check if the base RPMs are already installed. If yes, remove the installed RPMs.
- 2 Check if the `openwsmmand` and `sfcbd` binaries are already installed using `make-install`. You can check by running the commands:

```
#openwsmmand
```

or

```
#sfcbd
```

or

You can check the existence of the above binaries in the `/usr/local/sbin` directory.

- 3 If the binaries are installed, uninstall these binaries.
- 4 Check for the required dependencies for the `openwsmmand` and `sfcbd` RPMs.

The dependencies for `openwsmmand` are:

- `openssl` RPM (`lib_openssl` in the SUSE Linux Enterprise Server 11 operating system)
- `Libxml` RPM
- `Pkgconfig` (`pkg-config` in the SUSE Linux Enterprise Server 11 operating system)
- `Curl` RPM (`libcurl` in the SUSE Linux Enterprise Server 11 operating system)
- `Pam`
- `Chkconfig` (`aaa_base` in the SUSE Linux Enterprise Server operating system)
- `Initscript` (`aaa_base` in the SUSE Linux Enterprise Server operating system)
- `Sblim-sfcc` RPM

The dependencies for `sblim-sfcc` are:

- `Curl` RPM

The dependencies for `sblim-sfcb` are:


- `zlib`
- `curl` RPM
- `Pam`
- `Openssl` RPM
- `Chkconfig` (`aaa_base` in the SUSE Linux Enterprise Server operating system)
- `Initscript` (`aaa_base` in the SUSE Linux Enterprise Server operating system)

5 Install the base RPMs.

You can install all the RPMs with a single command.


```
#rpm -ivh rpm1 rpm2 rpm3 rpm4 ... rpmN
```

You can also install the RPMs individually.

 **NOTE:** If you are installing RPMs individually, follow the sequence below.

```
#rpm -ivh sblim-sfcb rpm
```

```
#rpm -ivh sblim-sfcc rpm
```

 **NOTE:** Install the `libwsman` and `openwsman` client RPMs simultaneously as they have cyclic dependency.

```
#rpm -ivh libwsman1 rpm openwsman-client rpm
```

```
#rpm -ivh openwsman-server rpm
```

Installing Managed System Software

This section explains how to install managed system software using the following installation options:

- Using the `srvadmin-install.sh` shell script for express installs or custom installs, in either interactive or unattended mode



NOTE: If you have downloaded the managed system software installer (available as a `.tar.gz` file) from the Dell Support site at support.dell.com, the `srvadmin-install.sh` shell script is present as `setup.sh` in the root directory.

- Using RPM commands for custom installs, in either interactive or unattended mode

For information on the various components of Server Administrator available in Dell OpenManage version 6.1 and to help you choose the required components to install, see "Deployment Scenarios for Server Administrator".

Prerequisites for Installing Managed System Software

- You must be logged in as `root`.
- The running kernel must have loadable module support enabled.
- The `/opt` directory must have at least 250 MB of free space, and the `/tmp`, `/etc`, and `/var` directories must each have at least 20 MB of free space. If you choose to use a non-default directory for the installation, then that directory must also have at least 250 MB of free space.
- The `ucd-snmp` or `net-snmp` package that is provided with the operating system must be installed if you use SNMP to manage your server. If you want to use supporting agents for the `ucd-snmp` or `net-snmp` agent, you must install the operating system support for the SNMP standard before you install Server Administrator. For more information about installing SNMP, see the installation instructions for the operating system you are running on your system.



NOTE: When installing an RPM package in VMware ESX, Red Hat Enterprise Linux, or SUSE Linux Enterprise Server, to avoid warnings concerning the RPM-GPG key, import the key with a command similar to the following:

```
rpm --import /mnt/dvdrom/SYSMGMT/srvadmin/  
linux/RPM-GPG-KEY
```

- Install all the prerequisite RPMs required for successful installation.

If your system had VMware ESX (version 3.5 or 4) factory-installed, Red Hat Enterprise Linux (versions 4 and 5), or SUSE Linux Enterprise Server (version 10 and 11), see the Server Administrator installation readme file (**readme_ins.txt**) on the *Dell Systems Management Tools and Documentation* DVD for information on any RPMs that you need to manually install prior to installing managed system software. Typically, you may not need to manually install any RPMs. See the readme file for more information.

If your system did not have a factory-installed Linux operating system, and you did not install a VMware ESX (version 3.5 or 4), Red Hat Enterprise Linux (versions 4 and 5), or SUSE Linux Enterprise Server (version 10 and 11) operating system using the Dell Systems Build and Update Utility, you need to manually install the prerequisite RPMs prior to installing managed system software. These RPM files are provided on the *Dell Systems Management Tools and Documentation* DVD. Navigate to **SYSMGMT/srvadmin/linux/RPMS/supportRPMS/** to locate the appropriate RPM files for your Linux operating system. Install applicable RPMs with `rpm -ivh <name_of_RPM>` before installing managed system software.

Installing Managed System Software Using Dell-Provided Media

The Dell OpenManage installer uses RPMs to install each component. The media (DVD) is divided into subdirectories to enable easy Custom Installs.



NOTE: On the Red Hat Enterprise Linux 5 operating system, DVDs are auto-mounted with the **-noexec** mount option. This option does not allow you to run any executable from the DVD. You need to manually mount the DVD and then run executables.

If you would like to review the software before you install it, follow this procedure:

- 1 Load the *Dell Systems Management Tools and Documentation* DVD into your system's DVD drive.
- 2 If necessary, use the command line to mount the DVD using a command such as:

```
mount /dev/dvdrom /mnt/dvdrom
```

3 When you have mounted the DVD, navigate to:
`cd /mnt/dvdrom/SYSMGMT/srvadmin/linux/`

4 Get a listing of the directories using the `ls` command.

The directories on the media that pertain to VMware ESX, Red Hat Enterprise Linux, and SUSE Linux Enterprise Server are the following:

- `SYSMGMT/srvadmin/linux`
- `SYSMGMT/srvadmin/linux/custom`
- `SYSMGMT/srvadmin/linux/RPMS`
- `SYSMGMT/srvadmin/linux/supportscripts`

Express Install

Use the provided shell script to perform the express installation in silent and unattended mode.



NOTE: On the Red Hat Enterprise Linux 5 operating system, DVDs are auto-mounted with the `-noexec` mount option. This option does not allow you to run any executable from the DVD. You need to manually mount the DVD and then run executables.

- 1** Log on as `root` to the system running the supported Red Hat Enterprise Linux or SUSE Linux Enterprise Server operating system where you want to install the managed system components.
- 2** Insert the *Dell Systems Management Tools and Documentation* DVD into the DVD drive.
- 3** If necessary, use the command line to mount the DVD using a command such as:
`mount /dev/dvdrom /mnt/dvdrom`
- 4** Navigate to the `SYSMGMT/srvadmin/linux/supportscripts` if you are using the DVD.

- 5 Run the `srvadmin-install.sh` shell script as shown below, which performs a silent and unattended express installation, the setup program installs following the managed system software features:

- Server Administrator Web Server
- Server Instrumentation
- Storage Management
- Remote Access Controller

```
sh srvadmin-install.sh --express
```

or

```
sh srvadmin-install.sh -x
```

Server Administrator services do not start automatically.

- 6 Start the Server Administrator services after the installation using the `srvadmin-services.sh` script by using the `sh srvadmin-services start` command.

Custom Install

Managed system software provides two custom installation paths. One is RPM-based, with pre-configured custom directories, and the other is shell script-based.

Using **Pre-configured Custom Directories** to perform the Custom installation

See Table 9-1 for details about using the RPMs to perform a custom installation using pre-configured custom directories.

Table 9-1. Custom Installation Using Pre-Configured Directories

Directory	Details
To facilitate an RPM-based custom installation, add the RPMs from the following directories:	
<code>SYSMGMT/srvadmin/linux/custom/ESX35</code>	Contains base Server Administrator with command line interface for VMware ESX (version 3.5)
<code>SYSMGMT/srvadmin/linux/custom/ESX40</code>	Contains base Server Administrator with command line interface for VMware ESX (version 4)

Table 9-1. Custom Installation Using Pre-Configured Directories (continued)

Directory	Details
<code>SYSMGMT/srvadmin/linux/custom/RHEL4</code>	Contains base Server Administrator with command line interface for Red Hat Enterprise Linux (version 4)
<code>SYSMGMT/srvadmin/linux/custom/RHEL5</code>	Contains base Server Administrator with command line interface for Red Hat Enterprise Linux (version 5)
<code>SYSMGMT/srvadmin/linux/custom/SLES10</code>	Contains base Server Administrator with command line interface for SUSE Linux Enterprise Server (version 10)
<code>SYSMGMT/srvadmin/linux/custom/SLES11</code>	Contains base Server Administrator with command line interface for SUSE Linux Enterprise Server (version 11)
For example, If you are running Red Hat Enterprise Linux (version 4), you can customize the installation by adding the RPMs from the following directories:	
<code>SYSMGMT/srvadmin/linux/custom/RHEL4/add-StorageManagement</code>	Storage Management component packages for Red Hat Enterprise Linux (version 4)
<code>SYSMGMT/srvadmin/linux/custom/RHEL4/SA-WebServer</code>	Server Administrator Web Server component packages for Red Hat Enterprise Linux (version 4)
<code>SYSMGMT/srvadmin/linux/custom/RHEL4/Server-Instrumentation</code>	Server Instrumentation packages for Red Hat Enterprise Linux (version 4)

The following is an example of custom RPMs-based installation of Server Administrator, including the installation of the Storage Management Service components.




NOTE: On the Red Hat Enterprise Linux 5 operating system, DVDs are auto-mounted with the `-noexec` mount option. This option does not allow you to run any executable from the DVD. You need to manually mount the DVD and then run executables.

- 1 Log on as `root` to the system running the supported VMware ESX, Red Hat Enterprise Linux, or SUSE Linux Enterprise Server operating system where you want to install the managed system components.
- 2 Insert the *Dell Systems Management Tools and Documentation* DVD into the DVD drive.

- 3 If necessary, mount the DVD using a command such as:
`mount /dev/dvdrrom /mnt/dvdrrom.`
- 4 Navigate to the `SYSMGMT/srvadmin/linux/custom/<os>`, where `<os>` is `ESX35` or `ESX40` or `RHEL4` or `RHEL5` or `SLES10` or `SLES11`. Enter the operating system specific directory corresponding to your system.
- 5 Type the following command.

```
rpm -ihv Server-Instrumentation/*.rpm  
add-StorageManagement/*.rpm
```

 **NOTE:** IPMI packages may already be installed on your system and hence may not require re-installation.

Server Administrator services do not start automatically.

- 6 Start the Server Administrator services after the installation by using the command:

```
sh srvadmin-services start
```

Using the Shell Script to Perform the Custom Installation

You can run the Server Administrator Custom Install script in interactive mode or in silent and unattended mode.

The basic usage of the script is:

```
srvadmin-install.sh [OPTION] . . .
```

Server Administrator Custom Installation Utility

This utility will run in interactive mode if you do not specify any options, and it will run silently if you provide one or more options.

The options are:

`[-x|--express]` installs all components (including **RAC**, if available) any other options passed will be ignored.

`[-d|--dellagent]` installs **Server Instrumentation** components.

`[-c|--cimagent]` installs **Remote Enablement** components.

`[-s|--storage]` installs **Storage Management**, including **Server Instrumentation**.

`[-r|--rac]` installs applicable **RAC** components, including **Server Instrumentation**.


`[-w|--web]` installs **Server Administrator Web Server**.

`[-u|--update]` updates applicable Server Administrator components.

`[-h|--help]` displays this help text.

Options that can be used along with the options above:

`[-p|--preserve]` preserves the screen without clearing off.

 **NOTE:** If you do not use the `[-p |--preserve]` option during the custom installation, the history information on the screen gets cleared off.

`[-a|--autostart]` starts the installed services after components have been installed.

`[--prefix PATH]` installs the selected components as specified in the **PATH**.

Using the Custom Install Script To Run in the Silent and Unattended Mode


The following is an example of a silent and unattended custom installation using the `srvadmin-install.sh` shell script:

- 1 Log on as `root` to the system running the supported Red Hat Enterprise Linux or SUSE Linux Enterprise Server operating system where you want to install the managed system components.
- 2 Insert the *Dell Systems Management Tools and Documentation* DVD into the DVD drive.
- 3 If necessary, mount the DVD using a command such as: `mount /dev/dvdrom /mnt/dvdrom`.
- 4 Navigate to `SYSMGMT/srvadmin/linux/supportscripts`.
- 5 To install the Storage Management Service components, type the following command.

```
sh srvadmin-install.sh --storage (these are long options)
```

or

```
sh srvadmin-install.sh -s (these are short options)
```

 **NOTE:** Long options can be combined with short options, and vice-versa. Server Administrator services do not start automatically.

- 6 Start Server Administrator services after the installation by using the command:

```
sh srvadmin-services start
```

Using the Shell Script to Perform the Custom Installation in Interactive Mode

This procedure uses the installation shell script to prompt you for the installation of specific components through the installation.

- 1 Log in as `root` to the system running the supported Red Hat Enterprise Linux or SUSE Linux Enterprise Server operating system where you want to install the managed system components.
- 2 Insert the *Dell Systems Management Tools and Documentation* DVD into the DVD drive.
- 3 If necessary, mount the DVD using the command:

```
mount /dev/dvdrom /mnt/dvdrom
```
- 4 Navigate to `SYSMGMT/srvadmin/linux/supportscripts` if you are using the DVD.
- 5 Execute the script with the `sh srvadmin-install.sh` command, which displays a list of component options. If any of the components are already installed, then those components are listed separately with a check mark next to them. The Server Administrator custom installation options are displayed.
- 6 Press `<c>` to copy, `<i>` to install, `<r>` to reset and start over, or `<q>` to quit.
 - If you press `<c>`, you are prompted to enter the absolute destination path.
 - If you press `<i>`, a message states that the RPMs will be installed in the `/opt/dell/srvadmin` directory. You can then press `<y>` to change, or press `<Enter>` to use the default installation path.

When the installation is completed, the script will have an option for starting the services.

- 7 Press `<n>` to exit. You can start the services manually later.

Post-Installation Configuration

This section details the steps to configure the base RPMs after you have installed the managed system software.

The post-installation configuration script is available at `srvadmin/linux/supportscripts/opensource-conf` on the *Dell Systems Management Tools and Documentation* DVD.

After installing all the base RPMs, execute the `autoconf_cim_component.sh` script.

Before executing the `autoconf_cim_component.sh` script, ensure Dell OpenManage is installed. For information on installing Dell OpenManage see, "Installing Managed System Software."

Execute the following command to configure `sfbc` and `openwsman` as per the default configurations:

```
# ./ autoconf_cim_component .sh
```

Creating Server Certificate for WSMAN

You can either create a new certificate for WSMAN or reuse an existing certificate.

Creating a New Certificate

You can create a new server certificate for WSMAN by executing the `owsmangencert.sh` script located at `/etc/openwsman`. This script is provided by the `openwsman` RPM. Follow the steps in the wizard to create the server certificate.

Reusing an Existing Certificate

If you have a self-signed or CA-signed certificate, you can use the same certificate for the `openwsman` server by updating the `ssl_cert_file` and `ssl_key_file` values, grouped under `[server]` tag, in `/etc/openwsman/openwsman.conf` with your existing certificate values.

Running `sfcb` and `openwsman`

Run `sfcb` and `openwsman`:

- `/etc/init.d/sfcb start`
- `/etc/init.d/openwsman start`

The managed system is configured and is ready to be used by the Server Administrator Web Server.

Winbind Configuration for openwsman and sfc for Red Hat Enterprise Linux Operating Systems

- 1 Take a backup of the following files:
 - /etc/pam.d/openwsman
 - /etc/pam.d/sfc
 - /etc/pam.d/system-auth
- 2 Replace the content of /etc/pam.d/openwsman and /etc/pam.d/sfc with:

```
auth required pam_stack.so service=system-auth
auth required /lib/security/pam_nologin.so
account required pam_stack.so service=system-auth
```

- 3 Replace the content of /etc/pam.d/system-auth with:

```
##PAM-1.0

# This file is auto-generated.

# User changes will be destroyed the next time
authconfig is run.

auth required /lib/security/$ISA/pam_env.so
auth sufficient /lib/security/$ISA/pam_unix.so
likeauth nullok

auth sufficient /lib/security/$ISA/pam_krb5.so
use_first_pass

auth sufficient /lib/security/$ISA/pam_winbind.so
use_first_pass

auth required /lib/security/$ISA/pam_deny.so
account required /lib/security/$ISA/pam_unix.so
broken_shadow

account sufficient
/lib/security/$ISA/pam_succeed_if.so uid 100 quiet

account [default=bad success=ok user_unknown=
ignore] /lib/security/$ISA/pam_krb5.so
```

```

account [default=bad success=ok user_unknown=
ignore] /lib/security/$ISA/pam_winbind.so
account required /lib/security/$ISA/pam_permit.so
password requisite
/lib/security/$ISA/pam_cracklib.so retry=3
password sufficient /lib/security/$ISA/pam_unix.so
nullok use_authtok md5 shadow
password sufficient /lib/security/$ISA/pam_krb5.so
use_authtok
password sufficient
/lib/security/$ISA/pam_winbind.so use_authtok
password required /lib/security/$ISA/pam_deny.so
session required /lib/security/$ISA/pam_limits.so
session required /lib/security/$ISA/pam_unix.so
session optional /lib/security/$ISA/pam_krb5.so

```

Winbind Configuration for openwsman and sfcf for SUSE Linux Enterprise Server Operating Systems

- 1 Take a backup of the following files:
 - /etc/pam.d/openwsman
 - /etc/pam.d/sfcf
 - /etc/pam.d/system-auth
 - /etc/pam.d/common-account
- 2 Replace the content of /etc/pam.d/openwsman/ and /etc/pam.d/sfcf with:

```

#%PAM-1.0
auth include common-auth
auth required /lib/security/pam_nologin.so
account include common-account

```


- 3 Replace the content of `/etc/pam.d/common-auth` with:

```
auth required pam_env.so  
  
auth sufficient pam_unix2.so debug  
  
auth sufficient pam_winbind.so use_first_pass  
debug
```
- 4 Replace the content of `/etc/pam.d/common-account` with:

```
account sufficient pam_unix2.so  
  
account sufficient pam_winbind.so
```

Workaround for the Libssl Issue

If the required library needed by `openwsman` is present on your system, the `autoconf_cim_component.sh` script tries to resolve the `libssl.so` issue. However, if the library is not present, then the script will report the same. Check if the latest version of the `libssl` library is installed on your system and then create a soft link with `libssl.so`.

For example: If you have `libssl.so.0.9.8a` and `libssl.so.0.9.8b` in `/usr/lib`, then create soft link with the latest `libssl.so.0.9.8b`:

- ```
ln -sf /usr/lib/libssl.so.0.9.8b
/usr/lib/libssl.so
```
- `ldconfig`

## Performing an Unattended Installation of the Managed System Software

You can use Dell OpenManage installer's **Express Install** and **Custom Install** options for the unattended installation procedure.

Unattended installation allows you simultaneously to install Server Administrator on multiple systems. You can perform an unattended installation by creating an unattended installation package that contains all of the necessary managed system software files.

The unattended installation package is distributed to the remote systems using a software distribution tool from an ISV. After the package is distributed, RPM installs the software.

The custom unattended installation package is located in the directory you created as detailed in the section "Using the Shell Script to Perform the Custom Installation in Interactive Mode." This directory contains all the RPMs for the managed system software components for distribution.

- 1 Configure your ISV software distribution software to execute `rpm -i *.rpm` after the unattended installation package has been distributed.
- 2 Use your ISV distribution software to distribute the unattended installation package to the remote systems. The RPM command installs Server Administrator on each remote system.

### Dependency Check

RPM has a test feature that verifies software dependencies without actually installing any software. To execute this dependency check, type `rpm -ihv *.rpm --test`. This command is valid for all the types of installation.



**NOTE:** The `rpm` command's `--test` feature does not perform any hardware verification. It will only check for RPM software dependencies.

### Creating and Distributing the Express Unattended Installation Package

The **Express Install** unattended installation option uses the `SYSMGMT/srvadmin/linux/supportscripts` and the `SYSMGMT/srvadmin/linux/RPMS` subdirectories as the unattended installation package. RPM accesses the DVD to install all required Server Administrator components on selected remote systems.

#### ***Distributing the Express-Install subdirectory as the Express Unattended Installation Package***

- 1 Distribute the `SYSMGMT/srvadmin/linux/supportscripts` and the `SYSMGMT/srvadmin/linux/RPMS` subdirectories of the *Dell Systems Management Tools and Documentation DVD*.
- 2 Configure your ISV software distribution software to execute `sh srvadmin-install.sh -x` from the `supportscripts` subdirectory. When the ISV software runs, it executes the RPMs to install Server Administrator on each remote system.

## **Creating and Distributing the Custom Unattended Installation Package**

The **Custom Install** unattended installation option creates an unattended installation package in a directory on your system's hard drive. To create an unattended installation package, use the copy capability described in the section "Using the Shell Script to Perform the Custom Installation in Interactive Mode" to create a custom directory with the RPM's you want to install. This directory will be your unattended installation directory.

### ***Distributing Unattended Installation Packages***

The custom unattended installation package is located in the directory you created in the preceding step 6 of the custom installation (see "Custom Install"). This directory contains all of the RPMs for the managed system software components to distribute.

- 1** Configure your ISV software distribution software to execute `rpm -i * .rpm` after the unattended installation package has been distributed.
- 2** Use your ISV distribution software to distribute the unattended installation package to the remote systems. The RPM command installs Server Administrator on each remote system.

## **Uninstalling Managed System Software**

You can uninstall managed system software from the Red Hat Enterprise Linux or SUSE Linux Enterprise Server command line. Additionally, you can perform an unattended uninstallation on multiple systems simultaneously.

### **Prerequisites for Uninstalling Managed System Software**

You must be logged in as `root`.

### **Uninstalling Managed System Software From the Red Hat Enterprise Linux or SUSE Linux Enterprise Server Command Line**

An uninstallation script is installed when you install Server Administrator. You can execute the script by typing `srvadmin-uninstall.sh` and then pressing <Enter>.

## Custom Uninstallation of Specific Components

Some individual components of Dell OpenManage can be uninstalled without uninstalling all of Dell OpenManage. Following are examples:

To uninstall only the Server Administrator Web Server, use this command:

```
rpm -e `rpm -qa | grep srvadmin-iws`
```

To uninstall storage, use this command:

```
rpm -e `rpm -qa | grep srvadmin-storage`
```

## Using Dell OpenManage with Citrix XenServer Dell Edition™

Dell OpenManage Server Administrator is pre-installed in Citrix® XenServer Dell Edition, hence no installation steps are required. See the *Citrix XenServer Dell Edition Solution Guide* at

<http://support.dell.com/support/edocs/software/Citrix/> for details on using Dell OpenManage with Citrix XenServer Dell Edition.

## Managed System Software Installation Using Third-Party Deployment Software

You can use third-party deployment software, such as Altiris Deployment Solution, to install managed system software onto supported Dell servers. To distribute and install managed system software using Altiris, start your Altiris application and import **OpenManage\_Jobs.bin** located at **SYSMGMT\sradmin\support\Altiris** on the *Dell Systems Management Tools and Documentation DVD*. Specify a job folder into which you want to import **OpenManage\_Jobs.bin**. You might need to modify the **Run Script** and **Copy File** tasks to match your deployment environment. Once complete, you can then schedule your job to run on the supported Dell systems that are managed from within your Altiris Deployment Solution.

# Dell OpenManage on VMware ESXi Software

VMware ESXi is factory-installed on some Dell™ systems. For a list of these systems, see the latest *Dell Systems Software Support Matrix* on the Dell Support website at [support.dell.com](http://support.dell.com). You can use Server Administrator Web Server version 6.1 to access VMware ESXi 3.5 update 4 and VMware ESXi 4.0 systems.

## Dell OpenManage on VMware ESXi 3.5 Update 4

You can use Server Administrator to manage a system with VMware® ESXi virtualization software. VMware ESXi and the instrumentation agent is factory-installed on some Dell™ systems. For a list of these systems, see the latest *Dell Systems Software Support Matrix* on the Dell Support site at [support.dell.com](http://support.dell.com).

You can install the Server Administrator Web Server on a management station and log on to a managed system pre-installed with VMware ESXi and the instrumentation agent to perform systems management tasks.

For information about the VMware ESXi virtualization software, see the VMware support site at [www.vmware.com/support](http://www.vmware.com/support).

For information on installing the Server Administrator Web Server on a management station, see "Installing Managed System Software on Microsoft Windows Operating Systems."

## Dell OpenManage on VMware ESXi 4.0 Patch Release ESXi400-200906001

Dell OpenManage Server Administrator is available as a .zip file (`oem-dell-openmanage-esxi_6.1-0000.zip`) to be installed on systems running on VMware ESXi 4.0. The `em-dell-openmanage-esxi_6.1-0000.zip` file is available for download on the Dell Support website at [support.dell.com](http://support.dell.com).

Download VMware vSphere Command Line Interface (vSphere CLI) from <http://www.vmware.com> and install on your Microsoft Windows or Linux system. Alternately, you can import VMware vSphere Management Assistant (vMA) into your ESXi 4 host.

## Using the vSphere CLI

- 1 Copy the `em-dell-openmanage-esxi_6.1-0000.zip` file to a directory on your system.
- 2 If you are using Microsoft Windows, navigate to the folder where you have installed the vSphere CLI utilities to execute the command mentioned in step 4. If you are using Linux, the command is installed when you install the vSphere CLI RPM.
- 3 Shut down all guest operating systems on the ESXi 4.0 host and put the ESXi 4.0 host in maintenance mode.
- 4 Execute the following command:  

```
vihostupdate --server <IP address of ESXi 4 host>
-i -b <path to Dell OpenManage file>
```
- 5 Enter the root username and password of the ESXi 4.0 host when prompted.  
The command output displays a successful or a failed update.
- 6 Restart the ESXi 4.0 host system.

## Using the VMware vSphere Management Assistant

The vSphere Management Assistant (vMA) allows administrators and developers to run scripts and agents to manage ESX/ESXi systems. For more information on vMA, see <http://www.vmware.com/support/developer/vima/>.

- 1 Log on to the vMA as the root user and provide the password when prompted.
- 2 Copy the `em-dell-openmanage-esxi_6.1-0000.zip` file to a directory on the vMA.
- 3 In the vMA, execute the following command:  

```
vihostupdate --server <IP address of ESXi 4 Host>
-i -b <path to Dell OpenManage file>
```

When you run the command, the following components are installed on your system:

- Server Administrator Instrumentation Service
- Remote Enablement
- Server Administrator Storage Management
- Remote Access Controller

You must install the Server Administrator Web Server separately on a management station. For information on installing the Server Administrator Web Server, see "Installing Managed System Software on Microsoft Windows Operating Systems."



**NOTE:** Ensure that you install only Server Administrator Web Server version 6.1. Server Administrator Web Server version 6.0.3 is not supported on VMware ESXi 4.0.

After installing Server Administrator, you have to enable Server Administrator Services. For information on enabling these services, see "Enabling Server Administrator Services on the Managed System."



**NOTE:** VMware ESXi 4.0 is tentatively scheduled to become available in the second half of 2009. For more information about the VMware ESXi 4.0 release, see [www.dell.com/vmware](http://www.dell.com/vmware).

## Troubleshooting

When attempting to use the `vihostupdate` command, the following error may be displayed:

```
unpacking c:\oem-dell-openmanage-esxi_6.1-0000.zip
metadata.zip.sig does not exist
signature mismatch : metadata.zip
Unable to unpack update package.
```

This error is displayed if you are using an older version of the Remote CLI. Download and install the vSphere version of the CLI.

# Enabling Server Administrator Services on the Managed System

The Server Administrator Web Server communicates with the VMware ESXi 3.5 system through the Server Administrator Common Interface Model (CIM) provider. The Server Administrator CIM provider is an OEM provider on the VMware ESXi 3.5 system. CIM OEM providers are disabled by default on VMware ESXi 3.5. You must enable the CIM OEM providers on the VMware ESXi 3.5/ESXi 4.0 system before accessing it using Server Administrator Web Server.

## Enabling CIM OEM Providers with VMware Infrastructure Client (for VMware ESXi 3.5)

To enable CIM OEM providers using the VMware Infrastructure (VI) Client, you need to have the VI Client tool installed. You can access the tool from [http://<ip\\_address>](http://<ip_address>) where *<ip\_address>* is the IP address of the VMware ESXi system.

To enable CIM OEM providers on the VMware ESXi system using VI Client:

- 1 Log in to the VMware ESXi system with the VI Client.
- 2 Select the **Configuration** tab.
- 3 Under the **Software** section on the left side, click **Advanced Settings**.
- 4 In the **Advanced Settings** dialog box, click **Miscellaneous** on the left pane.
- 5 Change the value of the **Enable OEM Provider** field to **1**.
- 6 Click **OK**.
- 7 For the change to be effective without restarting, use the **Restart Management Agents** operation in the Direct Console User Interface (DCUI) on the local console of the VMware ESXi system.
- 8 Restart your system for the change to take effect. The system can be rebooted from the **Summary** tab in the VI Client.



## Enabling CIM OEM Providers using VMware Infrastructure Remote CLI (for VMware ESXi 3.5)

To enable CIM OEM providers using the VI Remote CLI, you need to have the VI Remote CLI tool installed. You can download and install the tool from the VMware website at <http://www.vmware.com/go/remotecli/>.

To enable CIM OEM providers using the VI Remote CLI on Windows:

- 1 Open a command prompt.
- 2 Navigate to the directory where the Remote CLIs are installed. The default location is `C:\Program Files\VMware\VMware VI Remote CLI\bin`.
- 3 Execute the following command:

```
vicfg-advcfg --server <ip_address> --username
<user_name> --password <password> --set 1
Misc.CimOemProvidersEnabled
```



**NOTE:** If you do not specify a user name and password, you are prompted to specify the same.

- 4 For the change to be effective without restarting, use the **Restart Management Agents** operation in the Direct Console User Interface (DCUI) on the local console of the VMware ESXi system.
- 5 Restart the VMware ESXi system for the change to take effect.

For more information about using VI Client and VI Remote CLI, see the VMware support site at [www.vmware.com/support](http://www.vmware.com/support).

## Using vSphere Client to Enable CIM OEM Providers (for VMware ESXi 4.0)

To enable CIM OEM providers using VMware vSphere Client, you need to have the vSphere Client tool installed. You can download and install the tool from [https://<IP\\_address\\_of\\_ESXi\\_4\\_host>](https://<IP_address_of_ESXi_4_host>) where *<ip\_address>* is the IP address of the VMware ESXi 4 system.

To enable CIM OEM providers on the VMware ESXi 4 system using vSphere Client:

- 1 Log on to the VMware ESXi 4 host system using vSphere Client.
- 2 Click the **Configuration** tab.
- 3 Under the **Software** section on the left side, click **Advanced Settings**.

- 4** In the **Advanced Settings** dialog box, click **UserVars** on the left pane.
- 5** Change the value of the **CIMOEMProvidersEnabled** field to **1**.
- 6** Click **OK**.
- 7** Restart your VMware ESXi 4 host system for the change to take effect. Use the **Summary** tab in vSphere Client to restart the system.

# Installing Management Station Software

## Overview

The *Dell Systems Management Tools and Documentation* DVD provides a setup program to install, upgrade, and uninstall Dell™ OpenManage™ management station software on your system.

The management station applications include DRAC Tools, the BMC Utilities, the Microsoft Active Directory® Snap-in Utility, and Dell OpenManage IT Assistant. Except IT Assistant and the Active Directory Snap-in, all management station applications also run on Red Hat® Enterprise Linux® and SUSE® Linux Enterprise Server operating systems. See "Installing, Upgrading, and Uninstalling Management Station Software on Systems Running Supported Red Hat Enterprise Linux and SUSE Linux Enterprise Server Operating Systems" for more information.

## Installation Requirements

These are general requirements for management stations. Operating system-specific installation prerequisites are listed below as part of the installation procedures for the respective applications.

### Supported Operating Systems

For a list of the operating systems that the Systems Build and Update Utility supports, see the *Dell Systems Software Support Matrix* located at **docs** directory on the Dell-provided media or on the Dell support website at **support.dell.com**.

For more application-specific operating systems requirements, see the documentation for that application.

### System Requirements

On Windows systems, the setup program (**setup.exe**) runs the Prerequisite Checker to automatically analyze your system to determine if the system requirements have been met. (See "Prerequisite Checker.")

## Management Station Requirements

Microsoft Software Installer (MSI) version 3.1 or later is required on your system. Dell OpenManage software detects the MSI version on your system. If the version is lower than 3.1, the Prerequisite Checker prompts you to upgrade to MSI version 3.1.

When installing management station applications on systems running a Windows operating system, you must select a disk drive that has space greater than the required space. This ensures availability of additional space for the temporary installation (not reflected in the **Required Space**) required by the Windows Installer Service.

## IT Assistant Database Requirements

For information on IT Assistant database requirements, see the *Dell OpenManage IT Assistant User's Guide*.

## Enabling CIM Discovery and Security in IT Assistant

For detailed information on configuring CIM for IT Assistant, see the *Dell OpenManage IT Assistant User's Guide*.

## Installing SNMP

For information about installing SNMP on the IT Assistant management station, see the *Dell OpenManage IT Assistant User's Guide*.

# Installing, Upgrading, and Uninstalling Management Station Software on Systems Running Supported Windows Operating Systems

This section explains how to install, upgrade, and uninstall management station software on a system that is running a supported Windows operating system. If the prerequisites are met on a system, BMC Utilities and Remote Access Controller Console are installed by default.



**NOTE:** See "Installing Dell OpenManage Software On Microsoft Windows Server 2008 Core and Microsoft Hyper-V Server" for information on installing management station software on Windows Server 2008 Core operating system.



**NOTE:** If you are running any application on the *Dell Systems Management Tools and Documentation* DVD, close the application before installing the management station applications.

### Prerequisite Checker

The setup program runs the Prerequisite Checker, which examines the prerequisites for software features without launching the actual installation. The Prerequisite Checker displays a status window that provides information about your system's hardware and software that might affect the installation and operation of the software features.

The Prerequisite Checker displays three types of messages: informational, warning, and error messages.

- An informational message describes a condition, but does not prevent a feature from being installed.
- A warning message describes a condition that prevents a software feature from being installed during **Typical** installation. It is recommended that you resolve the condition causing the warning before proceeding with the installation of the software. If you decide to continue, you can select and install the software using the **Custom** installation.
- An error message describes a condition that prevents the software feature from being installed. You must resolve the condition causing the error before proceeding with the installation of that software feature. If you do not resolve the issue, the software feature will not be installed.

Execute the command `RunPreReqChecks.exe /s` if you want to run the prerequisite check in silent mode. For more information see "Prerequisite Checker."

### Installing and Upgrading the Management Station Software

This section explains how to install and upgrade management station software. The installation options are as follows:

- Use the setup program on the *Dell Systems Management Tools and Documentation* DVD to install or upgrade management station software and upgrade IT Assistant.
- Use the unattended installation method through the `msiexec.exe` Windows Installer Engine (see Table 11-1) to install management station software on multiple systems.

## Typical and Custom Installations

The management station installer provides two setup options: **Typical Setup** and **Custom Setup**.

The setup program runs the Prerequisite Checker and provides information about your system's hardware and software that might affect installation and operation of features.



**NOTE:** When installing Management Station applications on systems running Windows operating systems, additional **Custom Install** components selected during a **Typical Install** are retained upon returning to the **Typical Install** option. To remove these components, you must deselect them from the **Custom Install** dialog.

Perform the following steps for a typical installation of management station software on your system:

- 1 Launch the management station installation.
- 2 Click **Install, Modify, Repair or Remove Management Station** and click **Next**.
- 3 Select the **Typical Setup** option.

If the prerequisites are met, the DRAC Tools and BMC Utilities are installed by default. The Active Directory Snap-in Utility and IT Assistant are not selected by default and can be installed using the custom setup option. For more information about how to perform a **Typical Setup**, see the *Dell OpenManage Software Quick Installation Guide*.

## Custom Installation

The custom installation path enables you to choose specific software features to install.

This section illustrates the **Custom Setup** option using an install and upgrade of BMC Utilities as an example. You can also install other management station software using the **Custom Setup** option.



**NOTE:** You can install management station and managed system services in the same or different directories. You can select the directory for installation.

## Installing Management Station

On Microsoft Windows operating systems, perform the following steps:



**NOTE:** IT Assistant requires a default instance of a database to be installed on the system. IT Assistant cannot use a named instance of a database.



**NOTE:** Microsoft SQL Server 2005 Express requires Microsoft Data Access components 2.8 (MDAC 2.8) and .NET 2.0 Runtime to be installed. The Prerequisite Checker utility will prompt you to install MDAC 2.8 and .NET 2.0 Runtime, if they are not installed on your system.

- 1 Log on with administrator privileges to the system on which you want to install the management station software features.
- 2 Close all open applications.
- 3 Insert the *Dell Systems Management Tools and Documentation* DVD into your system's DVD drive.
- 4 Navigate to the `SYSMGMT\ManagementStation\windows` directory on the *Dell Systems Management Tools and Documentation* DVD and run the `setup.exe` file.

The **Dell OpenManage Management Station Prerequisite Status** screen appears and runs the prerequisite checks for the management station.

**Prerequisite Status** displays any relevant informational, warning, or error messages. Review the messages and, if necessary, resolve any warning and error messages before proceeding with the installation.

- 5 Click the **Install, Modify, Repair or Remove Management Station** option. The **Welcome to the Install Wizard for Dell OpenManage Management Station** screen appears.
- 6 Click **Next**.  
The **Dell Software License Agreement** appears.

- 7 Select **I accept the terms in the license agreement** and click **Next**.

The **Setup Type** dialog box appears.

- 8 Select **Custom** and click **Next**.

The **Custom Setup** dialog box appears.

To select a specific management station software application, click the drop-down arrow beside the listed feature and select to either install or not to install the application.

To accept the default directory path to install management station software, click **Next**. Otherwise, click **Change** and navigate to the directory where you want to install your management station software, and then click **Next**.

Make sure that **BMC Utilities** is selected.

- 9 Click **Next** to accept the selected software features for installation.

The **Ready to Install the Program** box appears.

- 10 Click **Install** to install the selected software features.

The **Installing Dell OpenManage Management Station** screen appears.

When the selected features are installed, the **Install Wizard Completed** dialog box appears.

- 11 Click **Finish** to leave the management station installation.



**NOTE:** You can cancel the installation process by clicking **Cancel**. The installation rolls back the changes that you made. If you click **Cancel** at a later point in the installation process, the installation may not roll back properly, leaving the system with an incomplete installation. See "System Recovery on Failed Installation" for more information.



## Upgrade

The Dell OpenManage installer provides an **Upgrade** option for upgrading IT Assistant and other management station software.

When you insert the *Dell Systems Management Tools and Documentation* DVD into your system's DVD drive, select **Dell OpenManage Management Station** from the autorun menu, and click **Install**. The Prerequisite Checker program checks your system.

To upgrade all of the management station software products that are currently installed on your system, click **Install, Modify, Repair or Remove Management Station** and select **Next**.



**NOTE:** Upgrade may require a reboot if the files to be upgraded are in use. This is a typical Windows installer behavior. It is recommended that you reboot the system when prompted.

All features appropriate for your system are pre-selected during an upgrade.

To upgrade the management station software, perform the following steps:

- 1 Insert the *Dell Systems Management Tools and Documentation* DVD into your system's DVD drive. The autorun menu appears. Select **Dell OpenManage Management Station** and click **Install**.

If the autorun program does not automatically start, navigate to the **SYSMGMT\ManagementStation\windows** directory on the DVD and double-click the **setup.exe** file.

The **Dell OpenManage Management Station Prerequisite Status** screen appears and runs the prerequisite checks for the management station.

**Prerequisite Status** displays any relevant informational, warning, or error messages. Review the messages and, if necessary, resolve any problems before proceeding with the installation.

- 2 Click the **Install, Modify, Repair or Remove Management Station** option. The **Welcome to the Install Wizard for Dell OpenManage Management Station** screen appears.

**3** Click **Next**.

The **Installing Dell OpenManage Management Station** screen appears. Messages provide the status and progress of the software features being installed or upgraded.

When the selected features are installed or upgraded, the **Install Wizard Completed** dialog box appears.

**4** Click **Finish** to leave the management station installation.

## **Modify**

If you want to add/remove management station components:

**1** Navigate to the Windows **Control Panel**.

**2** Double-click **Add/Remove Programs**.

**3** Click **Dell OpenManage Management Station** and click **Change**.

The **Welcome to the Install Wizard for Dell OpenManage Management Station** dialog box appears.

**4** Click **Next**.

The **Program Maintenance** dialog box appears.

**5** Select **Modify** and click **Next**.

The **Custom Setup** dialog box appears.

**6** Click the drop-down arrow beside the listed feature and select the desired management station software.

A selected feature has a hard drive icon next to it. A deselected feature has a red X next to it. By default, if the Prerequisite Checker finds software features with no supporting hardware or software, the checker deselects them.

**7** Click **Next** to accept the selected software features for installation.

The **Ready to Modify the Program** dialog box appears.

**8** Click **Install** to install the selected software features.

The **Installing Dell OpenManage Management Station** screen appears. Messages provide the status and progress of the software features being installed.

When the selected features are installed, the **Install Wizard Completed** dialog box appears.

**9** Click **Finish** to leave the management station installation.

## Repair

If you want to repair installed management station components that may be damaged:

- 1 Navigate to the Windows **Control Panel**.
- 2 Double-click **Add/Remove Programs**.
- 3 Click **Dell OpenManage Management Station** and click **Change**.  
The **Welcome to the Install Wizard for Dell OpenManage Management Station** dialog box appears.
- 4 Click **Next**.  
The **Program Maintenance** dialog box appears.
- 5 Select the **Repair** option and click **Next**.  
The **Ready to Repair the Program** dialog box appears.
- 6 Click **Install** to install the selected software features.  
The **Installing Dell OpenManage Management Station** screen appears and provides the status and progress of the software features being installed.  
When the selected features are installed, the **Install Wizard Completed** dialog box appears.
- 7 Click **Finish** to leave the management station installation.

## System Recovery on Failed Installation

If a software installation utility encounters a fatal error during setup, your system may become unstable. To address this problem, Dell OpenManage installers provide the ability to roll back, or return, the system to its fully-working condition prior to the failed installation.

The Windows Installer service provides Dell OpenManage installers the ability to roll back by maintaining an *undo* operation for every operation that it performs during an installation, uninstallation, or any other configuration change. If some aspect of the installation fails during an installation session, the Windows Installer service can precisely return the system to its previous stable state. This feature includes restoration of deleted or overwritten files, registry keys, and other resources. Files that are deleted or overwritten during

the course of an installation or removal are temporarily saved to a backup location, so they can be restored if necessary. After an installation finishes successfully, all temporary backup files are deleted.

An installation cannot be rolled back once it has successfully completed. A transacted installation is intended as a safety net that protects the system during a given installation session. If you want to remove an installed application, for example, you should uninstall that application.

When upgrading from Dell OpenManage software version 4.3 to version 5.x, an error will roll back the system to its previous state.



**NOTE:** Installations, uninstalls, and upgrades canceled by the administrator during installer cleanup or after the installation transaction is completed will not be rolled back.

## Performing an Unattended Installation of Management Station Software

The management station installer provides a **Typical Setup** option and a **Custom Setup** option for the unattended installation procedure.

Unattended installation allows you to install management station software simultaneously on multiple systems. You can perform an unattended installation by creating an unattended installation package that contains all of the necessary management station files. The unattended installation option also provides several features that enable you to configure, verify, and view information about unattended installations.

The unattended installation package is distributed to the remote systems using a software distribution tool from an independent software vendor (ISV).

When the package is distributed, the installation script installs the software.

### Unattended Installation Features

Unattended installation provides the following features:

- A set of optional command line settings to customize an unattended installation
- Customization parameters to designate specific software features for installation
- A prerequisite checker program that examines the dependency status of selected software features without having to perform an actual installation

## Creating and Distributing the Typical Unattended Installation Package

The **Typical Setup** unattended installation option uses the *Dell Systems Management Tools and Documentation* DVD as the unattended installation package. The `msiexec.exe /i MgmtSt.msi /qb` command accesses the DVD to accept the software license agreement and install all required management station software products on selected remote systems. The `msiexec.exe /i MgmtSt.msi /qb` command installs management station software on each remote system, based on the system's hardware and software configuration.

You can make the *Dell Systems Management Tools and Documentation* DVD image available to the remote system either by distributing the entire contents of the media, or by mapping a drive from the target system to the location of the CD image.

## Mapping a Drive to Act as the Typical Unattended Installation Package

To map a drive to act as the Typical unattended installation package, do the following:

- 1 Share an image of the *Dell Systems Management Tools and Documentation* DVD with each remote system on which you want to install the management station software.

You can accomplish this task by directly sharing the media or by copying the entire DVD to a drive and sharing the copy.

- 2 Create a script that maps a drive from the remote systems to the shared drive described in step 1. This script should execute the following command after you have mapped the drive:

```
msiexec.exe /i
MappedDrive\SYSTEMGMT\ManagementStation\windows\Man
agementStation\MgmtSt.msi /qb
```

- 3 Configure your ISV distribution software to distribute and execute the script created in step 2.
- 4 Distribute this script to the target systems by using your ISV software distribution tools.

The `msiexec.exe /i MgmtSt.msi /qb` command installs management station on each remote system.



**NOTE:** IT Assistant requires a supported database to be installed before IT Assistant can be installed.

See *DVD drive:\SYSMGMT\ManagementStation\Windows\ManagementStation\support\* to find the sample batch file and the necessary utilities.

### Distributing the Entire DVD as the Typical Unattended Installation Package

To distribute the entire DVD as the Typical unattended installation package, perform the following steps:



**NOTE:** From Dell OpenManage version 6.0.1 onwards, IT Assistant is no longer a part of Typical installation of management station. For more information on IT Assistant installation, see the *Dell OpenManage IT Assistant User's Guide*.

- 1 Distribute the entire image of the DVD to your target systems.
- 2 Configure your ISV distribution software to execute the `msiexec.exe /i DVD Drive\SYSMGMT\ManagementStation\windows\ManagementStation\MgmtSt.msi /qb` command from the *Dell Systems Management Tools and Documentation* DVD image.

The command executes from the DVD to install the management station on each remote system.

### Creating and Distributing Custom Unattended Installation Packages

To create a custom unattended installation package for distribution, copy the `SYSMGMT\ManagementStation\windows` directory on the DVD onto the system's hard drive.

Create a batch script that will execute the installation using the Windows Installer Engine (`msiexec.exe`). For example:

```
msiexec.exe /i MgmtSt.msi ADDLOCAL=ITA,RACMS,ADS /qb
```



**NOTE:** For a customized unattended installation, each required feature must be included as a command line interface (CLI) parameter for it to be installed.

Also, put the batch script in the `windows` directory on the system hard drive. See “Customization Parameters” for additional details and available feature identification.

## Distributing Custom Unattended Installation Packages



**NOTE:** The `MgmtSt.msi` installation package for management station used in the **Custom Setup** unattended installation as described in the previous section is located in the `SYSMGMT\ManagementStation\windows\ManagementStation` on the *Dell Systems Management Tools and Documentation DVD*.

- 1 Configure your ISV distribution software to execute the batch script once your installation package has been distributed.
- 2 Use your ISV distribution software to distribute the custom unattended installation package to the remote systems.

The following command executes from the script to install management station, along with specified features, on each remote system:

```
msiexec.exe /i System
Drive\SYSMGMT\ManagementStation\windows\Management
Station\MgmtSt.msi ADDLOCAL=ITA,RACMS,ADS /qb (if
you are using the DVD)
```

## Specifying Log File Locations

Run the following command to perform an unattended installation while specifying the log file location:

```
msiexec.exe /i MgmtSt.msi /l*v
"C:\openmanage\logs\MgmtSt.log"
```

## Optional Command Line Settings

Table 11-1 shows the optional command line settings available for the `msiexec.exe`. Type the optional settings on the command line after `msiexec.exe` with a space between each setting.



**NOTE:** See [support.microsoft.com](http://support.microsoft.com) for full details of all the Microsoft Windows Installer command line switches.

**Table 11-1. Command Line Settings for MSI Installer**

| <b>Setting</b>                                                 | <b>Result</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>/i</code><br><code>&lt;Package   Product Code&gt;</code> | Installs or configures a product.<br><code>/i MgmtSt.msi</code> – This command installs the management station software.                                                                                                                                                                                                                                                                                                                                                               |
| <code>/x</code><br><code>&lt;Package   Product Code&gt;</code> | Uninstalls a product.<br><code>/x MgmtSt.msi</code> – This command uninstalls the management station software.                                                                                                                                                                                                                                                                                                                                                                         |
| <code>/q[n b r f]</code>                                       | Sets the User Interface (UI) level.<br><code>/q</code> or <code>/qn</code> – no UI. This option is used for silent and unattended installation.<br><code>/qb</code> – basic UI. This option is used for unattended but not silent installation.<br><code>/qr</code> – reduced UI. This option is used for unattended installation while displaying a modal dialog box showing install progress.<br><code>/qf</code> – full UI. This option is used for standard attended installation. |



**Table 11-1. Command Line Settings for MSI Installer (continued)**

| Setting                                                           | Result                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>/f [p o e d c a u m s v] &lt;Package/ProductCode&gt;</code> | Repairs a product.<br><b>/fp</b> – This option reinstalls a product only if a file is missing.<br><b>/fo</b> – This option reinstalls a product if a file is missing or if an older version of a file is installed.<br><b>/fe</b> – This option reinstalls a product if a file is missing or an equal or older version of a file is installed.<br><b>/fd</b> – This option reinstalls a product if a file is missing or a different version of a file is installed.<br><b>/fc</b> – This option reinstalls a product if a file is missing or the stored checksum value does not match the calculated value.<br><b>/fa</b> – This option forces all files to be reinstalled.<br><b>/fu</b> – This option rewrites all required user-specific registry entries.<br><b>/fm</b> – This option rewrites all required system-specific registry entries.<br><b>/fs</b> – This option overwrites all existing shortcuts.<br><b>/fv</b> – This option runs from the source and re-caches the local package. Do not use the <b>/fv</b> reinstall option for the first installation of an application or feature. |
| <code>INSTALLDIR=&lt;path&gt;</code>                              | This command installs a product to a specific location. If you specify an installation directory with this switch, it must be created manually prior to executing the CLI install commands or they will fail with no error or message as to why they failed.<br><b>/i MgmtSt.msi INSTALLDIR=c:\OpenManage /qn</b> – This command installs a product to a specific location using <code>c:\OpenManage</code> as the install location.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

An example command with MSI is `msiexec.exe /i MgmtSt.msi /qn`. This command installs management station features on each remote system, based on the systems' hardware and software configuration, silently and without asking for prompts.

## Uninstalling Management Station Software

You can uninstall the management station software by using your operating system. Additionally, you can perform unattended uninstallations on multiple systems.

### Uninstall Management Station Software Using the Dell-provided Media

To uninstall the management station software using the DVD, perform the following steps:

- 1** Insert the DVD into your system's DVD drive.  
Navigate to the `SYSMGMT\ManagementStation\windows` directory on the DVD and double-click the `setup.exe` file.  
  
The **Dell OpenManage Management Station Prerequisite Status** screen appears and runs the prerequisite checks for the management station. **Prerequisite Status** displays any relevant informational, warning, or error messages.
- 2** Click the **Install, Modify, Repair or Remove Management Station** option.  
The **Welcome to the Install Wizard for Dell OpenManage Management Station** screen appears.
- 3** Click **Next**.  
The **Program Maintenance** dialog box appears. This dialog allows you to modify, repair, or remove the program.
- 4** Select the **Remove** option and click **Next**.  
The **Remove the Program** dialog box appears.
- 5** Click **Remove**.  
The **Uninstalling Dell OpenManage Management Station** screen appears. Messages provide the status and progress of the software features being uninstalled.  
  
When the selected features are uninstalled, the **Install Wizard Completed** dialog box appears.
- 6** Click **Finish** to exit the management station uninstallation.  
All management station features will be uninstalled.

## Uninstalling Management Station Software Features Using Add/Remove Programs

To uninstall the management station software features using Windows, perform the following steps:

- 1 Navigate to the Windows **Control Panel**.
- 2 Double-click **Add/Remove Programs**.
- 3 Click **Dell OpenManage Management Station** and click **Remove**.  
The **Add or Remove Programs** question box appears.
- 4 Click **Yes** to confirm uninstallation of management station.  
The **Uninstall Summary** screen appears. Messages provide the status and progress of the software features being uninstalled.  
All management station features will be uninstalled.

## Performing an Unattended Uninstallation of Management Station Software

The Dell OpenManage installer features a procedure for the unattended uninstallation of the management station software.

Unattended uninstallation enables you to uninstall management station software simultaneously from multiple systems. The unattended uninstallation package is distributed to the remote systems using a software distribution tool from an ISV. When the package is distributed, the uninstallation script executes to uninstall the software.

### Distributing the Unattended Uninstallation Package

The *Dell Systems Management Tools and Documentation DVD* is preconfigured to act as the unattended uninstallation package. To distribute the package to one or more systems, perform the following steps:

- 1 Configure your ISV distribution software to execute the  
`msiexec.exe /x DVD  
Drive\SYSMGMT\ManagementStation\windows\ManagementStation\MgmtSt.msi /qb` command after the unattended uninstallation package has been distributed.
- 2 Use your ISV distribution software to distribute the Typical unattended uninstallation package to the remote systems.
- 3 The command uninstalls management station software on each remote system.

## Unattended Uninstall Command Line Settings

Table 11-1 shows the unattended uninstallation command line settings available for unattended uninstallation. Type the optional settings on the command line after

`msiexec.exe /x MgmtSt.msi` with a space between each setting.

For example, running `msiexec.exe /x MgmtSt.msi /qb` runs the unattended uninstallation and displays the unattended installation status while it is running.

Running `msiexec.exe /x MgmtSt.msi /qn` runs the unattended uninstallation, but silently (without status displays).

## Unattended Uninstall Using the Product GUID

If you do not have the installation DVD or the MSI package available during an uninstallation, you can use the following command line to uninstall Dell OpenManage systems management software on management stations running Windows. For these cases, you can use the package GUIDs to uninstall the product.



**NOTE:** A Globally Unique Identifier (GUID) is 128 bits long. The product GUID uniquely identifies the application. In this case, the product GUID for Dell OpenManage Management Station is {F3A40221-64E6-4623-A03F-E9068CF311C4}.

For management stations, use this command:

```
msiexec.exe /x {F3A40221-64E6-4623-A03F-E9068CF311C4}
```

## Customization Parameters

The `ADDLOCAL`, `REINSTALL`, and `REMOVE` CLI parameters provide a way to specify the exact software features to install, reinstall, or uninstall when running silently or unattended. With the customization parameters, you can selectively install, reinstall, or uninstall software features for different systems using the same unattended installation package. For example, you can choose to install DRAC Tools, but not Remote Access Controller management station on a specific group of systems. You can also choose to uninstall one or multiple features on a specific group of systems.



**NOTE:** The software feature IDs mentioned in Table 11-2 are case-sensitive.

**Table 11-2. Feature IDs for the Management Station**

| Feature ID | Description                                        |
|------------|----------------------------------------------------|
| ADS        | Active Directory Snap-in Utility                   |
| BMU        | Baseboard Management Controller Management Utility |
| ITA        | IT Assistant                                       |
| RACMS      | DRAC Tools                                         |



**NOTE:** You have to type the `ADDLOCAL`, `REINSTALL`, and `REMOVE` CLI parameters in upper case as they are case-sensitive.

You can include the `ADDLOCAL` customization parameter on the command line, and assign the feature ID (or IDs) of the software feature that you would like to install. An example is:

```
msiexec.exe /i MgmtSt.msi ADDLOCAL=RACMS /qb
```

This command runs the installation for management station and installs only Remote Access Controller management station, in an unattended and verbose (with messages) mode.

You can include the `REINSTALL` customization parameter on the command line, and assign the feature ID (or IDs) of the software feature that you would like to reinstall. An example is

```
msiexec.exe /i MgmtSt.msi REINSTALL=RACMS /qb
```

This command runs the installation for only the management station and reinstalls Remote Access Controller management station, in an unattended and verbose mode.

The `REMOVE` customization parameter can be included on the command line and assigned the feature ID (or IDs) of the software feature that you would like to uninstall. An example is

```
msiexec.exe /i MgmtSt.msi REMOVE=RACMS /qb
```

This command runs only the installation for management station and uninstalls Remote Access Controller management station, in an unattended and verbose mode.

You can also choose to install, reinstall, and uninstall features with one execution of the `msiexec.exe` program. An example is

```
msiexec.exe /i MgmtSt.msi ADDLOCAL=ADS REINSTALL=RACMS REMOVE=BMC /qb
```

This command runs the installation for management station and simultaneously installs Active Directory Snap-in Utility, reinstalls Remote Access Controller management station, and uninstalls the Baseboard Management Controller utility. This execution will be in an unattended and verbose mode.

## Supported Management and Alerting Agents

With Dell OpenManage software, *agent* is a general term applied to the software features of systems management instrumentation. Degrees of support vary among agents. For example, IT Assistant automatically discovers, displays, receives alerts from, and can perform actions on the systems managed by Server Administrator, but IT Assistant can only receive alerts from certain storage device agents. See the *Dell OpenManage IT Assistant User's Guide* for a list of agents supported by IT Assistant.

## Upgrading IT Assistant After Migrating to Windows Server 2003

If a system with IT Assistant installed is migrated to Windows Server 2003 and then upgraded to a recent version of IT Assistant, a problem may occur due to encryption differences between Windows Server 2003 and earlier versions of Windows.

After an upgrade on a system that has been migrated to Windows Server 2003, systems configured with the CIM protocol might no longer be discovered. If this issue occurs, reset the password for the CIM user. In the IT Assistant user interface, go to **Discovery and Monitoring**, select **Ranges** and right-click **Include Ranges**. Click **New Include Range** to run the New Discovery Wizard, where you can specify the new CIM user name in the **CIM Configuration** window. See the IT Assistant online help for additional information.

## Other Known Issues for Microsoft Installations

- Directories might be left behind during an uninstall for reasons such as sharing violations or open user interface connections. It is recommended that you close all open interface sessions before you perform an uninstallation. Manually remove directories left behind in the default installation directory or the user-specified installation directory. You might also have to manually remove the registry entries under `HKEY_LOCAL_MACHINE\SOFTWARE\Dell Computer Corporation\Dell OpenManage IT Assistant`.

# Installing, Upgrading, and Uninstalling Management Station Software on Systems Running Supported Red Hat Enterprise Linux and SUSE Linux Enterprise Server Operating Systems

## Installing Management Station Software

Only the BMC and the RAC features of the management station suite of software can be used on a management station running Red Hat Enterprise Linux and SUSE Linux Enterprise Server operating systems.



**NOTE:** On the Red Hat Enterprise Linux 5 operating system, DVDs are auto-mounted with the `-noexec` mount option. This option does not allow you to run any executable from the DVD. You need to manually mount the DVD and then run executables.

To install the BMC Management Utility onto a management station, perform the following steps:

- 1 Log on as `root` to the system on which you want to install the management station features.
- 2 If necessary, mount the *Dell Systems Management Tools and Documentation* DVD to a desired location using the `mount` command or a similar command.

- 3 Navigate to the `SYSMGMT/ManagementStation/linux/bmc` directory and install the BMC software using the `rpm` commands specific to the operating system:
  - For systems running Red Hat Enterprise Linux, use `osabmcutil*-RHEL-*.rpm`, for example, `rpm -ivh osabmcutil*-RHEL-*.rpm`.
  - For systems running SUSE Linux Enterprise Server, use `osabmcutil*-SUSE-*.rpm`, for example, `rpm -ivh osabmcutil*-SUSE-*.rpm`.
  - To install the `ipmitool` BMC Management Utility, navigate to the operating system sub-directory under `SYSMGMT/ManagementStation/linux/bmc/ipmitool` corresponding to your operating system and execute the command `rpm -ivh *.rpm`. If there is a version of `ipmitool` on the system use the command `rpm -Uvh *.rpm`.

To install the DRAC Tools feature, perform the following steps:

- 1 Log on as `root` to the system on which you want to install the management station features.
- 2 If necessary, mount the DVD to a desired location using the `mount` command or a similar command.
- 3 Navigate to the `SYSMGMT/ManagementStation/linux/rac` directory and install the RAC software using the `rpm -ivh *.rpm` command.

## Upgrading Management Station Software

To upgrade the BMC Management Utility onto a management station, perform the following steps:

- 1 Log on as `root` to the system on which you want to upgrade the management station features.
- 2 If necessary, mount the *Dell Systems Management Tools and Documentation* DVD to a desired location using the `mount` command or a similar command.



- 3 Navigate to the **SYSMGMT/ManagementStation/linux/bmc** directory and upgrade the BMC software using the rpm commands specific to the operating system:
  - For systems running Red Hat Enterprise Linux, use `osabmcutil*-RHEL-*.rpm`, for example, `rpm -Uvh osabmcutil*-RHEL-*.rpm`.
  - For systems running SUSE Linux Enterprise Server, use `osabmcutil*-SUSE-*.rpm`, for example, `rpm -Uvh osabmcutil*-SUSE-*.rpm`.
  - To upgrade the ipmitool BMC Management Utility, navigate to the operating system sub-directory under **SYSMGMT/ManagementStation/linux/bmc/ipmitool** corresponding to your operating system and execute the command `rpm -Uvh *.rpm`.

To upgrade the DRAC Tools feature, perform the following steps:

- 1 Log on as `root` to the system on which you want to upgrade the management station features.
- 2 If necessary, mount the DVD to a desired location using the `mount` command or a similar command.
- 3 Navigate to the **SYSMGMT/ManagementStation/linux/rac** directory and upgrade the RAC software using the `rpm -Uvh *.rpm` command.

## Uninstalling Management Station Software

To uninstall the BMC Management Utility onto a management station, perform the following steps:

- 1 Log on as `root` to the system where you want to install the management station features.
- 2 Use the `rpm query` command to determine which version of the BMC Management Utility is installed. Use the `rpm -qa | grep osabmcutil` command.
- 3 Verify the package version to be uninstalled and uninstall the feature by using the `rpm -e `rpm -qa | grep osabmcutil`` command.

To uninstall the IPMItool, use `rpm -e `rpm -qa | grep ipmitool`` for SUSE Linux Enterprise Server operating systems or `rpm -e `rpm -qa | grep OpenIPMI-tools`` command for Red Hat Enterprise Linux operating systems.

To uninstall the DRAC Tools feature, perform the following steps:

- 1** Log on as `root` to the system where you want to install the management station features.
- 2** Use the `rpm` query command to determine which version of the DRAC Tools is installed. Use the `rpm -qa | grep mgmtst-racadm` command.
- 3** Verify the package version to be uninstalled and uninstall the feature by using the `rpm -e `rpm -qa | grep mgmtst-racadm`` command.

# Using Microsoft Active Directory

## Controlling Access to Your Network

If you use Active Directory® service software, you can configure it to control access to your network. Dell has modified the Active Directory database to support remote management authentication and authorization. Dell™ OpenManage™ IT Assistant and Dell OpenManage Server Administrator, as well as Integrated Dell Remote Access Controllers (iDRAC), Dell Remote Access Controllers (DRAC), can now interface with Active Directory. With this tool, you can add and control users and privileges from one central database.

Only iDRAC6 is supported on xx1x systems. For information on using iDRAC with Microsoft Active directory, see the *Integrated Dell Remote Access Controller User's Guide*.

For information on using DRAC with Microsoft Active directory, see the *Dell Remote Access Controller 4 User's Guide* and *Dell Remote Access Controller 5 User's Guide*.



**NOTE:** Using Active Directory to recognize iDRAC, DRAC, IT Assistant, or Server Administrator users is supported on the Microsoft® Windows Server® 2003 and Windows Server 2008 operating systems.

## Active Directory Schema Extensions

The Active Directory data exists in a distributed database of **Attributes** and **Classes**. An example of a Active Directory **Class** is the **User** class. Some example **Attributes** of the user class might be the user's first name, last name, phone number, and so on. Every **Attribute** or **Class** that is added to an existing Active Directory schema must be defined with a unique ID. To maintain unique IDs throughout the industry, Microsoft maintains a database of Active Directory Object Identifiers (OIDs).

The Active Directory schema defines the rules for what data can be included in the database. To extend the schema in Active Directory, Dell received unique OIDs, unique name extensions, and unique linked attribute IDs for the new attributes and classes in the directory service.

Dell extension is: dell

Dell base OID is: 1.2.840.113556.1.8000.1280

Dell LinkID range is:12070 to 12079

The Active Directory OID database maintained by Microsoft can be viewed at [msdn.microsoft.com/certification/ADAcctInfo.asp](https://msdn.microsoft.com/certification/ADAcctInfo.asp) by entering our extension, *dell*.

### **Overview of the Active Directory Schema Extensions**

Dell created Classes, or groups of objects, that can be configured by the user to meet their unique needs. New Classes in the schema include an Association, a Product, and a Privilege class. An Association object links the users or groups to a given set of privileges and to systems (Product Objects) in your network. This model gives an administrator control over the different combinations of users, privileges, and systems or RAC devices on the network, without adding complexity.

### **Active Directory Object Overview**

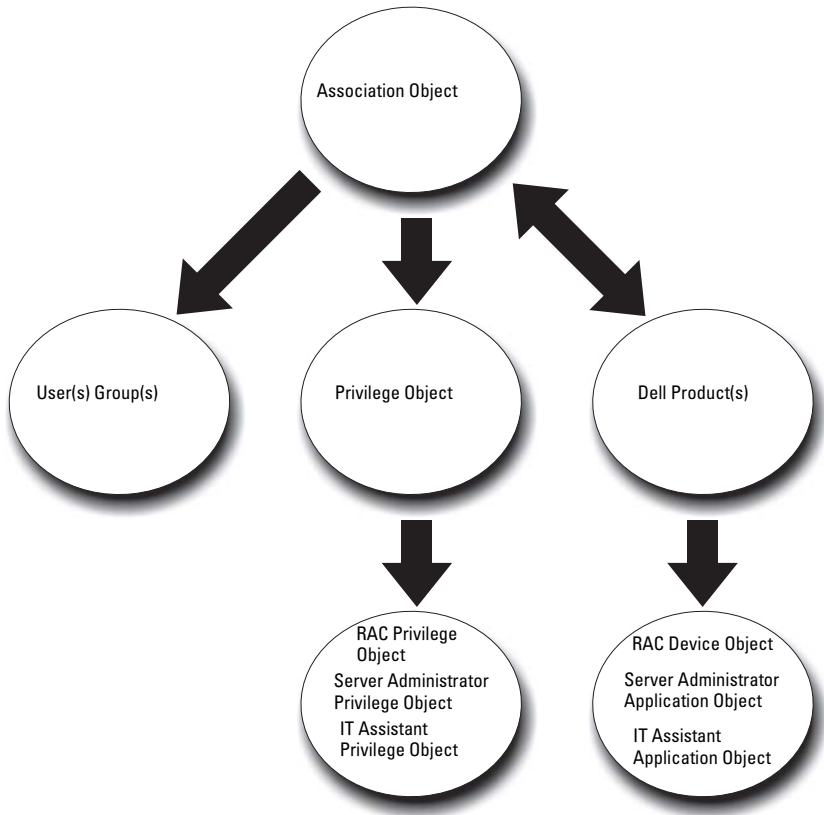
For each of the systems that you want to integrate with Active Directory for authentication and authorization, there must be at least one Association Object and one Product Object. The Product Object represents the system. The Association Object links it with users and privileges. You can create as many Association Objects as you need.

Each Association Object can be linked to as many users, groups of users, and Product Objects as desired. The users and Product Objects can be from any domain. However, each Association Object may only link to one Privilege Object. This behavior allows an Administrator to control which users have which rights on specific systems.

The Product Object links the system to Active Directory for authentication and authorization queries. When a system is added to the network, the Administrator must configure the system and its product object with its Active Directory name so that users can perform authentication and authorization with Active Directory. The Administrator must also add the system to at least one Association Object in order for users to authenticate.

Figure 12-1 illustrates that the Association Object provides the connection that is needed for all of the authentication and authorization.

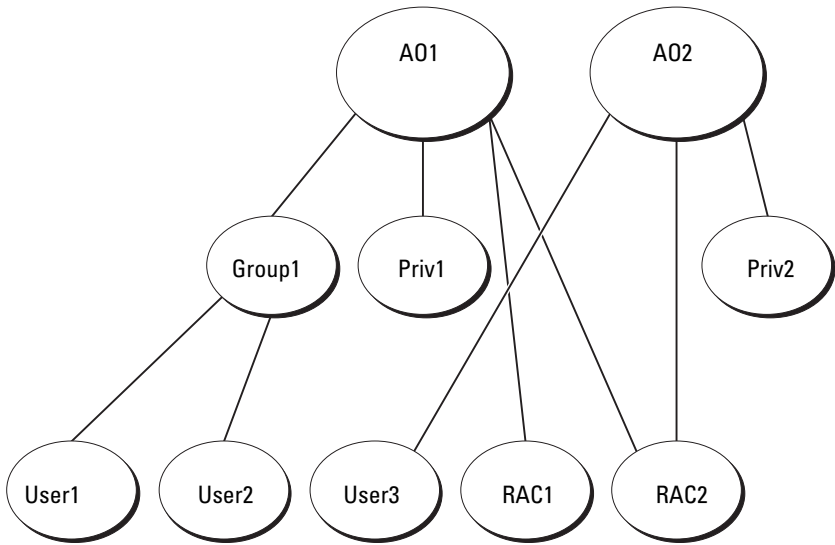
**Figure 12-1. Typical Setup for Active Directory Objects**



In addition, you can set up Active Directory objects in a single domain or in multiple domains. Setting up objects in a single domain does not vary, whether you are setting up RAC, Server Administrator, or IT Assistant objects. When multiple domains are involved, however, there are some differences.

For example, you have two DRAC 4 cards (RAC1 and RAC2) and three existing Active Directory users (user1, user2, and user3). You want to give user1 and user2 an Administrator privilege on both DRAC 4 cards and give user3 a Login privilege on the RAC2 card. Figure 12-2 shows how you set up the Active Directory objects in this scenario.

**Figure 12-2. Setting Up Active Directory Objects in a Single Domain**



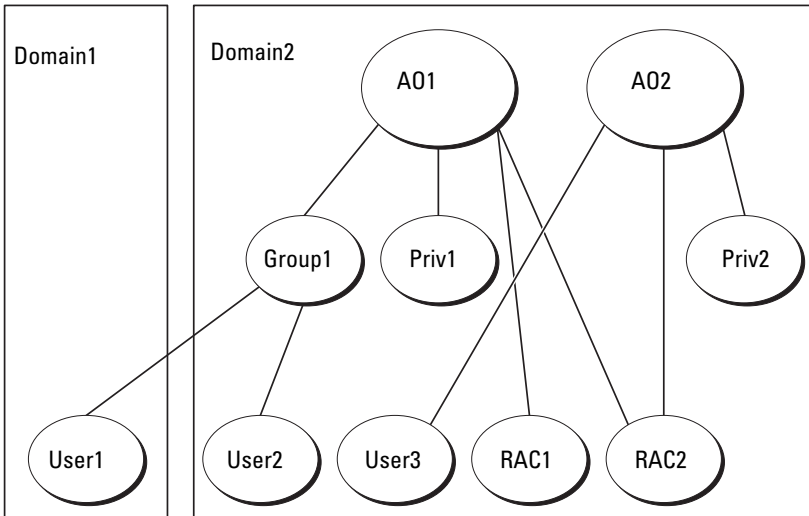
To set up the objects for the single domain scenario, perform the following tasks:

- 1 Create two Association Objects.
- 2 Create two RAC Product Objects, RAC1 and RAC2, to represent the two DRAC 4 cards.
- 3 Create two Privilege Objects, Priv1 and Priv2, in which Priv1 has all privileges (Administrator) and Priv2 has Login privileges.
- 4 Group User1 and User2 into Group1.
- 5 Add Group1 as Members in Association Object 1 (AO1), Priv1 as Privilege Objects in AO1, and both RAC1 and RAC2 as RAC Products in AO1.
- 6 Add User3 as Members in Association Object 2 (AO2), Priv2 as Privilege Objects in AO2, and RAC2 as RAC Products in AO2.

See "Adding Users and Privileges to Active Directory" for detailed instructions.

Figure 12-3 shows how to setup the Active Directory objects in multiple domains for RAC. In this scenario, you have two DRAC 4 cards (RAC1 and RAC2) and three existing Active Directory users (User1, User2, and User3). User1 is in Domain1, but User2 and User3 are in Domain2. You want to give User1 and User2 Administrator privileges on both the RAC1 and the RAC2 card and give User3 a Login privilege on the RAC2 card.

**Figure 12-3. Setting Up RAC Active Directory Objects in Multiple Domains**



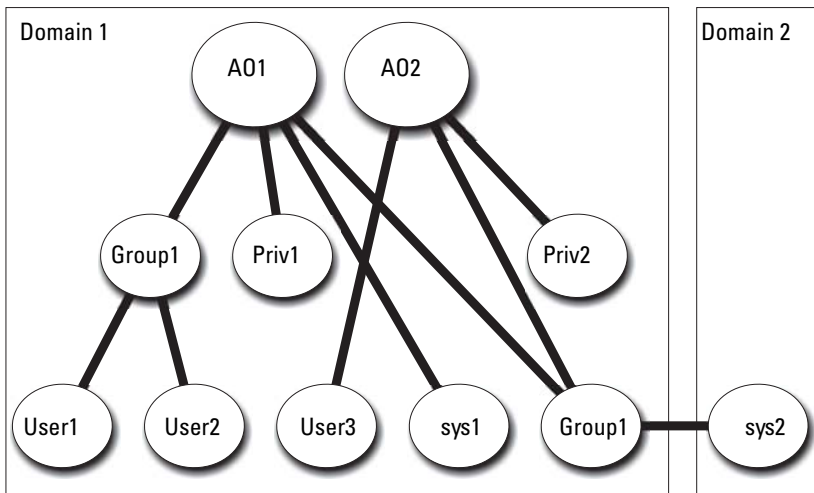
To set up the objects for this multiple domain scenario, perform the following tasks:

- 1 Ensure that the domain forest function is in Native or Windows 2003 mode.
- 2 Create two Association Objects, A01 (of Universal scope) and A02, in any domain. The figure shows the objects in Domain2.
- 3 Create two RAC Device Objects, RAC1 and RAC2, to represent the two remote systems.
- 4 Create two Privilege Objects, Priv1 and Priv2, in which Priv1 has all privileges (Administrator) and Priv2 has Login privileges.

- 5 Group User1 and User2 into Group1. The group scope of Group1 must be Universal.
- 6 Add Group1 as Members in Association Object 1 (AO1), Priv1 as Privilege Objects in AO1, and both RAC1 and RAC2 as Products in AO1.
- 7 Add User3 as Members in Association Object 2 (AO2), Priv2 as Privilege Objects in AO2, and RAC2 as a Product in AO2.

For Server Administrator or IT Assistant, on the other hand, the users in a single Association can be in separate domains without needing to be added to a universal group. The following is a very similar example to show how Server Administrator or IT Assistant *systems* in separate domains affect the setup of directory objects. Instead of RAC devices, you'll have two systems running Server Administrator (Server Administrator Products sys1 and sys2). Sys1 and sys2 are in different domains. You can use any existing Users or Groups that you have in Active Directory. Figure 12-4 shows how to set up the Server Administrator Active Directory objects for this example.

**Figure 12-4. Setting Up Server Administrator Active Directory Objects in Multiple Domains**





To set up the objects for this multiple domain scenario, perform the following tasks:

- 1 Ensure that the domain forest function is in Native or Windows 2003 mode.
- 2 Create two Association Objects, AO1 and AO2, in any domain. The figure shows the objects in Domain1.
- 3 Create two Server Administrator Products, sys1 and sys2, to represent the two systems. Sys1 is in Domain1 and sys2 is in Domain2.
- 4 Create two Privilege Objects, Priv1 and Priv2, in which Priv1 has all privileges (Administrator) and Priv2 has Login privileges.
- 5 Group sys2 into Group1. The group scope of Group1 must be universal.
- 6 Add User1 and User2 as Members in Association Object 1 (AO1), Priv1 as Privilege Objects in AO1, and both sys1 and Group1 as Products in AO1.
- 7 Add User3 as a Member in Association Object 2 (AO2), Priv2 as a Privilege object in AO2, and Group1 as a Product in AO2.

Note that neither of the Association objects needs to be of Universal scope in this case.

### **Configuring Active Directory to Access Your Systems**

Before you can use Active Directory to access your systems, you must configure both the Active Directory software and the systems.

- 1 Extend the Active Directory schema (see "Extending the Active Directory Schema.")
- 2 Extend the Active Directory Users and Computers Snap-in (see "Installing the Dell Extension to the Active Directory Users and Computers Snap-In.")
- 3 Add system users and their privileges to Active Directory (see "Adding Users and Privileges to Active Directory.")
- 4 For RAC systems only, enable SSL on each of your domain controllers.
- 5 Configure the system's Active Directory properties using either the Web-based interface or the CLI (see "Configuring Your Systems or Devices.")

## Configuring the Active Directory Product Name

To configure the Active Directory product name:

- 1 Locate the **omsaoem.ini** file in your installation directory.
- 2 Edit the file to add the line `adproductname=text`, where `text` is the name of the product object that you created in Active Directory. For example, the **omsaoem.ini** file contains the following syntax if the Active Directory product name is configured to `omsaApp`.

```
productname=Server Administrator

startmenu=Dell OpenManage Applications

autdbid=omsa

accessmask=3


adsupport=true

adproductname=omsaApp
```


- 3 Restart the **DSM SA Connection Service** after saving the **omsaoem.ini** file.

## Extending the Active Directory Schema

RAC, Server Administrator, and IT Assistant schema extensions are available. You only need to extend the schema for software or hardware that you are using. Each extension must be applied individually to receive the benefit of its software-specific settings. Extending your Active Directory schema will add schema classes and attributes, example privileges and association objects, and a Dell organizational unit to the schema.

 **NOTE:** Before you extend the schema, you must have **Schema Admin** privileges on the Schema Master Flexible Single Master Operation (FSMO) Role Owner of the domain forest.

You can extend your schema using two different methods. You can use the Dell Schema Extender utility, or you can use the Lightweight Directory Interchange Format (LDIF) script file.

 **NOTE:** The Dell organizational unit will not be added if you use the LDIF script file.

The LDIF script files and the Dell Schema Extender are located in the following directories on your *Dell Systems Management Tools and Documentation* DVD:

- <DVD drive>:\SYSMGMT\ManagementStation\support\OMActiveDirectory\_Tools\  
<installation type>\LDIF Files
- <DVD drive>:\SYSMGMT\ManagementStation\support\OMActiveDirectory\_Tools\  
<installation type>\Schema Extender

Table 12-1 list the folder names and <installation type>.

**Table 12-1. Folder Names and Installation Types**

| Folder Name                | Installation Type                                    |
|----------------------------|------------------------------------------------------|
| ITA7                       | IT Assistant version 7.0 or later                    |
| OMSA                       | Dell OpenManage Server Administrator                 |
| Remote_Management          | RAC 4, RAC 5, CMC, and iDRAC on xx0x modular systems |
| Remote_Management_Advanced | iDRAC on xx1x systems                                |

**NOTE:** Only iDRAC6 is supported on xx1x systems.

To use the LDIF files, see the instructions in the readme that is in the LDIF files directory. To use the Dell Schema Extender to extend the Active Directory Schema, perform the steps in "Using the Dell Schema Extender."

You can copy and run the Schema Extender or LDIF files from any location.

## Using the Dell Schema Extender

 **CAUTION: The Dell Schema Extender uses the SchemaExtenderOem.ini file. To ensure that the Dell Schema Extender utility functions properly, do not modify the name or the contents of this file.**

- 1 Click **Next** on the **Welcome** screen.
- 2 Read the warning and click **Next** again.
- 3 Either select **Use Current Log In Credentials** or enter a user name and password with schema administrator rights.
- 4 Click **Next** to run the Dell Schema Extender.
- 5 Click **Finish**.

To verify the schema extension, use the Active Directory Schema Snap-in in the Microsoft Management Console (MMC) to verify the existence of the following classes (listed in Table 12-2, Table 12-5, Table 12-7, Table 12-8, Table 12-9, and Table 12-10) and attributes (listed in Table 12-11 and Table 12-12). See your Microsoft documentation for more information on how to enable and use the Active Directory Schema Snap-in in the MMC.

For more information on class definitions for DRAC, see the *Dell Remote Access Controller 4 User's Guide* and *Dell Remote Access Controller 5 User's Guide*.

For more information on class definitions for iDRAC, see the *Integrated Dell Remote Access Controller User's Guide*.

**Table 12-2. Class Definitions for Classes Added to the Active Directory Schema**

| Class Name            | Assigned Object Identification Number (OID) | Class Type       |
|-----------------------|---------------------------------------------|------------------|
| dellAssociationObject | 1.2.840.113556.1.8000.1280.1.1.1.2          | Structural Class |
| dellPrivileges        | 1.2.840.113556.1.8000.1280.1.1.1.4          | Structural Class |
| dellProduct           | 1.2.840.113556.1.8000.1280.1.1.1.5          | Structural Class |
| dellOmsa2AuxClass     | 1.2.840.113556.1.8000.1280.1.2.1.1          | Auxiliary Class  |
| dellOmsaApplication   | 1.2.840.113556.1.8000.1280.1.2.1.2          | Structural Class |
| dellIta7AuxClass      | 1.2.840.113556.1.8000.1280.1.3.1.1          | Auxiliary Class  |
| dellItaApplication    | 1.2.840.113556.1.8000.1280.1.3.1.2          | Structural Class |

**Table 12-3. dellAssociationObject Class**

|              |                                                                                                                                                  |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| OID          | 1.2.840.113556.1.8000.1280.1.1.1.2                                                                                                               |
| Description  | This class represents the Dell Association Object. The Association Object provides the connection between the users and the devices or products. |
| Class Type   | Structural Class                                                                                                                                 |
| SuperClasses | Group                                                                                                                                            |
| Attributes   | dellProductMembers<br>dellPrivilegeMember                                                                                                        |

**Table 12-4. dellPrivileges Class**

|              |                                                                                         |
|--------------|-----------------------------------------------------------------------------------------|
| OID          | 1.2.840.113556.1.8000.1280.1.1.1.4                                                      |
| Description  | This class is used as a container Class for the Dell Privileges (Authorization Rights). |
| Class Type   | Structural Class                                                                        |
| SuperClasses | User                                                                                    |
| Attributes   | dellRAC4Privileges<br>dellRAC3Privileges<br>dellOmsaAuxClass<br>dellItaAuxClass         |

**Table 12-5. dellProduct Class**

|              |                                                                  |
|--------------|------------------------------------------------------------------|
| OID          | 1.2.840.113556.1.8000.1280.1.1.1.5                               |
| Description  | This is the main class from which all Dell products are derived. |
| Class Type   | Structural Class                                                 |
| SuperClasses | Computer                                                         |
| Attributes   | dellAssociationMembers                                           |

**Table 12-6. dellOmsa2AuxClass Class**

|              |                                                                                              |
|--------------|----------------------------------------------------------------------------------------------|
| OID          | 1.2.840.113556.1.8000.1280.1.2.1.1                                                           |
| Description  | This class is used to define the privileges (Authorization Rights) for Server Administrator. |
| Class Type   | Auxiliary Class                                                                              |
| SuperClasses | None                                                                                         |
| Attributes   | dellOmsaIsReadOnlyUser<br>dellOmsaIsReadWriteUser<br>dellOmsaIsAdminUser                     |

**Table 12-7. dellOmsaApplication Class**

|              |                                                                                                                                                                                                                                                           |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OID          | 1.2.840.113556.1.8000.1280.1.2.1.2                                                                                                                                                                                                                        |
| Description  | This class represents the Server Administrator application. Server Administrator must be configured as dellOmsaApplication in Active Directory. This configuration enables the Server Administrator application to send LDAP queries to Active Directory. |
| Class Type   | Structural Class                                                                                                                                                                                                                                          |
| SuperClasses | dellProduct                                                                                                                                                                                                                                               |
| Attributes   | dellAssociationMembers                                                                                                                                                                                                                                    |

**Table 12-8. dellIta7AuxClass Class**

|              |                                                                                      |
|--------------|--------------------------------------------------------------------------------------|
| OID          | 1.2.840.113556.1.8000.1280.1.3.1.1                                                   |
| Description  | This class is used to define the privileges (Authorization Rights) for IT Assistant. |
| Class Type   | Auxiliary Class                                                                      |
| SuperClasses | None                                                                                 |
| Attributes   | dellItaIsReadOnlyUser<br>dellItaIsReadWriteUser<br>dellItaIsAdminUser                |

**Table 12-9. dellItaApplication Class**

|              |                                                                                                                                                                                                                  |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OID          | 1.2.840.113556.1.8000.1280.1.3.1.2                                                                                                                                                                               |
| Description  | This class represents the IT Assistant application. IT Assistant must be configured as dellItaApplication in Active Directory. This configuration enables IT Assistant to send LDAP queries to Active Directory. |
| Class Type   | Structural Class                                                                                                                                                                                                 |
| SuperClasses | dellProduct                                                                                                                                                                                                      |
| Attributes   | dellAssociationMembers                                                                                                                                                                                           |

**Table 12-10. General Attributes Added to the Active Directory Schema**

| <b>Attribute Name/Description</b>                                                                                                                                                                    | <b>Assigned OID/Syntax Object Identifier</b>                                                             | <b>Single Valued</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------|
| <b>dellPrivilegeMember</b><br>List of dellPrivilege Objects that belong to this Attribute.                                                                                                           | 1.2.840.113556.1.8000.1280.1.1.2.1<br>Distinguished Name (LDAPTYPE_DN<br>1.3.6.1.4.1.1466.115.121.1.12)  | FALSE                |
| <b>dellProductMembers</b><br>List of dellRacDevices Objects that belong to this role. This attribute is the forward link to the dellAssociationMembers backward link.<br>Link ID: 12070              | 1.2.840.113556.1.8000.1280.1.1.2.2<br>Distinguished Name (LDAPTYPE_DN<br>1.3.6.1.4.1.1466.115.121.1.12)  | FALSE                |
| <b>dellAssociationMembers</b><br>List of dellAssociationObjectMembers that belong to this Product. This attribute is the backward link to the dellProductMembers Linked attribute.<br>Link ID: 12071 | 1.2.840.113556.1.8000.1280.1.1.2.14<br>Distinguished Name (LDAPTYPE_DN<br>1.3.6.1.4.1.1466.115.121.1.12) | FALSE                |

**Table 12-11. Server Administrator-Specific Attributes Added to the Active Directory Schema**

| <b>Attribute Name/Description</b>                                                                | <b>Assigned OID/Syntax Object Identifier</b>                                                     | <b>Single Valued</b> |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------|
| <b>dellOMSAIsReadOnlyUser</b><br>TRUE if the User has Read-Only rights in Server Administrator   | 1.2.840.113556.1.8000.1280.1.2.2.1<br>Boolean (LDAPTYPE_BOOLEAN<br>1.3.6.1.4.1.1466.115.121.1.7) | TRUE                 |
| <b>dellOMSAIsReadWriteUser</b><br>TRUE if the User has Read-Write rights in Server Administrator | 1.2.840.113556.1.8000.1280.1.2.2.2<br>Boolean (LDAPTYPE_BOOLEAN<br>1.3.6.1.4.1.1466.115.121.1.7) | TRUE                 |
| <b>dellOMSAIsAdminUser</b><br>TRUE if the User has Administrator rights in Server Administrator  | 1.2.840.113556.1.8000.1280.1.2.2.3<br>Boolean (LDAPTYPE_BOOLEAN<br>1.3.6.1.4.1.1466.115.121.1.7) | TRUE                 |

**Table 12-12. IT Assistant-Specific Attributes Added to the Active Directory Schema**

| <b>Attribute Name/Description</b>                                                       | <b>Assigned OID/Syntax Object Identifier</b>                                                     | <b>Single Valued</b> |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------|
| <b>dellItaIsReadWriteUser</b><br>TRUE if the User has Read-Write rights in IT Assistant | 1.2.840.113556.1.8000.1280.1.3.2.1<br>Boolean (LDAPTYPE_BOOLEAN<br>1.3.6.1.4.1.1466.115.121.1.7) | TRUE                 |
| <b>dellItaIsAdminUser</b><br>TRUE if the User has Administrator rights in IT Assistant  | 1.2.840.113556.1.8000.1280.1.3.2.2<br>Boolean (LDAPTYPE_BOOLEAN<br>1.3.6.1.4.1.1466.115.121.1.7) | TRUE                 |
| <b>dellItaIsReadOnlyUser</b><br>TRUE if the User has Read-Only rights in IT Assistant   | 1.2.840.113556.1.8000.1280.1.3.2.3<br>Boolean (LDAPTYPE_BOOLEAN<br>1.3.6.1.4.1.1466.115.121.1.7) | TRUE                 |

## Active Directory Users and Computers Snap-In


### Installing the Dell Extension to the Active Directory Users and Computers Snap-In


When you extend the schema in Active Directory, you must also extend the Active Directory Users and Computers snap-in so that the administrator can manage Products, Users and User Groups, Associations, and Privileges. You only need to extend the snap-in once, even if you have added more than one schema extension. You must install the snap-in on each system that you intend to use for managing these objects.

When you install your systems management software using the *Dell Systems Management Tools and Documentation* DVD, you can install the Snap-in by selecting the **Active Directory Snap-in** option during the installation procedure. See the *Dell OpenManage Software Quick Installation Guide* for additional instructions about installing systems management software.


For 64-bit Windows Operating Systems, the Snap-in installer is located under <DVD drive>:\SYSMGMT\ManagementStation\support\OMActiveDirectory\_SnapIn64.



 **NOTE:** You must install the Administrator Pack on each management station that is managing the new Active Directory objects. The installation is described in the following section, "Opening the Active Directory Users and Computers Snap-In." If you do not install the Administrator Pack, then you cannot view the new object in the container.

 **NOTE:** For more information about the Active Directory Users and Computers snap-in, see your Microsoft documentation.

### **Opening the Active Directory Users and Computers Snap-In**

 **NOTE:** On Windows 2000 Server, you can extend the schema but will not be able to install the Dell extension to the snap-in.

In order to manage the extended schema on the domain controllers running Windows 2000, perform the following steps:

#### ***Connecting to a Windows 2000 Server Domain Controller from Another Domain Controller***

- 1 Click **Start**→**Admin Tools**→**Active Directory Users and Computers**.
- 2 In the left-hand pane, right click **Active Directory Users and Computers**.
- 3 Click **Connect to Domain Controller** to connect to another domain controller.
- 4 Enter the name of the Windows 2000 domain controller.

#### ***Connecting to a Windows 2000 Server Domain controller from a Local System***

- 1 You must have the appropriate Microsoft administrator pack installed on your local system.
- 2 To install this administrator pack, click **Start**→**Run**, type MMC and press <Enter>.  
The Microsoft Management Console (MMC) window is displayed.
- 3 Click **File**.
- 4 Click **Add/Remove Snap-in**.
- 5 Click **Add**.
- 6 Select the **Active Directory Users and Computers Snap-in** and click **Add**.
- 7 Click **Close** and click **OK**.

This will connect to the current domain controller. If this is not the Windows 2000 domain controller, then continue with the steps mentioned under "Connecting to a Windows 2000 Server Domain Controller from Another Domain Controller."

***To open the Active Directory Users and Computers snap-in, perform the following steps:***

- 1 If you are on the domain controller, click **Start**→**Admin Tools**→**Active Directory Users and Computers**. If you are not on the domain controller, you must have the appropriate Microsoft administrator pack installed on your local system. To install this administrator pack, click **Start**→**Run**, type **MMC** and press **Enter**.

The Microsoft Management Console (MMC) window appears.

- 2 Click **File** in the **Console 1** window.
- 3 Click **Add/Remove Snap-in**.
- 4 Click **Add**.
- 5 Select the **Active Directory Users and Computers** snap-in and click **Add**.
- 6 Click **Close** and click **OK**.

## **Adding Users and Privileges to Active Directory**

The Dell-extended Active Directory Users and Computers snap-in allows you to add DRAC, Server Administrator, and IT Assistant users and privileges by creating RAC, Association, and Privilege objects. To add an object, perform the steps in the applicable subsection.

### **Creating a Product Object**



**NOTE:** Server Administrator and IT Assistant users must use Universal-type Product Groups to span domains with their product objects.



**NOTE:** When adding Universal-type Product Groups from separate domains, you have to create an Association object with Universal scope. The default Association objects created by the Dell Schema Extender utility are domain Local Groups and will not work with Universal-type Product Groups from other domains.

In the **Console Root** (MMC) window, right-click a container.

- 1 Select **New**.
- 2 Select a RAC, Server Administrator, or IT Assistant object, depending on which you have installed.

The **New Object** window appears.

- 3 Type in a name for the new object. This name must match the **Active Directory product name** as discussed in "Configuring Active Directory Using CLI on Systems Running Server Administrator," or for a RAC device, the name that you will type in step 4 of "Configuring Your Systems or Devices," or for IT Assistant, the name discussed in "Configuring Active Directory on Systems Running IT Assistant."
- 4 Select the appropriate **Product Object**.
- 5 Click **OK**.

### **Creating a Privilege Object**

Privilege Objects must be created in the same domain as the Association Object to which they are associated.

- 1 In the **Console Root** (MMC) window, right-click a container.
- 2 Select **New**.
- 3 Select a RAC, Server Administrator, or IT Assistant object, depending on which you have installed.

The **New Object** window appears.

- 4 Type in a name for the new object.
- 5 Select the appropriate **Privilege Object**.
- 6 Click **OK**.
- 7 Right-click the privilege object that you created and select **Properties**.
- 8 Click the appropriate **Privileges** tab and select the privileges that you want the user to have (for more information, see Table 12-2 and Table 12-8).

### **Creating an Association Object**

The Association Object is derived from a Group and must contain a group Type. The Association Scope specifies the Security Group Type for the Association Object. When you create an Association Object, you must choose

the Association Scope that applies to the type of objects you intend to add. Selecting **Universal**, for example, means that Association Objects are only available when the Active Directory Domain is functioning in Native Mode or above.

- 1 In the **Console Root** (MMC) window, right-click a container.
- 2 Select **New**.
- 3 Select a RAC, Server Administrator, or IT Assistant object, depending on which you have installed.

The **New Object** window appears.

- 4 Type in a name for the new object.
- 5 Select **Association Object**.
- 6 Select the scope for the **Association Object**.
- 7 Click **OK**.

### Adding Objects to an Association Object

By using the **Association Object Properties** window, you can associate users or user groups, privilege objects, systems, RAC devices, and system or device groups.



**NOTE:** RAC users must use Universal Groups to span domains with their users or RAC objects.

You can add groups of Users and Products. You can create Dell-related groups in the same way that you created other groups.

To add Users or User Groups:

- 1 Right-click the **Association Object** and select **Properties**.
- 2 Select the **Users** tab and click **Add**.
- 3 Type the User or User Group name or browse to select one and click **OK**.

Click the **Privilege Object** tab to add the privilege object to the association that defines the user's or user group's privileges when authenticating to a system.




**NOTE:** You can add only one Privilege Object to an association object.

To add a privilege:

- 1 Select the **Privileges Object** tab and click **Add**.
- 2 Type the Privilege Object name or browse for one and click **OK**.

Click the **Products** tab to add one or more systems or devices to the association. The associated objects specify the products connected to the network that are available for the defined users or user groups.


 **NOTE:** You can add multiple systems or RAC devices to an Association Object.

To add Products:

- 1 Select the **Products** tab and click **Add**.
- 2 Type the system, device, or group name and click **OK**.
- 3 In the **Properties** window, click **Apply** and then **OK**.


## Configuring Your Systems or Devices

For instructions on how to configure your Server Administrator or IT Assistant systems using CLI commands, see "Configuring Active Directory Using CLI on Systems Running Server Administrator" and "Configuring Active Directory on Systems Running IT Assistant." For DRAC users, see the *Dell Remote Access Controller 4 User's Guide* or *Dell Remote Access Controller 5 User's Guide*. For iDRAC users, see the *Integrated Dell Remote Access Controller User's Guide*.

 **NOTE:** The systems on which Server Administrator and/or IT Assistant are installed must be a part of the Active Directory domain and should also have computer accounts on the domain.

### Configuring Active Directory Using CLI on Systems Running Server Administrator

You can use the `omconfig preferences dirservice` command to configure the Active Directory service. The `productem.ini` file is modified to reflect these changes. If the `adproductname` is not present in the `productem.ini` file, a default name will be assigned. The default value will be `system name-software-product name`, where `system name` is the name of the system running Server Administrator, and `software-product name` refers to the name of the software product defined in `omprv32.ini` (that is, `computerName-omsa`).

 **NOTE:** This command is applicable only on systems running the Windows operating system.


 **NOTE:** Restart the Server Administrator service after you have configured Active Directory.

Table 12-13 shows the valid parameters for the command.


**Table 12-13. Active Directory Service Configuration Parameters**

| <b>name=value pair</b>                    | <b>Description</b>                                                                                                                                                                                                                    |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>prodname= &lt;text&gt;</code>       | Specifies the software product to which you want to apply the Active Directory configuration changes. <i>Prodname</i> refers to the name of the product defined in <b>omprv32.ini</b> . For Server Administrator, it is <i>omsa</i> . |
| <code>enable= &lt;true   false&gt;</code> | <b>true:</b> Enables Active Directory service authentication support.<br><b>false:</b> Disables Active Directory service authentication support                                                                                       |
| <code>adprodname= &lt;text&gt;</code>     | Specifies the name of the product as defined in the Active Directory service. This name links the product with the Active Directory privilege data for user authentication.                                                           |

### **Configuring Active Directory on Systems Running IT Assistant**

By default, the Active Directory product name corresponds to the *machinename-ita*, where *machinename* is the name of the system on which IT Assistant is installed. To configure a different name, locate the **itaoem.ini** file in your installation directory. Edit the file to add the line "`adproductname= text`" where *text* is the name of the product object that you created in Active Directory. For example, the **itaoem.ini** file will contain the following syntax if the Active Directory product name is configured to **mgmtStationITA**.

```
productname=IT Assistant
startmenu=Dell OpenManage Applications
autdbid=ita
accessmask=3
startlink=ITAUIServlet
adsupport=true
adproductname=mgmtStationITA
```

 **NOTE:** Restart the IT Assistant services after saving the **itaoem.ini** file to the disk.

# Prerequisite Checker

## Command Line Operation of the Prerequisite Checker

You can run the prerequisite check silently by executing `runprereqchecks.exe /s` from the `SYSMGMT\ManagementStation\windows\PreReqChecker` or `SYSMGMT\srvadmin\windows\PreReqChecker` directory on the *Dell Systems Management Tools and Documentation* DVD. After running the prerequisite check, an HTML file will be created in the `%Temp%` directory. The file is named `omprereq.htm`, and it contains the results of the prerequisite check. The `Temp` directory is not usually `X:\Temp`, but `X:\Documents and Settings\username\Local Settings\Temp`. To find `%TEMP%`, go to a command line prompt and type `echo %TEMP%`.

The results of the Prerequisite Checker are written to the registry for the management station under the registry key:

`HKEY_LOCAL_MACHINE\Software\Dell Computer Corporation\OpenManage \PreReqChecks\MS\`

The results are written under the following key for a Managed System:

`HKEY_LOCAL_MACHINE\Software\Dell Computer Corporation\OpenManage \PreReqChecks\MN\`

When running the Prerequisite Check silently, the return code from `runprereqchecks.exe` will be the number associated with the highest severity condition for all of the software products. The return code numbers are the same as those used in the registry. Table 13-1 details the codes that are returned.

**Table 13-1. Return Codes While Running the Prerequisite Check Silently**

| <b>Return Code</b> | <b>Description</b>                                                                                                                                                                                                                                                   |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0                  | No condition, or conditions, is associated with the software.                                                                                                                                                                                                        |
| 1                  | An informational condition, or conditions, is associated with the software. It does not prevent a software product from being installed.                                                                                                                             |
| 2                  | A warning condition, or conditions, is associated with the software. It is recommended that you resolve the conditions causing the warning before you proceed with the installation of the software.                                                                 |
| 3                  | An error condition, or conditions, is associated with the software. It is required that you resolve the conditions causing the error before proceeding with the installation of that software. If you do not resolve the issues, the software will not be installed. |
| -1                 | A Microsoft® Windows® Script Host (WSH) error. The Prerequisite Checker will not run.                                                                                                                                                                                |
| -2                 | The operating system is not supported. The Prerequisite Checker will not run.                                                                                                                                                                                        |
| -3                 | The user does not have Administrator privileges. The Prerequisite Checker will not run.                                                                                                                                                                              |
| -4                 | Not an implemented return code.                                                                                                                                                                                                                                      |
| -5                 | The user failed to change the working directory to %TEMP%. The Prerequisite Checker will not run.                                                                                                                                                                    |
| -6                 | The destination directory does not exist. The Prerequisite Checker will not run.                                                                                                                                                                                     |
| -7                 | An internal error has occurred. The Prerequisite Checker will not run.                                                                                                                                                                                               |
| -8                 | The software is already running. The Prerequisite Checker will not run.                                                                                                                                                                                              |
| -9                 | The Windows Script Host is corrupted, is a wrong version, or is not installed. The Prerequisite Checker will not run.                                                                                                                                                |
| -10                | An error has occurred with the scripting environment. The Prerequisite Checker will not run.                                                                                                                                                                         |

Each software product has an associated value set after running the prerequisite check. Table 13-2 and Table 13-3 provide the list of feature IDs for each software feature. The feature ID is a 2- to 5-character designation.





**NOTE:** The software feature IDs mentioned in Table 13-2 and Table 13-3 are case-sensitive.

**Table 13-2. Feature IDs for the Management Station**

| <b>Feature ID</b> | <b>Description</b>                                 |
|-------------------|----------------------------------------------------|
| ADS               | Microsoft Active Directory® Snap-in Utility        |
| ITA               | Dell OpenManage™ IT Assistant                      |
| BMC               | Baseboard Management Controller Management Utility |
| RACMS             | Remote Access Controller                           |

**Table 13-3. Software Feature IDs**

| <b>Feature ID</b> | <b>Description</b>                              |
|-------------------|-------------------------------------------------|
| ALL               | All features                                    |
| BRCM              | Broadcom NIC Agent                              |
| INTEL             | Intel® NIC Agent                                |
| IWS               | Dell OpenManage Server Administrator Web Server |
| OMSM              | Server Administrator Storage Management Service |
| RAC4              | Remote Access Controller (DRAC 4)               |
| RAC5              | Dell Remote Access Controller                   |
| iDRAC             | Integrated Dell Remote Access Controller        |
| SA                | Server Administrator                            |
| RmtMgmt           | Remote Enablement                               |



# Frequently Asked Questions

## General

### Where can I find the quick installation instructions?

The *Quick Installation Guide* comes as a small brochure with the DVD kit. You can also find the guide on the Dell™ Support website at [support.dell.com](http://support.dell.com) and on the *Dell Systems Management Tools and Documentation* DVD at `docs` directory.

### How do I install Dell OpenManage Server Administrator with only the CLI features?

By choosing not to install the Server Administrator Web Server, you will get CLI features only.

### What ports do Dell OpenManage applications use?

The default port used by Server Administrator is 1311. The default ports used by Dell OpenManage™ IT Assistant are 2606 (for the connection service) and 2607 (for the network monitoring service). These ports are configurable. See Table 2-1 in this guide for additional details.

### When I run virtual media on the DRAC controller over a Wide Area Network (WAN) with low bandwidth and latency, launching OpenManage Install directly on the virtual media failed, what do I do?

In case of failure, copy the Web install package (available on [support.dell.com](http://support.dell.com)) directly to your local system first and directly launch Dell OpenManage Install from your local system.

### Do I need to uninstall the Adaptec Fast Console application installed on the system before installing the Server Administrator Storage Management Service?

Yes, if you already have Adaptec Fast Console installed on your system, you must uninstall this application before installing the Server Administrator Storage Management Service.

# Microsoft® Windows®

## How do I fix a faulty installation of Server Administrator?

You can fix a faulty installation by forcing a reinstall and then performing an uninstall of Server Administrator. To force a reinstall:

- Find out the version of Server Administrator that was previously installed.
- Download the installation package for that version from the Dell Support website at [support.dell.com](http://support.dell.com).
- Locate `SysMgmt.msi` from the `SYSMGMT\srvadmin\windows\SystemManagement` directory and enter the following command at the command prompt to force a reinstall.

```
msiexec /i SysMgmt.msi REINSTALL=ALL
REINSTALLMODE=vomus
```

- Select **Custom Setup** and choose all the features that were originally installed. If you are not sure which features were installed, select all of them and perform the installation.



**NOTE:** If you installed Server Administrator in a non-default directory, make sure to change it in **Custom Setup** as well.

Once the application is installed, you can uninstall it from **Add/Remove Programs**.

## What do I do when the creation of WinRM listener fails with the error message *The CertificateThumbprint property must be empty when the SSL configuration will be shared with another service?*

When Internet Information Server (IIS) is already installed and configured for HTTPS communication the above error is encountered. Details about coexistence of IIS and WinRM are available at:

<http://technet.microsoft.com/en-us/library/cc782312.aspx>.

In this case, use the below command to create a HTTPS Listener with the `CertificateThumbprint` empty.

```
For example: winrm create winrm/config/Listener?Address=
*+Transport=HTTPS @{Hostname=
"<host_name>";CertificateThumbprint="" }
```

## **What are the firewall relate configuration that needs to be done for WinRM?**

With firewall turned ON, WinRM need to be added to the firewall exclusion list to allow TCP port 443 for HTTPS traffic. For more information on TCP ports, see Built-in Security Features.

## **When launching the Dell OpenManage Installer, an error message may display, stating a failure to load a specific library, a denial of access, or an initialization error. An example of installation failure during Dell OpenManage Install is "failed to load OMIL32.DLL." What do I do?**

This is most likely due to insufficient COM permissions on the system. See the following article to remedy this situation:

<http://support.installshield.com/kb/view.asp?articleid=Q104986>

The Dell OpenManage Install may also fail if a previous installation of Dell OpenManage systems management software or some other software product was unsuccessful. A temporary Windows Installer registry can be deleted, which may remedy the Dell OpenManage Install failure. Delete the following key, if present:

```
HKLM\Software\Microsoft\Windows\CurrentVersion\Installer\InProgress
```

## **I get an out-of-disk-space message while adding a feature during the Server Administration or Management Station installation?**

When adding a feature, if you do not have sufficient disk space on the drive where Server Administrator or Management Station is installed, you will get an out-of-disk-space message suggesting that you select a different destination drive. To correct the problem, free up space on the drive where Server Administrator or Management Station is installed.

## **I am getting misleading warning/error message during Dell OpenManage installation?**

If you have insufficient disk space on your Windows system drive, you may encounter misleading warning or error messages when you run Dell OpenManage Install. Additionally, windows installer requires space to temporarily extract the installer package to the %TEMP% folder. Ensure that you have sufficient disk space (100 MB or more) on your system drive prior to running Dell OpenManage Install.

**I am getting an error message "An older version of Server Administrator software is detected on this system. You must uninstall all previous versions of Server Administrator applications before installing this version" while launching Dell OpenManage Install?**

If you see this error when trying to launch Dell OpenManage Install, it is recommended that you run the OMClean.exe program, under the `SYSMGMT\svadmin\support\OMClean` directory, to remove an older version of Server Administrator on your system.

**Do I need to uninstall previous versions of Server Administrator before installing Citrix Metaframe?**

Yes. Uninstall previous versions of Server Administrator before installing Citrix Metaframe (all versions). As errors may exist in the registry after the Citrix Metaframe installation, you will need to reinstall Server Administrator.

**When I run Dell OpenManage Installer, I see unreadable characters on the Prerequisite check information screen.**

When you run Dell OpenManage Install in English, German, French, or Spanish and get unreadable characters on the **Prerequisite Check Information** screen, ensure that your browser encoding has the default character set. Resetting your browser encoding to use the default character set will resolve the problem.

**I have installed Server Administrator and Dell Online Diagnostics in the same directory and Dell Online Diagnostics fails to work, what do I do?**

If you have installed Server Administrator and Online Diagnostics in the same directory, Online Diagnostics may fail to work. Later, on uninstalling Server Administrator, you may also lose all Online Diagnostics files. To avoid this problem, install Server Administrator and Online Diagnostics in different directories. In general it is recommended that more than one application not be installed in the same directory.

**I have installed Server Administrator using remote Server Administrator deploy on Windows Server 2008, I do not see Server Administrator icon on the desktop?**

On an initial Server Administrator install using remote Server Administrator deploy (OMSA push) on a server running Windows 2008, the Server Administrator icon will not be visible until the desktop is refreshed manually. For example, by pressing the <F5> key

**I see warning message while uninstalling Server Administrator on Microsoft Windows Server 2008 as the installer tries to remove the shortcut link?**

While uninstalling Server Administrator on Microsoft Windows Server 2008, you might see a warning message as the installer tries to remove the shortcut link. Click OK on the warning message to continue the uninstallation.

**How do I perform a silent (unattended) upgrade from Dell OpenManage 5.0 or later to Dell OpenManage 6.1?**

Use the following commands for a management station:

```
msiexec /i MgmtSt.msi /qn (for fresh installs or major upgrades.
```

```
For example, upgrading from Dell OpenManage version 5.0 to version 5.5.)
```

**How do I prevent the system from rebooting after a silent (unattended) install/uninstall?**

Use the optional command line switch:

```
Reboot=ReallySuppress
```

Here is an example for the management station:

```
msiexec /i SysMgmt.msi /qb Reboot=ReallySuppress
```

**During Management Station installation/upgrade/uninstallation, Windows installer displays a message stating that specific files needed by Management Station are in use, what do I do?**

Select the **Ignore** option in the message box to continue.

**Where can I find the MSI log files?**

By default, the MSI log files are stored in the path defined by the `%TEMP%` environment variable.

**I downloaded the Server Administrator files for Windows from the Dell Support website and copied it to my own CD/DVD. When I tried to launch the SysMgmt.msi file, it failed. What is wrong?**

MSI requires all installers to specify the `MEDIAPACKAGEPATH` property if the MSI file does not reside on the root of the DVD.

This property is set to `SYSMGMT\srvadmin\windows\SystemManagement` for the managed system software MSI package. If you decide to make your own DVD you must ensure that the DVD layout stays the same. The `SysMgmt.msi` file must be located in the `SYSMGMT\srvadmin\windows\SystemManagement`.

For more detailed information, go to <http://msdn.microsoft.com> and search for: MEDIAPACKAGEPATH Property.

### **Does Dell OpenManage Installer supports Windows Advertised installation?**

No. Dell OpenManage Install does not support Windows "Advertised" installation - the process of automatically distributing a program to client computers for installation, through the Windows group policies.

### **Can I remove Dell OpenManage systems management software by running the *Dell Systems Management Tools and Documentation* DVD or the Management Station Web package?**

Yes. If you choose to remove Dell OpenManage systems management software by running the *Dell Systems Management Tools and Documentation* DVD or the Management Station Web package, it may take a few moments for the system to respond after you select the **Remove** option to continue. This may give you the impression that the system has stopped responding. Dell recommends that you uninstall using **Add/Remove Programs**.

### **How do I check the disk space availability during custom installation?**

In the **Custom Setup** screen, you must click on an active feature to view your hard drive space availability or to change the installation directory. For example, if Feature A is selected for installation (active) and Feature B is not active, the **Change** and **Space** buttons will be disabled if you click Feature B. Click Feature A to view the space availability or to change the installation directory.

### **What do I do when I see the current version is already installed message is displayed?**

If you upgrade from version "X" to version "Y" using MSP and then try to use the version "Y" DVD (full install), the Prerequisite Checker on the version "Y" DVD will inform you that the current version is already installed. If you proceed, the installation will not run in "Maintenance" mode and you will not get the option to "Modify," "Repair," or "Remove." Proceeding with the installation will remove the MSP and create a cache of the MSI file present in the version "Y" package. When you run it a second time, the installer will run in "Maintenance" mode.



## What is the best way to use the Prerequisite Checker information?

The Prerequisite Checker is available for Windows. See the readme file at `SYSMGMT\srvadmin\windows\PreReqChecker\readme.txt` on the *Dell Systems Management Tools and Documentation* DVD, for detailed information about how to use the Prerequisite Checker.

**In the Prerequisite Checker screen, I get the message "An error occurred while attempting to execute a Visual Basic Script. Please confirm that Visual Basic files are installed correctly." What can I do to resolve this problem?**

This error occurs when the Prerequisite Checker calls the Dell OpenManage script, `vbstest.vbs` (a visual basic script), to verify the installation environment, and the script fails.

The possible causes are:

- Incorrect Internet Explorer Security Settings.  
Ensure that **Tools**→**Internet Options**→**Security**→**Custom Level**→**Scripting**→**Active Scripting** is set to **Enable**  
  
Ensure that **Tools**→**Internet Options**→**Security**→**Custom Level**→**Scripting**→**Scripting of Java Applets** is set to **Enable**.
- Windows Scripting Host (WSH) has disabled the running of VBS scripts. WSH is installed during operating system installation, by default. WSH can be configured to prevent the running of scripts with a `.VBS` extension.
  - a Right click **My Computer** on your desktop and click **Open**→**Tools**→**Folder Options**→**File Types**.
  - b Look for the **VBS** file extension and ensure that **File Types** is set to **VBScript Script File**.
  - c If not, click **Change** and choose **Microsoft Windows Based Script Host** as the application that gets invoked to run the script.
- WSH is the wrong version, corrupted, or not installed. WSH is installed during operating system installation, by default. Download WSH from [msdn.microsoft.com](http://msdn.microsoft.com).

**After unattended installation is completed, can I use the same console window to execute CLI commands?**

No. A new console window must be opened and CLI commands executed from that window after an "Unattended Installation" has completed.

**Is the time shown during installation/uninstallation by Windows Installer Services is accurate?**

No. During installation/uninstallation, the Windows Installer Service may display the time remaining for the current task to complete. This is only an approximation by the Windows Installer Engine based on varying factors.

**Can I launch my installation without running the Prerequisite Checker? How do I do that?**

Yes, you can. For example, you can run the MSI of the managed system software, directly from the **SYSMGMT\srvadmin\Windows\SystemManagement**. In general, it is not a good idea to bypass the prerequisite information as there could be important information that you would not know otherwise.

**How do I know what version of systems management software is installed on the system?**

Go to **Start→Settings→Control Panel→Add/Remove programs** and select **Dell OpenManage Server Administrator**. Select the link for support information.

**Do I need to reboot the system after upgrading the Dell OpenManage?**

Upgrade may require a reboot if the files to be upgraded are in use. This is a typical Windows installer behavior. It is recommended that you reboot the system when prompted.

**Where can I see the Server Administrator features that are currently installed on my system?**

See **Windows Add/Remove Programs** to find out what Server Administrator features are currently installed.

**What are the names of all the Dell OpenManage features under Windows?**

The following table lists the names of all Dell OpenManage features and their corresponding names in Windows.

**Table 14-1. Dell OpenManage Features Under Windows**

| <b>Feature</b>                                  | <b>Name in Windows</b>              |
|-------------------------------------------------|-------------------------------------|
| <b>Managed System Services</b>                  |                                     |
| Server Administrator Instrumentation Service    | DSM SA Data Manager                 |
|                                                 | DSM SA Event Manager                |
| Server Administrator                            | DSM SA Connection Service           |
|                                                 | DSM SA Shared Services              |
| Server Administrator Storage Management Service | Mr2kserv                            |
| Remote Access Controller Console (DRAC 4)       | Remote Access Controller 4 (DRAC 4) |
| <b>Management Station Services</b>              |                                     |
| IT Assistant                                    | DSM IT Assistant Network Monitor    |
|                                                 | DSM IT Assistant Connection Service |
|                                                 | DSM IT Assistant Common Services    |
| Baseboard Management Controller (BMC)           | DSM BMU SOL Proxy                   |

## **Red Hat<sup>®</sup> Enterprise Linux<sup>®</sup> or SUSE<sup>®</sup> Linux Enterprise Server**

I manually installed my Red Hat Enterprise Linux 4 - x86\_64 operating system and am seeing RPM dependencies when trying to install Server Administrator. Where could I find these dependent RPM files?

For Red Hat Enterprise Linux, the dependent RPM files are on the Red Hat Enterprise Linux installation CD. All other RPMs are available in the `/SYSMGMT/srvadmin/linux/RPMS/supportRPMS` directory.

To install or update all the dependent RPM files execute the following command:

```
rpm -ivh /SYSMGMT/srvadmin/linux/RPMS/
supportRPMS/<name_of_RPM>
```

You will then be able to continue with the Server Administrator installation.

## I have performed a non-default install of your Linux operating system using your Linux operating system media, I see missing RPM file dependencies while installing Server Administrator?

Server Administrator is a 32-bit application. When installed on a system running a 64-bit version of Red Hat Enterprise Linux operating system, the Server Administrator remains a 32-bit application, while the device drivers installed by Server Administrator are 64-bit. If you attempt to install Server Administrator on a system running Red Hat Enterprise Linux (versions 4 and version 5) for Intel EM64T, ensure that you install the applicable 32-bit versions of the missing RPM file dependencies. The 32-bit RPM versions always have **i386** in the file name extension. You may also experience failed shared object files (files with **so** in the file name extension) dependencies. In this case, you can determine which RPM is needed to install the shared object, by using the RPM `--whatprovides` switch. For example:

```
rpm -q --whatprovides libpam.so.0
```

An RPM name such as **pam-0.75-64** could be returned, so obtain and install the **pam-0.75-64.i386.rpm**. When Server Administrator is installed on a system running a 64-bit version of a Linux operating system, ensure that the **compat-libstdc++-<version>.i386.rpm** RPM package is installed. You will need to resolve the dependencies manually by installing the missing RPM files from your Linux operating system media.



**NOTE:** If you are using later versions of supported Linux operating systems and the RPM files available in the directory `/SYSMGMT/srvadmin/linux/RPMS/supportRPMS` on the DVD are incompatible, use the latest RPMs from your Operating System media.

## Where can I find the source packages for Open Source RPMs?

Source packages for Open Source RPMs are available on an orderable DVD image.

## What do I do when management station RAC utility installation fails due to missing RPM file?

During the install of the management station RAC utility (`mgmtst-racadm` RPM under `/SYSMGMT/ManagementStation/linux/rac` directory on the *Dell Systems Management Tools and Documentation* DVD), the install may fail due to missing RPM file dependencies on `libstdc++` libraries. Install the **compat-libstdc++ rpm** provided in the same directory to resolve the dependency and retry the installation.

**I have installed Server Administrator in a non default location, when I uninstall Server Administrator the directories are not deleted, what do I do?**

If the default install location of Server Administrator has changed during installation, some of the directories in which Server Administrator is installed will not be deleted during its removal. This issue is related to the default behavior of the RPM engine. For example, if installed with the prefix `--prefix/opt/dell2/srvadmin2/abc/`, the RPM deletes only the last directory `abc` and the remaining directories `/opt/dell2/srvadmin2` are left undeleted.

**When using the `rpm -e 'rpm -qa | grep srvadmin'` command to remove Dell OpenManage systems management software, some RPM utility versions may schedule an uninstall in an incorrect order, which results in users encountering misleading warning or error messages. What is the solution?**

The solution is to use the Dell OpenManage uninstall script, `srvadmin-uninstall.sh`, provided on the DVD.

**What do I do when I am asked to authenticate using the root user account?**

Dell Systems Build and Update Utility adds a script to the root user's `.bash_profile` file that prompts for the installation of Dell OpenManage systems management software. This script may interfere with remote client applications that authenticate using the root user account on the system, but do not have a means to handle user prompts. To remedy this limitation, edit the `.bash_profile` file and comment the line: `[ ${SHLVL} . . .`

**During uninstallation, error: `%preun(srvadmin-NAME-X.Y.Z-N.i386) scriptlet failed, exit status 1` error message is displayed.**

There may be problems uninstalling Server Administrator after an unsuccessful upgrade during a manual RPM upgrade. You will see the following error message:

```
error: %preun(srvadmin-NAME-X.Y.Z-N.i386) scriptlet
failed, exit status 1
```

In this case, `NAME` is a feature name, for example `omacore.X.Y.Z-N` is the version and build number of the feature. Some possible solutions to rectify this problem:

- 1 Attempt to uninstall again. For example, use the following command:  

```
rpm -e srvadmin-NAME-X.Y.Z-N.i386
```
- 2 Delete the "upgrade.relocation=bad" line if present in the `/etc/omreg.cfg` file and attempt to uninstall again.

### Why am I getting a warning concerning the RPM package key during installation?

The RPM files are signed with a digital signature. To avoid this warning, you should mount the CD or package, and import the key using a command such as the following:

```
rpm --import
/mnt/dvdrom/SYSMGMT/srvadmin/linux/RPM-GPG-KEY
```

### Why is the Prerequisite Checker not available under Red Hat Enterprise Linux and SUSE Linux Enterprise Server?

The Prerequisite Checker is built into the `omilcore` RPM package. The checker uses a combination of RPM dependency checks and Dell hardware checks.

### What are the names of all the Dell OpenManage features under Red Hat Enterprise Linux or SUSE Linux Enterprise Server?

The following table lists the names of all Dell OpenManage features and their corresponding init script names under Red Hat Enterprise Linux and SUSE Linux Enterprise Server operating systems:

**Table 14-2. Dell OpenManage Features Under Red Hat Enterprise Linux and SUSE Linux Enterprise Server**

| <b>Feature</b>                  | <b>Name in VMware ESX, Red Hat Enterprise Linux, and SUSE Linux Enterprise Server</b> |
|---------------------------------|---------------------------------------------------------------------------------------|
| Managed System Services Feature | Feature init Script Name                                                              |
| DSM SA Device Drivers           | instsvcdrv                                                                            |
| DSM SA Data Engine Service      | dataeng                                                                               |
| DSM SA Shared Service           | dsm_om_shrsvc                                                                         |
| DSM SA Connection Service       | dsm_om_connsvc                                                                        |

**Table 14-2. Dell OpenManage Features Under Red Hat Enterprise Linux and SUSE Linux Enterprise Server (continued)**

| Feature                                          | Name in VMware ESX, Red Hat Enterprise Linux, and SUSE Linux Enterprise Server |
|--------------------------------------------------|--------------------------------------------------------------------------------|
| DSM SM LSI Manager                               | mptctl                                                                         |
| Integrated Dell Remote Access Controller (iDRAC) | None                                                                           |
| Remote Access Controller (DRAC 4)                | racsvc                                                                         |
| Remote Access Controller (DRAC 5)                | None                                                                           |
| Management Station Services                      | Feature init Script Name                                                       |
| Baseboard Management Controller (BMC)            | dsm_bmu_sol_proxy                                                              |
| Non-Dell OpenManage Features                     | Feature init Script Name                                                       |
| OpenIPMI                                         | ipmi (if not present, dsm_sa_ipmi)                                             |

What do the directories under `srvadmin/linux/custom/<operating system>` contain?

The following table lists the names of the directories in the `SYSMGMT/srvadmin/linux/custom/<operating system>` directory.

**Table 14-3. Names of the Directories Under the `srvadmin/linux/custom/<operating system>` Directory**

| Name of RPM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Description                                                                                          | Other Server Administrator RPMs required                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <p><b>Server-Instrumentation</b> — This is the core code for Server Administrator. It provides motherboard alerts and contains the CLI that allows for monitoring and control of Server Administrator, for example, <code>omconfig</code>, <code>omdiag</code>, and <code>omreport</code>. All peripheral packages, except the standalone DRAC support, require all or most of the RPM's in this directory to be installed.</p> <p><b>NOTE:</b> You may need to install IPMI drivers for proper functionality.</p> |                                                                                                      |                                                                                                   |
| <code>srvadmin-cm</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Server Administrator Inventory Collector — Systems management change management inventory collector. | <code>srvadmin-omilcore</code> , <code>srvadmin-deng</code> , and <code>srvadmin-omacore</code> . |

**Table 14-3. Names of the Directories Under the `srvadmin/linux/custom/<operating system>` Directory (*continued*)**

| Name of RPM      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Other Server Administrator RPMs required                                             |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| srvadmin-deng    | Server Administrator Data Engine — Systems management provides a data management framework for systems management software.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | srvadmin-omilcore                                                                    |
| srvadmin-hapi    | Server Administrator Hardware Application Programming Interface — This systems management package provides the device drivers and libraries needed by systems management software to access information about the hardware on supported systems.                                                                                                                                                                                                                                                                                                                                                                                 | srvadmin-omilcore                                                                    |
| srvadmin-isvc    | Server Administrator Instrumentation Service — Server Administrator provides a suite of systems management information for keeping supported systems on your network healthy. Server Administrator Instrumentation Service provides fault management information, prefailure information, and asset and inventory information to management applications. The Instrumentation Service monitors the health of the system and provides rapid access to detailed fault and performance information about the hardware on supported systems. The Instrumentation Service requires installation of systems management device drivers. | srvadmin-omilcore, srvadmin-deng, and srvadmin-hapi                                  |
| srvadmin-omacore | Server Administrator — Systems management managed mode core and CLI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | srvadmin-omilcore and srvadmin-deng                                                  |
| srvadmin-omhip   | Server Administrator Instrumentation Service Integration Layer — Provides Instrumentation CLI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | srvadmin-omilcore, srvadmin-deng, srvadmin-hapi, srvadmin-isvc, and srvadmin-omacore |



**Table 14-3. Names of the Directories Under the `srvadmin/linux/custom/<operating system>` Directory (*continued*)**

| Name of RPM                                                                                                              | Description                                                                                                                                                                                                      | Other Server Administrator RPMs required                                         |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| srvadmin-omilcore                                                                                                        | Server Administrator Install Core — This is the core install package that provides the tools necessary for the rest of the Systems management install packages. All Server Administrator RPM's require this RPM. |                                                                                  |
| srvadmin-syscheck                                                                                                        | Package that checks the level of OpenManage support.                                                                                                                                                             | srvadmin-omilcore                                                                |
| <b>add-iDRAC</b> — Software for remote management of third generation Remote Access Controllers.<br>For example: iDRAC.  |                                                                                                                                                                                                                  |                                                                                  |
| srvadmin-idrac-components                                                                                                | Integrated Dell Remote Access Card Data Populator Remote Access Controller components.                                                                                                                           | srvadmin-omilcore, srvadmin-deng, srvadmin-hapi, and srvadmin-racser             |
| srvadmin-idracadm                                                                                                        | iDRAC Command Interface — The command line user interface to the Integrated Dell Remote Access Controller.                                                                                                       | srvadmin-omilcore                                                                |
| srvadmin-idracdrsc                                                                                                       | iDRAC Integration Layer — Integrated Dell Remote Access CLI and Web Plugin to Server Administrator                                                                                                               | srvadmin-omilcore, srvadmin-deng, srvadmin-rac4 components, and srvadmin-omacore |
| <b>add-RAC4</b> — Software for remote management of fourth generation Remote Access Controllers.<br>For example: DRAC 4. |                                                                                                                                                                                                                  |                                                                                  |
| srvadmin-rac4-components                                                                                                 | Remote Access Card Data Populator — Remote Access Controller components.                                                                                                                                         | srvadmin-omilcore, srvadmin-deng, srvadmin-hapi, and srvadmin-racsvc             |
| srvadmin-racadm4                                                                                                         | RAC Command Interface — The command line user interface to the Remote Access Controller (RAC).                                                                                                                   | srvadmin-omilcore                                                                |

**Table 14-3. Names of the Directories Under the `srvadmin/linux/custom/<operating system>` Directory (*continued*)**

| Name of RPM                                                                                                              | Description                                                                                                                                                                                | Other Server Administrator RPMs required                                         |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| srvadmin-racdrsc4                                                                                                        | DRAC 4 Integration Layer — Remote Access CLI and Web Plugin to Server Administrator                                                                                                        | srvadmin-omilcore, srvadmin-deng, srvadmin-rac4 components, and srvadmin-omacore |
| srvadmin-racsvc                                                                                                          | Remote Access Card Managed Node — Remote Access Controller (RAC) services supporting the central administration of server clusters and the remote administration of distributed resources. | srvadmin-omilcore                                                                |
| <b>add-RAC5 — Software for remote management of fifth generation Remote Access Controllers.<br/>For example: DRAC 5.</b> |                                                                                                                                                                                            |                                                                                  |
| srvadmin-rac5-components                                                                                                 | Remote Access Card Data Populator, DRAC 5 and Remote Access Controller components, DRAC 5.                                                                                                 | srvadmin-omilcore, srvadmin-deng, and srvadmin-hapi                              |
| srvadmin-racadm5                                                                                                         | RAC Command Interface — The command line user interface to the Remote Access Controller (RAC).                                                                                             | srvadmin-omilcore and srvadmin-hapi                                              |
| srvadmin-racdrsc5                                                                                                        | DRAC 5 Integration Layer — Remote Access CLI and Web Plug-in to Server Administrator                                                                                                       | srvadmin-omilcore, srvadmin-deng, srvadmin-omacore, and srvadmin-rac5 components |
| <b>add-StorageManagement — Storage Management RAID configuration utility and storage alert software</b>                  |                                                                                                                                                                                            |                                                                                  |
| srvadmin-storage                                                                                                         | Storage Management — Provides Systems Management Storage Services.                                                                                                                         | srvadmin-omilcore, srvadmin-deng, srvadmin-omacore, and srvadmin-odf             |

**Table 14-3. Names of the Directories Under the `srvadmin/linux/custom/<operating system>` Directory (*continued*)**

| Name of RPM                                                           | Description                                                                                                                                                                                                                                      | Other Server Administrator RPMs required                             |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>SA-WebServer</b> — Provides Web access to management of the server |                                                                                                                                                                                                                                                  |                                                                      |
| srvadmin-hapi                                                         | Server Administrator Hardware Application Programming Interface — This systems management package provides the device drivers and libraries needed by systems management software to access information about the hardware on supported systems. | srvadmin-omilcore                                                    |
| srvadmin-iws                                                          | Secure Port Server — Systems Management Managed Node Web Server package.                                                                                                                                                                         | srvadmin-omilcore, srvadmin-deng, srvadmin-omacore, and srvadmin-jre |
| srvadmin-jre                                                          | Server Administrator Sun Java Runtime Environment — Systems management managed node Java runtime.                                                                                                                                                | srvadmin-omilcore, srvadmin-deng, and srvadmin-omacore               |
| srvadmin-omauth                                                       | Provides the authentication files.                                                                                                                                                                                                               | srvadmin-omilcore                                                    |
| srvadmin-omcommon                                                     | Provides the common framework required by Server Administrator.                                                                                                                                                                                  | srvdamin-omilcore                                                    |
| srvadmin-omilcore                                                     | Server Administrator Web Server Install Core — This is the core install package. All Server Administrator Web Server RPM's require this RPM.                                                                                                     |                                                                      |
| srvadmin-wsmanclient                                                  | Operating system specific WSMAN client package.                                                                                                                                                                                                  | srvadmin-omcommon and srvadmin-omauth                                |

**Table 14-3. Names of the Directories Under the `srvadmin/linux/custom/<operating system>` Directory (*continued*)**

| Name of RPM                                                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Other Server Administrator RPMs required                |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Remote-Enablement — Manage and monitor your current system using some other remote system |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                         |
| srvadmin-cm                                                                               | Server Administrator Inventory Collector — Systems management change management inventory collector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | srvadmin-omilcore, srvadmin-deng, and srvadmin-omacore. |
| srvadmin-deng                                                                             | Server Administrator Data Engine — Systems management provides a data management framework for systems management software.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | srvadmin-omilcore                                       |
| srvadmin-hapi                                                                             | Server Administrator Hardware Application Programming Interface — This systems management package provides the device drivers and libraries needed by systems management software to access information about the hardware on supported systems.                                                                                                                                                                                                                                                                                                                                                                                 | srvadmin-omilcore                                       |
| srvadmin-isvc                                                                             | Server Administrator Instrumentation Service — Server Administrator provides a suite of systems management information for keeping supported systems on your network healthy. Server Administrator Instrumentation Service provides fault management information, prefailure information, and asset and inventory information to management applications. The Instrumentation Service monitors the health of the system and provides rapid access to detailed fault and performance information about the hardware on supported systems. The Instrumentation Service requires installation of systems management device drivers. | srvadmin-omilcore, srvadmin-deng, and srvadmin-hapi     |

**Table 14-3. Names of the Directories Under the `srvadmin/linux/custom/<operating system>` Directory (*continued*)**

| <b>Name of RPM</b>             | <b>Description</b>                                                                                                                                                                                               | <b>Other Server Administrator RPMs required</b>                                                                                                           |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>srvadmin-omacore</code>  | Server Administrator — Systems management managed mode core and CLI.                                                                                                                                             | <code>srvadmin-omilcore</code> and <code>srvadmin-deng</code>                                                                                             |
| <code>srvadmin-omcommon</code> | Provides Common Framework required by Server Administrator.                                                                                                                                                      | <code>srvadmin-omilcore</code>                                                                                                                            |
| <code>srvadmin-omhip</code>    | Server Administrator Instrumentation Service Integration Layer — Provides Instrumentation CLI.                                                                                                                   | <code>srvadmin-omilcore</code> , <code>srvadmin-deng</code> , <code>srvadmin-hapi</code> , <code>srvadmin-isvc</code> , and <code>srvadmin-omacore</code> |
| <code>srvadmin-omilcore</code> | Server Administrator Install Core — This is the core install package that provides the tools necessary for the rest of the Systems management install packages. All Server Administrator RPM's require this RPM. |                                                                                                                                                           |
| <code>srvadmin-ssa</code>      | Enables management of the system from a remote system on which Server Administrator Web Server is installed, using WS-Man interfaces.                                                                            | <code>srvadmin-omacore</code> , <code>srvadmin-omhip</code> , and <code>srvadmin-isvc</code> .                                                            |
| <code>srvadmin-syscheck</code> | Package that checks the level of OpenManage support.                                                                                                                                                             | <code>srvadmin-omilcore</code>                                                                                                                            |

**What are the additional components that can be installed on a system that already has Server Administrator installed?**

There are a few additional components that can be installed on a system that already has Server Administrator installed. For example, you can install Online Diagnostics on a system that has previously been installed with managed system software. On such a system, while uninstalling Server Administrator, only those RPM packages that are not required by any of the newly installed components are uninstalled. In the above example,

Online Diagnostics requires packages such as -

`srvadmin-omilcore-X.Y.Z-N` and `srvadmin-hapi-X.Y.Z-N`. These packages will not get uninstalled during an uninstallation of Server Administrator.

In this case, if you try to install Server Administrator later by running the `sh srvadmin-install.sh` command, you will get the following message:

Server Administrator version X.Y.Z is currently installed.

Installed Components are:

- `srvadmin-omilcore-X.Y.Z-N`
- `srvadmin-hapi-X.Y.Z-N`

Do you want to upgrade Server Administrator to X.Y.Z? Press (y for yes | **Enter** to exit):

On pressing y, only those Server Administrator packages (in the above example, `srvadmin-omilcore-X.Y.Z-N` and `srvadmin-hapi-X.Y.Z-N` residing on the system are upgraded.

If you have to install other Dell OpenManage components as well, you will have to run the following command once again:

```
sh srvadmin-install.sh
```

### **What happens if I install the RPM package on an unsupported system or on an unsupported operating system?**

If you try to install the RPM packages on an unsupported system or an unsupported operating system, you may see unpredictable behavior during the install, uninstall, or during use of the RPM package. Most of the RPM packages have been written and tested for Dell PowerEdge™ systems and the Linux versions listed in this readme.

### **What daemons run on Red Hat Enterprise Linux and SUSE Linux Enterprise Server operating systems after Server Administrator is started?**

The daemons that run on Red Hat Enterprise Linux and SUSE Linux Enterprise Server operating systems depend on what has been installed and what is enabled to run. The following table displays the daemons that typically run for a full install:

**Table 14-4. Daemons that run on Red Hat Enterprise Linux and SUSE Linux Enterprise Server once Server Administrator is started**

| <b>Daemon Name</b>                               | <b>Name in Red Hat Enterprise Linux and SUSE Linux Enterprise Server</b>                                    |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>For RPMs in the srvadmin-base directory</b>   |                                                                                                             |
| dsm_sa_datamgr32d                                | DSM SA Data Manager — Server Administrator data manager daemon started by DSM SA Data Engine service.       |
| dsm_sa_eventmgr32d                               | DSM SA Event Manager — Server Administrator event and logging daemon started by DSM SA Data Engine service. |
| dsm_sa_snmp32d                                   | DSM SA SNMP daemon — Server Administrator SNMP daemon started by DSM SA Data Engine service.                |
| dsm_om_shrsvc32d                                 | DSM SA Shared Services — Server Administrator core daemon.                                                  |
| <b>For RPMs in the SA-WebServer directory</b>    |                                                                                                             |
| dsm_om_connsvc32d                                | DSM SA Connection Services — Server Administrator Web server daemon.                                        |
| <b>For systems that support DRAC 4: add-RAC4</b> |                                                                                                             |
| raesvc                                           | DRAC 4 Administrator daemon                                                                                 |

**What kernel modules are loaded when Server Administrator is started?**

This is dependent on the type of systems instrumentation. The following table displays the kernel modules loaded when Server Administrator is started.

**Table 14-5. Kernel Modules Loaded when Server Administrator Services are Started**

| <b>Driver Name</b>            | <b>Description</b>                                                                                                         |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>For a system with IPMI</b> |                                                                                                                            |
| dell_rbu                      | Dell BIOS Update Driver                                                                                                    |
| ipmi_devintf                  | IPMI device driver                                                                                                         |
| ipmi_msghandler               | IPMI device driver                                                                                                         |
| ipmi_si                       | IPMI device driver — For systems running Red Hat Enterprise Linux (version 4) or SUSE Linux Enterprise Server (version 10) |

**Table 14-5. Kernel Modules Loaded when Server Administrator Services are Started (continued)**

| <b>Driver Name</b>                                         | <b>Description</b>                  |
|------------------------------------------------------------|-------------------------------------|
| <b>For a TVM system</b>                                    |                                     |
| dcdbas                                                     | Dell Systems Management Base Driver |
| dell_rbu                                                   | Dell BIOS Update Driver             |
| <b>For an ESM system</b>                                   |                                     |
| dcdbas                                                     | Dell Systems Management Base Driver |
| dell_rbu                                                   | Dell BIOS Update Driver             |
| <b>For support of Server Administrator Storage Systems</b> |                                     |
| mptctl                                                     | Device driver for LSI RAID          |



# Glossary

The following list defines technical terms, abbreviations, and acronyms used in your system documents.

## **attribute**

As it relates to an attribute is a piece of information related to a component. Attributes can be combined to form groups. If an attribute is defined as read-write, it may be defined by a management application.

## **beep code**

A diagnostic message in the form of a pattern of beeps from your system's speaker. For example, one beep, followed by a second beep, and then a burst of three beeps is beep code 1-1-3.

## **BIOS**

Acronym for basic input/output system. Your system's BIOS contains programs stored on a flash memory chip. The BIOS controls the following:

- Communications between the microprocessor and peripheral devices, such as the keyboard and the video adapter
- Miscellaneous functions, such as system messages

## **BMC**

Abbreviation for baseboard management controller, which is a controller that provides the intelligence in the IPMI structure.

## **boot routine**

When you start your system, it clears all memory, initializes devices, and loads the operating system. Unless the operating system fails to respond, you can reboot (also called warm boot) your system by pressing <Ctrl><Alt><Del>; otherwise, you must perform a cold boot by pressing the reset button or by turning the system off and then back on.

## **bootable diskette**

You can start your system from a diskette. To make a bootable diskette, insert a diskette in the diskette drive, type `sys a:` at the command line prompt, and press <Enter>. Use this bootable diskette if your system will not boot from the hard drive.

**bus**

An information pathway between the components of a system. Your system contains an expansion bus that allows the microprocessor to communicate with controllers for all the various peripheral devices connected to the system. Your system also contains an address bus and a data bus for communications between the microprocessor and RAM.

**CA**

Abbreviation for certification authority.

**CIM**

Acronym for Common Information Model, which is a model for describing management information from the DMTF. CIM is implementation independent, allowing different management applications to collect the required data from a variety of sources. CIM includes schemas for systems, networks, applications and devices, and new schemas will be added. It provides mapping techniques for interchange of CIM data with MIB data from SNMP agents.

**CI/O**

Abbreviation for comprehensive input/output.

**CLI**

Abbreviation for command line interface.

**cm**

Abbreviation for centimeter(s).

**ConsoleOne**

Novell® ConsoleOne® is a Java-based foundation for graphical utilities that manage and administer network resources from different locations and platforms. ConsoleOne provides a single point of control for all Novell and external products.

**controller**

A chip that controls the transfer of data between the microprocessor and memory or between the microprocessor and a peripheral device such as a disk drive or the keyboard.

**control panel**

The part of the system that contains indicators and controls, such as the power switch, hard drive access indicator, and power indicator.

**device driver**

A program that allows the operating system or some other program to interface correctly with a peripheral device, such as a printer. Some device drivers—such as network drivers—must be loaded from the `config.sys` file (with a `device=` statement) or as memory-resident programs (usually, from the `autoexec.bat` file). Others—such as video drivers—must load when you start the program for which they were designed.

**DHCP**

Abbreviation for Dynamic Host Configuration Protocol, a protocol that provides a means to dynamically allocate IP addresses to computers on a LAN.

**DIN**

Acronym for Deutsche Industrie Norm which is the standards-setting organization for Germany. A DIN connector is a connector that conforms to one of the many standards defined by DIN. DIN connectors are used widely in personal computers. For example, the keyboard connector for personal computers is a DIN connector.

**directory**

Directories help keep related files organized on a disk in a hierarchical, "inverted tree" structure. Each disk has a "root" directory; for example, a `C:\>` prompt normally indicates that you are at the root directory of hard drive C. Additional directories that branch off of the root directory are called subdirectories. Subdirectories may contain additional directories branching off of them.

**display adapter**

See video adapter.

**DKS**

Abbreviation for Dynamic Kernel Support.

**DNS**

Abbreviation for Domain Name Service.

**DRAC 4**

Acronym for Dell™ Remote Access Controller 4.

**DRAM**

Acronym for dynamic random-access memory. A system's RAM is usually made up entirely of DRAM chips. Because DRAM chips cannot store an electrical charge indefinitely, your system continually refreshes each DRAM chip in the system.

**ERA**

Abbreviation for embedded remote access.

**ERA/MC**

Abbreviation for embedded remote access modular computer. See modular system.

**ERA/O**

Abbreviation for embedded remote access option.

**expansion-card connector**

A connector on the system's system board or riser board for plugging in an expansion card.

**extended memory**

RAM above 1 MB. Most software that can use it, such as the Microsoft® Windows® operating system, requires that extended memory be under the control of an XMM.

**external cache memory**

A RAM cache using SRAM chips. Because SRAM chips operate at several times the speed of DRAM chips, the microprocessor can retrieve data and instructions faster from external cache memory than from RAM.

**F**

Abbreviation for Fahrenheit.

**FAT**

Acronym for file allocation table. FAT and FAT32 are file systems that are defined as follows:

- **FAT** — The operating system maintains a table to keep track of the status of various segments of disk space used for file storage.
- **FAT32** — A derivative of the FAT file system. FAT32 supports smaller cluster sizes than FAT, thus providing more efficient space allocation on FAT32 drives.

**Fibre Channel**

A data transfer interface technology that allows for high-speed I/O and networking functionality in a single connectivity technology. The Fibre Channel Standard supports several topologies, including Fibre Channel Point-to-Point, Fibre Channel Fabric (generic switching topology), and Fibre Channel Arbitrated Loop (FC\_AL).

**firmware**

Software (programs or data) that has been written onto read-only memory (ROM). Firmware can boot and operate a device. Each controller contains firmware which helps provide the controller's functionality.

**format**

To prepare a hard drive or diskette for storing files. An unconditional format deletes all data stored on the disk.

**FSMO**

Abbreviation for Flexible Single Master Operation.

**FTP**

Abbreviation for file transfer protocol.

**GB**

Abbreviation for gigabyte(s). A gigabyte equals 1024 megabytes or 1,073,741,824 bytes.

**gcc**

Abbreviation for GNU C compiler.

**GNU**

Acronym for GNU's Not UNIX®. GNU software is published under the GPL open-source license.

**GPG**

Abbreviation for GNU Privacy Guard.

**GUI**

Acronym for graphical user interface.

**GUID**

Acronym for Globally Unique Identifier.

**h**

Abbreviation for hexadecimal. A base-16 numbering system, often used in programming to identify addresses in the system's RAM and I/O memory addresses for devices. The sequence of decimal numbers from 0 through 16, for example, is expressed in hexadecimal notation as: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, 10. In text, hexadecimal numbers are often followed by h.

**HBA**

Abbreviation for host bus adapter. A PCI adapter card that resides in the system whose only function is to convert data commands from PCI-bus format to storage interconnect format (examples: SCSI, Fibre Channel) and communicate directly with hard drives, tape drives, CD drives, or other storage devices.

**HTTP**

Abbreviation for Hypertext Transfer Protocol. HTTP is the client-server TCP/IP protocol used on the World Wide Web for the exchange of HTML documents.

**HTTPS**

Abbreviation for HyperText Transmission Protocol, Secure. HTTPS is a variant of HTTP used by Web browsers for handling secure transactions. HTTPS is a unique protocol that is simply SSL underneath HTTP. You need to use "https://" for HTTP URLs with SSL, whereas you continue to use "http://" for HTTP URLs without SSL.

**ICES**

Abbreviation for Interface-Causing Equipment Standard (in Canada).

**ICMP**

Abbreviation for Internet Control Message Protocol. ICMP is a TCP/IP protocol used to send error and control messages.

**ICU**

Abbreviation for ISA Configuration Utility.

**ID**

Abbreviation for identification.

**iDRAC**

Acronym for Integrated Dell Remote Access Controller

**IDE**

Abbreviation for Integrated Drive Electronics. IDE is a computer system interface, used primarily for hard drives and CDs.

**I/O**

Abbreviation for input/output. The keyboard is an input device, and a printer is an output device. In general, I/O activity can be differentiated from computational activity. For example, when a program sends a document to the printer, it is engaging in output activity; when the program sorts a list of terms, it is engaging in computational activity.

**IHV**

Abbreviation for independent hardware vendor. IHVs often develop their own MIBs for components that they manufacture.

**interlacing**

A technique for increasing video resolution by only updating alternate horizontal lines on the screen. Because interlacing can result in noticeable screen flicker, most users prefer noninterlaced video adapter resolutions.

**IP address**

Abbreviation for Internet Protocol address. See TCP/IP.

**IPMI**

Abbreviation for Intelligent Platform Management Interface, which is an industry standard for management of peripherals used in enterprise computers based on Intel<sup>®</sup> architecture. The key characteristic of IPMI is that inventory, monitoring, logging, and recovery control functions are available independent of the main processors, BIOS, and operating system.

**IRQ**

Abbreviation for interrupt request. A signal that data is about to be sent to or received by a peripheral device travels by an IRQ line to the microprocessor. Each peripheral connection must be assigned an IRQ number. For example, the first serial port in your system (COM1) is assigned to IRQ4 by default. Two devices can share the same IRQ assignment, but you cannot operate both devices simultaneously.

**ISV**

Abbreviation for independent software vendor.

**ITE**

Abbreviation for information technology equipment.

**Java**

A cross-platform programming language developed by Sun Microsystems.

**JSSE**

Abbreviation for Java Secure Socket Extension.

**K**

Abbreviation for kilo-, indicating 1000.

**Kerberos**

A network authentication protocol. It is designed to provide strong authentication for client/server applications by using secret-key cryptography.

**key combination**

A command requiring you to press multiple keys at the same time. For example, you can reboot your system by pressing the <Ctrl> <Alt> <Del> key combination.

**LAN**

Acronym for local area network. A LAN system is usually confined to the same building or a few nearby buildings, with all equipment linked by wiring dedicated specifically to the LAN.

**LDAP**

Abbreviation for Lightweight Directory Access Protocol.

**LDIF**

Abbreviation for Lightweight Directory Interchange Format.

**local bus**

On a system with local-bus expansion capability, certain peripheral devices (such as the video adapter circuitry) can be designed to run much faster than they would with a traditional expansion bus. Some local-bus designs allow peripherals to run at the same speed and with the same width data path as the system's microprocessor.

**LRA**

Abbreviation for local response agent.



**managed system**

A managed system is any system that is monitored and managed using Dell OpenManage™ Server Administrator. Systems running Server Administrator can be managed locally or remotely through a supported Web browser. See remote management system.

**management station**

A system used to remotely manage one or more managed systems from a central location.

**math coprocessor**

See coprocessor.

**Mb**

Abbreviation for megabit.

**MB**

Abbreviation for megabyte(s). The term megabyte means 1,048,576 bytes; however, when referring to hard drive storage, the term is often rounded to mean 1,000,000 bytes.

**memory**

A system can contain several different forms of memory, such as RAM, ROM, and video memory. Frequently, the word memory is used as a synonym for RAM; for example, an unqualified statement such as "a system with 16 MB of memory" refers to a system with 16 MB of RAM.

**memory address**

A specific location, usually expressed as a hexadecimal number, in the system's RAM.

**MIB**

Acronym for management information base. The MIB is used to send detailed status or commands from or to an SNMP-managed device.

**microprocessor**

The primary computational chip inside the system that controls the interpretation and execution of arithmetic and logic functions. Software written for one microprocessor must usually be revised to run on another microprocessor. CPU is a synonym for microprocessor.

**mm**

Abbreviation for millimeter(s).

**MMC**

Abbreviation for Microsoft Management Console.

**modular system**

A system that can include multiple server modules. Each server module functions as an individual system. To function as a system, a server module is inserted into a chassis which includes power supplies, fans, a system management module, and at least one network switch module. The power supplies, fans, system management module, and network switch module are shared resources of the server modules in the chassis. See server module.

**MOF**

Acronym for managed object format, which is an ASCII file that contains the formal definition of a CIM schema.

**mouse**

A pointing device that controls the movement of the cursor on a screen. Mouse-aware software allows you to activate commands by clicking a mouse button while pointing at objects displayed on the screen.

**MPEG**

Acronym for Motion Picture Experts Group. MPEG is a digital video file format.

**ms**

Abbreviation for millisecond(s).

**name**

The name of an object or variable is the exact string that identifies it in an SNMP Management Information Base (MIB) file or in a CIM Management Object File (MOF).

**NDS**

Abbreviation for Novell Directory Service.

**NIC**

Acronym for network interface card.

**NIS**

Abbreviation for Network Information Services. NIS is a network naming and administration system for smaller networks. A user at any host can get access to files or applications on any host in the network with a single user identification and password.

**noninterlaced**

A technique for decreasing screen flicker by sequentially refreshing each horizontal line on the screen.

**ns**

Abbreviation for nanosecond(s), one billionth of a second.

**NTFS**

Abbreviation for the Microsoft Windows NT<sup>®</sup> File System option in the Windows NT operating system. NTFS is an advanced file system designed for use specifically within the Windows NT operating system. It supports file system recovery, extremely large storage media, and long file names. It also supports object-oriented applications by treating all files as objects with user-defined and system-defined attributes. See also FAT and FAT32.

**NTLM**

Abbreviation for Windows NT LAN Manager. NTLM is the security protocol for the Windows NT operating system. NTLM is now known as Integrated Windows Authentication.

**OID**

Abbreviation for object identifier. An implementation-specific integer or pointer that uniquely identifies an object.

**online access service**

A service that typically provides access to the Internet, e-mail, bulletin boards, chat rooms, and file libraries.

**PAM**

Acronym for Pluggable Authentication Modules. PAM allows system administrators to set an authentication policy without having to recompile authentication programs.

**parallel port**

An I/O port used most often to connect a parallel printer to your system. You can usually identify a parallel port on your system by its 25-hole connector.

**parameter**

A value or option that you specify to a program. A parameter is sometimes called a switch or an argument.

**partition**

You can divide a hard drive into multiple physical sections called partitions with the fdisk command. Each partition can contain multiple logical drives. After partitioning the hard drive, you must format each logical drive with the format command.

**PC card**

A credit-card sized, removable module for portable computers standardized by PCMCIA. PC Cards are also known as "PCMCIA cards." PC Cards are 16-bit devices that are used to attach modems, network adapters, sound cards, radio transceivers, solid state disks and hard disks to a portable computer. The PC Card is a "plug and play" device, which is configured automatically by the Card Services software.

**PCI**

Abbreviation for Peripheral Component Interconnect. The predominant 32-bit or 64-bit local-bus standard developed by Intel Corporation.

**PERC**

Acronym for Expandable RAID controller.

**peripheral device**

An internal or external device—such as a printer, a disk drive, or a keyboard—connected to a system.

**physical memory array**

The physical memory array is the entire physical memory of a system. Variables for physical memory array include maximum size, total number of memory slots on the motherboard, and total number of slots in use.

**physical memory array mapped**

The physical memory array mapped refers to the way physical memory is divided. For example, one mapped area may have 640 KB and the other mapped area may have between 1 MB and 127 MB.

**pixel**

A single point on a video display. Pixels are arranged in rows and columns to create an image. A video resolution, such as 640 x 480, is expressed as the number of pixels across by the number of pixels up and down.

**Plug and Play**

An industry-standard specification that makes it easier to add hardware devices to personal computers. Plug and Play provides automatic installation and configuration, compatibility with existing hardware, and dynamic support of mobile computing environments.

**power supply**

An electrical system that converts AC current from the wall outlet into the DC currents required by the system circuitry. The power supply in a personal computer typically generates multiple voltages.

**power unit**

A set of power supplies in a system chassis.

**ppm**

Abbreviation for pages per minute.

**PPP**

Abbreviation for Point-to-Point Protocol.

**program diskette set**

The set of diskettes from which you can perform a complete installation of an operating system or application program. When you reconfigure a program, you often need its program diskette set.

**protected mode**

An operating mode supported by 80286 or higher microprocessors, protected mode allows operating systems to implement:

- A memory address space of 16 MB (80286 microprocessor) to 4 GB (Intel386 or higher microprocessor)
- Multitasking
- Virtual memory, a method for increasing addressable memory by using the hard drive

**provider**

A provider is an extension of a CIM schema that communicates with managed objects and accesses data and event notifications from a variety of sources. Providers forward this information to the CIM Object Manager for integration and interpretation.

**RAC**

Acronym for remote access controller.

**RAID**

Acronym for redundant array of independent drives.

**RAM**

Acronym for random-access memory. A system's primary temporary storage area for program instructions and data. Each location in RAM is identified by a number called a memory address. Any information stored in RAM is lost when you turn off your system.

**RBAC**

Abbreviation for role-based access control.

**read-only file**

A read-only file is one that you are prohibited from editing or deleting. A file can have read-only status if:

- Its read-only attribute is enabled.
- It resides on a physically write-protected diskette or on a diskette in a write-protected drive.
- It is located on a network in a directory to which the system administrator has assigned read-only rights to you.

**readme file**

A text file included with a software package or hardware product that contains information supplementing or updating the documentation for the software or hardware. Typically, readme files provide installation information, describe new product enhancements or corrections that have not yet been documented, and list known problems or other things you need to be aware of as you use the software or hardware.

**real mode**

An operating mode supported by 80286 or higher microprocessors, real mode imitates the architecture of an 8086 microprocessor.

**refresh rate**

The rate at which the monitor redraws the video image on the monitor screen. More precisely, the refresh rate is the frequency, measured in Hz, at which the screen's horizontal lines are recharged (sometimes also referred to as its vertical frequency). The higher the refresh rate, the less video flicker can be seen by the human eye. The higher refresh rates are also noninterlaced.

**remote management system**

A remote management system is any system that accesses the Server Administrator home page on a managed system from a remote location using a supported Web browser. See managed system.

**ROM**

Acronym for read-only memory. Your system contains some programs essential to its operation in ROM code. Unlike RAM, a ROM chip retains its contents even after you turn off your system. Examples of code in ROM include the program that initiates your system's boot routine and the POST.

**RPM**

Abbreviation for Red Hat® Package Manager.

**SAN**

Acronym for storage area network.

**SAS**

Acronym for serial attached SCSI.

**SCA**

Abbreviation for single connector attachment.

**schema**

A collection of class definitions that describes managed objects in a particular environment. A CIM schema is a collection of class definitions used to represent managed objects that are common to every management environment, which is why CIM is called the Common Information Model.

**SCSI**

Acronym for small computer system interface. An I/O bus interface with faster data transmission rates than standard ports. You can connect up to seven devices (15 for some newer SCSI types) to one SCSI interface.

**SEL**

Acronym for system event log.

**sec**

Abbreviation for second(s).

**secure port server**

An application that makes Web pages available for viewing by Web browsers using the HTTPS protocol. See Web server.

**serial port**

An I/O port used most often to connect a modem to your system. You can usually identify a serial port on your system by its 9-pin connector.

**settings**

Settings are conditions of a manageable object help to determine what happens when a certain value is detected in a component. For example, a user can set the upper critical threshold of a temperature probe to 75 degrees Celsius. If the probe reaches that temperature, the setting results in an alert being sent to the management system so that user intervention can be taken. Some settings, when reached, can trigger a system shutdown or other response that can prevent damage to the system.

**server module**

A modular system component that functions as an individual system. To function as a system, a server module is inserted into a chassis which includes power supplies, fans, a system management module, and at least one network switch module. The power supplies, fans, system management module, and network switch module are shared resources of the server modules in the chassis. See modular system.



**service tag number**

A bar code label that identifies each system in the event that you need to call for customer or technical support.

**shadowing**

A computer's system and video BIOS code is usually stored on ROM chips. Shadowing refers to the performance-enhancement technique that copies BIOS code to faster RAM chips in the upper memory area (above 640 KB) during the boot routine.

**SIMM**

Acronym for single in-line memory module. A small circuit board containing DRAM chips that connects to the system board.

**SMTP**

Abbreviation for Simple Mail Transfer Protocol.

**SNMP**

Abbreviation for Simple Network Management Protocol. SNMP, a popular network control and monitoring protocol, is part of the original TCP/IP protocol suite. SNMP provides the format in which vital information about different network devices, such as network servers or routers, can be sent to a management application.

**SRAM**

Abbreviation for static random-access memory. Because SRAM chips do not require continual refreshing, they are substantially faster than DRAM chips.

**SSL**

Abbreviation for secure socket layer.

**state**

Refers to the condition of an object that can have more than one condition. For example, an object may be in the "not ready" state.

**status**

Refers to the health or functioning of an object. For example, a temperature probe can have the status normal if the probe is measuring acceptable temperatures. When the probe begins reading temperatures that exceed limits set by the user, it reports a critical status.

**SVGA**

Abbreviation for super video graphics array. VGA and SVGA are video standards for video adapters with greater resolution and color display capabilities than previous standards.

To display a program at a specific resolution, you must install the appropriate video drivers and your monitor must support the resolution. Similarly, the number of colors that a program can display depends on the capabilities of the monitor, the video driver, and the amount of video memory installed in the system.

**switch**

On a system board, switches control various circuits or functions in your computer system. These switches are known as DIP switches; they are normally packaged in groups of two or more switches in a plastic case. Two common DIP switches are used on system boards: slide switches and rocker switches. The names of the switches are based on how the settings (on and off) of the switches are changed.

**syntax**

The rules that dictate how you must type a command or instruction so that the system understands it. A variable's syntax indicates its data type.

**system board**

As the main circuit board, the system board usually contains most of your system's integral components, such as the following:

- Microprocessor
- RAM
- Controllers for standard peripheral devices, such as the keyboard
- Various ROM chips

Frequently used synonyms for system board are motherboard and logic board.

**system configuration information**

Data stored in memory that tells a system what hardware is installed and how the system should be configured for operation.

**system diskette**

System diskette is a synonym for bootable diskette.

**system memory**

System memory is a synonym for RAM.

**System Setup program**

A BIOS-based program that allows you to configure your system's hardware and customize the system's operation by setting such features as password protection and energy management. Some options in the System Setup program require that you reboot the system (or the system may reboot automatically) in order to make a hardware configuration change. Because the System Setup program is stored in NVRAM, any settings remain in effect until you change them again.

**system.ini file**

A start-up file for the Windows operating system. When you start Windows, it consults the **system.ini** file to determine a variety of options for the Windows operating environment. Among other things, the **system.ini** file records which video, mouse, and keyboard drivers are installed for Windows.

Running the Control Panel or Windows Setup program may change options in the **system.ini** file. On other occasions, you may need to change or add options to the **system.ini** file manually with a text editor, such as Notepad.

**table**

In SNMP MIBs, a table is a two dimensional array that describes the variables that make up a managed object.

**TCP/IP**

Abbreviation for Transmission Control Protocol/Internet Protocol. A system for transferring information over a computer network containing dissimilar systems, such as systems running Windows and UNIX.

**termination**

Some devices (such as the last device at each end of a SCSI cable) must be terminated to prevent reflections and spurious signals in the cable. When such devices are connected in a series, you may need to enable or disable the termination on these devices by changing jumper or switch settings on the devices or by changing settings in the configuration software for the devices.

**text editor**

An application program for editing text files consisting exclusively of ASCII characters. Windows Notepad is a text editor, for example. Most word processors use proprietary file formats containing binary characters, although some can read and write text files.

**TFTP**

Abbreviation for Trivial File Transfer Protocol. TFTP is a version of the TCP/IP FTP protocol that has no directory or password capability.

**text mode**

A video mode that can be defined as x columns by y rows of characters.

**threshold values**

Systems are normally equipped with various sensors that monitor temperature, voltage, current, and fan speed. The sensor's threshold values specify the ranges (min and max values) for determining whether the sensor is operating under normal, noncritical, critical or fatal conditions. Server Administrator-supported threshold values are

- UpperThresholdFatal
- UpperThresholdCritical
- UpperThresholdNon-critical
- Normal
- LowerThresholdNon-critical
- LowerThresholdCritical
- LowerThresholdFatal

**time-out**

A specified period of system inactivity that must occur before an energy conservation feature is activated.

**tpi**

Abbreviation for tracks per inch.

**TSR**

Abbreviation for terminate-and-stay-resident. A TSR program runs "in the background." Most TSR programs implement a predefined key combination (sometimes referred to as a hot key) that allows you to activate the TSR program's interface while running another program. When you finish using the TSR program, you can return to the other application program and leave the TSR program resident in memory for later use. TSR programs can sometimes cause memory conflicts. When troubleshooting, rule out the possibility of such a conflict by rebooting your system without starting any TSR programs.

**TSOP**

Abbreviation for thin small outline package. A very thin, plastic, rectangular surface mount chip package with gull-wing pins on its two short sides.

**UDP**

Abbreviation for user datagram protocol.

**UMB**

Abbreviation for upper memory blocks.

**unicode**

A fixed width, 16-bit world wide character encoding, developed and maintained by the Unicode Consortium.

**upper memory area**

The 384 KB of RAM located between 640 KB and 1MB. If the system has an Intel386 or higher microprocessor, a utility called a memory manager can create UMBs in the upper memory area, in which you can load device drivers and memory-resident programs.

**URL**

Abbreviation for Uniform Resource Locator (formerly Universal Resource Locator).

**USB**

Abbreviation for Universal Serial Bus. A USB connector provides a single connection point for multiple USB-compliant devices, such as mice, keyboards, printers, and computer speakers. USB devices can also be connected and disconnected while the system is running.

**utility**

A program used to manage system resources —memory, disk drives, or printers.

**utility partition**

A bootable partition on the hard drive that provides utilities and diagnostics for your hardware and software. When activated, the partition boots and provides an executable environment for the partition's utilities.

**varbind**

An algorithm used to assign an object identifier (OID). The varbind gives rules for arriving at the decimal prefix that uniquely identifies an enterprise, as well as

the formula for specifying a unique identifier for the objects defined in that enterprise's MIB.

**variable**

A component of a managed object. A temperature probe, for example, has a variable to describe its capabilities, its health or status, and certain indexes that you can use to help you in locating the right temperature probe.

**VGA**

Abbreviation for video graphics array. VGA and SVGA are video standards for video adapters with greater resolution and color display capabilities than previous standards. To display a program at a specific resolution, you must install the appropriate video drivers and your monitor must support the resolution. Similarly, the number of colors that a program can display depends on the capabilities of the monitor, the video driver, and the amount of video memory installed for the video adapter.

**VGA feature connector**

On some systems with a built-in VGA video adapter, a VGA feature connector allows you to add an enhancement adapter, such as a video accelerator, to your system. A VGA feature connector can also be called a VGA pass-through connector.

**video adapter**

The logical circuitry that provides—in combination with the monitor—your system's video capabilities. A video adapter may support more or fewer features than a specific monitor offers. Typically, a video adapter comes with video drivers for displaying popular application programs and operating systems in a variety of video modes.

On some systems, a video adapter is integrated into the system board. Also available are many video adapter cards that plug into an expansion-card connector.

Video adapters often include memory separate from RAM on the system board. The amount of video memory, along with the adapter's video drivers, may affect the number of colors that can be simultaneously displayed. Video adapters can also include their own coprocessor for faster graphics rendering.

**video driver**

A program that allows graphics-mode application programs and operating systems to display at a chosen resolution with the desired number of colors. A software package may include some "generic" video drivers. Any additional video drivers may need to match the video adapter installed in the system.

**video memory**

Most VGA and SVGA video adapters include memory chips in addition to your system's RAM. The amount of video memory installed primarily influences the number of colors that a program can display (with the appropriate video drivers and monitor capabilities).

**video mode**

Video adapters normally support multiple text and graphics display modes. Character-based software displays in text modes that can be defined as  $x$  columns by  $y$  rows of characters. Graphics-based software displays in graphics modes that can be defined as  $x$  horizontal by  $y$  vertical pixels by  $z$  colors.

**video resolution**

Video resolution—800 x 600, for example—is expressed as the number of pixels across by the number of pixels up and down. To display a program at a specific graphics resolution, you must install the appropriate video drivers and your monitor must support the resolution.

**virtual memory**

A method for increasing addressable RAM by using the hard drive. For example, in a system with 16 MB of RAM and 16 MB of virtual memory set up on the hard drive, the operating system would manage the system as though it had 32 MB of physical RAM.

**virus**

A self-starting program designed to inconvenience you. Virus programs have been known to corrupt the files stored on a hard drive or to replicate themselves until a computer system or network runs out of memory. The most common way that virus programs move from one system to another is via "infected" diskettes, from which they copy themselves to the hard drive. To guard against virus programs, you should do the following:

- Periodically run a virus-checking utility on your system's hard drive
- Always run a virus-checking utility on any diskettes (including commercially sold software) before using them

**VMS**

Acronym for Virtual Media Server.

**VNC**

Acronym for Virtual Network Computing. In a VNC system, servers provide applications, data, and the desktop environment, all of which may be accessed through the Internet.

**VRAM**

Acronym for video random-access memory. Some video adapters use VRAM chips (or a combination of VRAM and DRAM) to improve video performance. VRAM is dual-ported, allowing the video adapter to update the screen and receive new image data at the same time.

**W**

Abbreviation for watt(s).

**Wakeup on LAN**

The ability for the power in a client station to be turned on by the network. Remote wake-up enables software upgrading and other management tasks to be performed on users' machines after the work day is over. It also enables remote users to gain access to machines that have been turned off. Intel calls remote wake-up "Wake-on-LAN."

**Web server**

An application that makes Web pages available for viewing by Web browsers using the HTTP protocol.

**Winbind**

A program that allows users in a heterogeneous network to log in using workstations that have either UNIX or Windows operating systems. The program makes workstations using UNIX functional in Windows domains, by making Windows appear like UNIX to each UNIX workstation.



**win.ini file**

A start-up file for the Windows operating system. When you start Windows, it consults the **win.ini** file to determine a variety of options for the Windows operating environment. Among other things, the **win.ini** file records what printer(s) and fonts are installed for Windows. The **win.ini** file also usually includes sections that contain optional settings for Windows application programs that are installed on the hard drive. Running the Control Panel or Windows Setup program may change options in the **win.ini** file. On other occasions, you may need to change or add options to the **win.ini** file manually with a text editor such as Notepad.

**Windows NT**

High-performance server and workstation operating system software developed by Microsoft that is intended for technical, engineering, and financial applications.

**write-protected**

Read-only files are said to be write-protected. You can write-protect a 3.5-inch diskette by sliding its write-protect tab to the open position or by setting the write-protect feature in the System Setup program.

**WMI**

Acronym for Windows Management Instrumentation. WMI provides CIM Object Manager services.

**X.509 Certificate**

An X.509 certificate binds a public encryption key to the identity or other attribute of its principal. Principals can be people, application code (such as a signed applet) or any other uniquely identified entity (such as a secure port server or Web server).

**XMM**

Abbreviation for extended memory manager, a utility that allows application programs and operating systems to use extended memory in accordance with the XMS.

**XMS**

Abbreviation for eXtended Memory Specification.

**X Window System**

The graphical user interface used in the Red Hat<sup>®</sup> Enterprise Linux<sup>®</sup> and SUSE<sup>®</sup> Linux Enterprise Server environments.

**ZIF**

Acronym for zero insertion force. Some systems use ZIF sockets and connectors to allow devices such as the microprocessor chip to be installed or removed with no stress applied to the device.

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