IBM

Implementing IBM Systems Director 6.1

- Practical guide to getting the most out of the next generation of IBM Director
- Detailed rationale for the use of each management operation
- Useful real-world scenarios put it all together

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Note: Before using this information and the product it supports, read the information in “Notices” on page xiii.

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Preface

IBM Systems Director is a platform management foundation that streamlines the way physical and virtual systems are managed across a multi-system environment. Leveraging industry standards, IBM Systems Director supports multiple operating systems and virtualization technologies across IBM® and non-IBM platforms.

IBM Systems Director provides multi-system support for IBM Power Systems™, Systems x, BladeCenter®, System z®, and Storage Systems, enabling integration of IBM systems with the total infrastructure. IBM Systems Director also manages non-IBM x86-based systems through a dedicated agent.

This IBM Redbooks® publication describes how to implement systems management with IBM Systems Director 6.1, discussing IBM Systems Director architecture, its adherence to industry standards, and the planning required for a successful implementation.

This book helps you tailor and configure IBM Systems Director while showing how to maximize your investment in IBM technology. This book is a companion to the IBM Systems Director online publications and the product DVDs.

The team that wrote this book

This book was produced by a team of specialists from around the world working at the International Technical Support Organization, Raleigh Center.

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1

Introduction

This chapter provides an overview of the IBM systems management solution and the IBM Systems Director 6.1 offering. A product overview and licensing summary is provided, along with a description of some of the main new features of the latest release. It also provides a list of resources for additional information about Systems Director, including where to obtain various related pieces of software.

This chapter discusses the following topics:

1.1 Overview

Effective systems management is more important than ever as IT administrators are faced with the daunting task of managing complex, heterogeneous IT environments with fewer resources. Reducing the complexity with intuitive, automated tools that simplify critical IT tasks and require less training is key to helping customers face this challenge. The latest release of the IBM Director product family represents the next generation in systems management tools developed by IBM for its server customers. IBM Systems Director 6.1 enables IT staff to reduce the complexity and costs associated with managing IT environments. Systems Director's new Web interface helps customers get started faster and be more productive in less time, with enhancements that improve ease of use.

Users are so dependent on their computer systems that they are increasingly frustrated by system outages, print problems, and anything that keeps them from being productive. They expect immediate assistance from the help desk or support center to fix a problem or to show them how to use an application. IT personnel are challenged to keep system availability high and to handle user requests quickly and efficiently. Yet today, their environments are more complex than ever, with diverse management tools that have no common characteristics and little to no integration. This means that they can spend too much time managing existing IT resources rather than working on other important problems.

IBM Systems Director's Web and command-line interfaces provide a consistent user environment focused on driving common systems management tasks and functions. Moving forward, this same look and feel will become consistent across many tools from IBM, including those offered by Tivoli®.

Systems Director enables monitoring and event management across heterogeneous IT environments from a single browser-based user interface. IBM Systems Director provides broad platform coverage, including Microsoft Windows®, Intel® Linux®, Power Linux, AIX®, i5/OS®, IBM i, and System z Linux environments across System p, System i®, System x, System z, BladeCenter, and OpenPower®, as well as x86-based non-IBM hardware.

From one access point, users can monitor system environmentals, resources, inventory, events, task management, core corrective actions, distributed commands, and hardware control for both servers and storage. This IBM Redbooks publication provides a detailed discussion of the new Web interface, as well as important details concerning the implementation of the next generation IBM release of its IBM Director product family.

1.2 Industry standards

It has often been said that *the nice thing about industry standards is that there are so many of them*. This statement certainly is true regarding systems management. A key underpinning of IBM Systems Director is the adherence to industry standards for systems management.

IBM servers are instrumented to support many industry standards related to systems management. IBM Systems Director supports these standards as well, providing comprehensive cross-platform support. Since Systems Director is based on industry standards, it can manage both IBM and non-IBM Intel processor-based hardware. This is a huge benefit from the standpoint of simplifying systems management of a heterogeneous environment.

A very brief summary of each systems management industry standard supported by Systems Director is provided here.

1.2.1 Common Information Model

The Common Information Model (CIM), adopted and evolved by the Distributed Management Task Force (DMTF), is a published systems management standard and was developed in an open forum by DMTF member companies. Defined and promoted as an industry standard for managing systems, CIM was designed to be used for describing management information between differing management applications, running in many different operating environments, including Microsoft Windows and Linux. Detailed information about the CIM Specification is available from the DMTF home page:

`http://www.dmtf.org`

CIM provides a common definition of management information for systems, networks, applications, and services, and allows for vendor extensions. CIM's common definitions enable vendors to exchange rich management information between systems throughout the network. CIM is composed of a specification and a schema. The schema provides the actual model descriptions, while the specification defines the details for integration with other management models.

CIM is used extensively throughout Systems Director. In fact, all management function performed against Platform Agent is based entirely on CIM instrumentation and providers. For more about information about Platform Agent and its capabilities, see “Platform Agent” on page 14.

1.2.2 Intelligent Platform Management Interface

Intelligent Platform Management Interface (IPMI) is a standardized, abstracted, message-based interface developed by Intel that defines records for describing platform management devices and their characteristics. This interface allows for standard communication between systems management software such as IBM Systems Director and IPMI-compliant system management hardware such as IBM Baseboard Management Controllers (BMCs).

1.2.3 Platform Event Trap

A platform event is defined as an event that is originated directly from platform firmware (Basic Input/Output System, or BIOS) or platform hardware (application-specific integrated circuit (ASIC), chip set, or microcontroller) independent of the state of the operating system or system management hardware. The Platform Event Trap (PET) format is used for sending a platform event in an Simple Network Management Protocol (SNMP) trap. The trap may be directly issued from the platform or may be indirectly issued via a proxy (local or remote) that acts on events or alternatively formatted traps from the platform.

The Platform Event Trap allows traps to be generated from various sources including:

- BIOS
- Operating system (OS) bootstrap loader
- Network interface card
- System alert ASIC
- System management micro-controller
- System management software
- Alert proxy software
- Service Location Protocol

PET-formatted events are generated by BMC service processors found in IBM System x hardware. Other IBM service processors, even on System x servers, do not generate PET events.

1.2.4 Predictive Failure Analysis

Predictive Failure Analysis (PFA) gives key components in IBM System x servers the ability to monitor their own health and generate an alert up to 48 hours before failure occurs. This allows the system administrator to either hot swap the component (if applicable) or schedule downtime at low-impact times for the component to be changed or refreshed.

PFA code monitors certain subsystems within the component, and if tolerances exceed a predetermined range, an alert is automatically generated. For example, in hard disks, PFA code monitors:

- Read/write errors
- Fly height changes (the height of the disk head above the platter)
- Torque amplification control (the amount of power used to keep the drive spinning at a constant speed)

IBM implements PFA on more server components than any other vendor. The System x components currently protected by PFA are:

- CPUs
- Memory
- Hard disk drives
- Voltage regulator modules
- Power supply units
- Fans

IBM is extremely confident in the PFA technology used in System x servers. If a hardware component generates an alert within the warranty period of the component, IBM will exchange the component on the basis of that alert rather than wait for the failure to actually occur.

1.2.5 Service Location Protocol

The Service Location Protocol (SLP) was originally an Internet Engineering Task Force (IETF) standards track protocol that provides a framework to allow networking applications to discover the existence, location, and configuration of networked services in enterprise networks. Traditionally, in order to locate services in the network, users of network applications have been required to supply the host name or network address of the machine that provides a desired service. SLP eliminates the need for a user to know the name or address of a network host supporting a service.

SLP is used to discover Platform Agent systems. For more about Platform Agent and its capabilities, see “Platform Agent” on page 14.

1.2.6 Simple Network Management Protocol

The Simple Network Management Protocol (SNMP) is a set of internet standards for communicating with devices such as servers, workstations, printers, routers, switches, and hubs connected on a TCP/IP network.

A device is said to be SNMP manageable if it can be monitored and controlled using SNMP messages. These devices contain SNMP agent software to send, receive, and act upon SNMP messages. SNMP uses Management Information Base (MIB) files, which define the information available from any SNMP-manageable device.

SNMP is an application layer protocol that facilitates the exchange of management information between network devices and is part of the TCP/IP suite. It is perhaps the oldest and most widely implemented standard for systems management. Although SNMPv3 can be implemented in a secure manner, there are serious security issues that you must consider before using SNMPv1 or SNMPv2.

For more information about SNMP security, see “Simple Network Management Protocol (SNMP)” on page 91.

1.2.7 Storage Management Initiative Specification

The Storage Management Initiative Specification (SMI-S), driven by the Storage Networking Industry Association (SNIA), is an industry standard to access and manage storage devices. SMI-S defines a method for the interoperable management of a heterogeneous storage area network (SAN). SMI-S expands on the CIM and WBEM standards, using XML over HTTP to communicate between storage management applications and the devices that they manage.

The specification standardizes and streamlines storage management functions and features into a common set of tools that address the day-to-day tasks of the IT environment. Common systems management functionality such as discovery, inventory, system configuration, and event notification can be achieved using the SMI-S standard.

The following storage devices are SMI-S compliant and are supported directly by Storage Management in Systems Director:

- LSI 1064 RAID controller (onboard controller found in IBM System x servers)
- LSI 1078 RAID controller (onboard controller found in IBM System x servers)
- IBM System Storage™ DS3000 series disk storage systems
- IBM System Storage DS4000® series disk storage systems
- IBM System Storage DS6000™ series disk storage systems
- QLogic® 2 Gbps and 4 Gbps Fibre Channel switches for IBM BladeCenter
- All Brocade Fibre Channel switches for IBM BladeCenter

QLogic 8 Gbps Fibre Channel switches were not supported at the time of writing.

For more information about the SNIA and details on the SMI-S specification, see:

http://www.snia.org

1.2.8 System Management Bus

The System Management Bus (SMBus) is the default standard interface for system management communication in most electronic equipment from televisions to computers. It is based on the Inter Integrated Circuit (I^2C) bus that was developed by Phillips. It is a two-wired bus embedded on the system board in all IBM System x servers and supports temperature sensors, fan sensors, power supply sensors, and other devices that might exist in the server and can provide system management information.

Some servers do not have a service processor, but they still can provide some system management information. This is taken care of by the LM chip. The LM chip replaces the service processor in entry-level servers and is connected to the SMBus. Because the LM chip is very common in computers today, most operating systems contain a device driver for it and can receive any messages sent from it. IBM Systems Director can get system management information from the SMBus driver running non-IBM hardware that use the LM chip.

Even if the chip provides support for many different system management devices, it still comes down to the kind of components used in the server. For example, a fan must have an RPM counter, and the system board must have a temperature sensor for these parameters to be monitored and communicated. The LM chip is a one-way chip that can only send information to the operating system. It is not possible to request information from the LM chip.

For information about SMBus see:

http://www.smbus.org

For information about I^2C see:

http://www.philipslogic.com/i2c

1.2.9 System Management BIOS

BIOS is the program originally conceived to get a PC started after power-on. The BIOS also manages pre-boot data flow between the computer's operating system and attached devices such as the hard disk, video adapter, keyboard, and mouse. When the BIOS starts up a computer, it first determines whether all of the attachments are in place and operational and then loads the operating system (or key parts of it) into the computer's memory from local storage or the network.

The System Management BIOS (SMBIOS) specification, developed by Intel, addresses how motherboard and system vendors present management information about their products in a standard format by extending the BIOS interface on x86 architecture systems. The information is intended to allow generic instrumentation to deliver this information to management applications that use Desktop Management Interface (DMI), CIM, or direct access, eliminating the need for error-prone operations like probing system hardware for presence detection.

A critical requirement that must be met by any Intel-based, non-IBM system is that the system must implement SMBIOS Version 2.2 or later. SMBIOS extends the system BIOS to support retrieval of management data in desktop, mobile, and server system hardware. As this requirement is placed on system firmware, it is applicable even for systems prior to loading an operating system. Most Intel-based hardware vendors implement SMBIOS in their systems.

1.2.10 Systems Management Architecture for Server Hardware

The DMTF Systems Management Architecture for Server Hardware (SMASH) initiative is a suite of specifications that deliver architectural semantics, industry standard protocols, and profiles to unify the management of the data center. The server management (SM) Command Line Protocol (CLP) specification enables management of heterogeneous servers independent of machine state, operating system state, server system topology, or access method. This allows local and remote management of server hardware in both out-of-service and out-of-band management environments. SMASH also includes the SM Managed Element Addressing Specification, SM CLP-to-CIM Mapping Specification, SM CLP Discovery Specification, and Server Management Profiles.

SMASH is a CIM standard that uses profiles to store and manage compliant devices. Although not available in its initial release, future releases of IBM Systems Director will use SMASH-compliant CIM profiles when communicating with Platform Agent on System x servers that contain an integrated Management Module. This next-generation service processor will merge many capabilities of current BMC and Remote Supervisor Adapter (RSA) subsystems to provide higher-level on-board systems management functionality out of the box.

1.2.11 Unified Extensible Firmware Interface

Unified Extensible Firmware Interface (UEFI) is a specification detailing an interface that helps hand off control of the system for the pre-boot environment to an operating system. It replaces BIOS. UEFI provides a clean interface between operating systems and platform firmware at boot time, and supports an architecture-independent mechanism for initializing add-in cards.

The UEFI specification is based on the EFI 1.10 specification published by Intel with corrections and changes managed by the Unified EFI Forum. There will not be any future versions of the Intel EFI specification. For more information about the UEFI specification, see the Unified EFI Forum site at:

http://www.uefi.org

BIOS has served as the OS-to-firmware interface since the original PC-XT and PC-AT computers. This interface has been expanded over the years as the PC market has grown, but was never fully modernized. UEFI defines a similar OS-firmware interface, known as *boot services* and *runtime services*, but is not specific to any processor architecture. BIOS is specific to the Intel x86 processor architecture, as it relies on the 16-bit real mode interface supported by x86 processors.

IBM has already released systems that utilize UEFI rather than heritage BIOS and intends to adopt UEFI across its entire System x server family moving forward. These systems will also utilize the integrated Management Module mentioned in the next section.

1.2.12 Integrated Management Module

The integrated Management Module (iMM) service processor provides standards-based systems management functionality, enabling upward integration into a wide variety of enterprise management environments out of the box. Available in the newest IBM System x servers, the iMM provides RSA II functionality, as well as remote presence, in addition to several new functions. It is not necessary to install device drivers for an iMM, since drivers are already present in both Windows and Linux operating systems. A single firmware image for the iMM will be used across the IBM System x product set, simplifying this aspect of systems management. The iMM allows a choice of dedicated or shared Ethernet connectivity, so systems management network traffic can be fully isolated from the production network.

1.3 IBM Systems Director

IBM Systems Director is a platform management foundation that streamlines the way physical and virtual systems are managed across a multi-system environment. Leveraging industry standards, Systems Director supports multiple operating systems and virtualization technologies across IBM and non-IBM platforms. IBM Systems Director is an easy-to-use, point-and-click, simplified management solution. Through a single browser-based user interface, Systems Director provides consistent views for visualizing managed systems and

determining how these systems relate to one another while identifying their individual status.

IBM Systems Director 6.1 is a platform management solution that utilizes a modular and extensible platform services foundation, which provides a way to add advanced platform management capabilities to the base offering. Advanced platform management functions can be added via plug-ins as they are required. IBM Systems Director is based on industry standards and can report results to other tools.

IBM Systems Director unifies the management of IBM systems, delivering a consistent look and feel for common management tasks, and integrates the IBM best-of-breed virtualization capabilities to provide new and radically improved ways to simplify the management of physical and virtual platform resources. Systems Director provides multi-system support for IBM Power Systems, Systems x, BladeCenter, System z, and Storage Systems, enabling seamless integration of IBM systems with the total infrastructure. Systems Director also manages non-IBM x86-based systems through a dedicated agent.

IBM Systems Director is the next-generation platform management solution of IBM Director that can improve the customer's total cost of ownership by decreasing management costs and improving the utilization of existing IT resources within a datacenter by eliminating the need to maintain multiple tools.

1.3.1 Features of IBM Systems Director 6.1

There is a long list of features associated with IBM Systems Director. Key among these are that it:

- Unifies the management of IBM systems, delivering a consistent look and feel for common management tasks
- Integrates IBM best-of-breed virtualization capabilities to provide new and radically improved ways to simplify the management of physical and virtual platform resources
- Provides multi-system support for IBM Power Systems, Systems x, BladeCenter, System z, and Storage Systems
- Provides an extensible and modular foundation to advance the core systems management capabilities with additional plug-ins
- Enables seamless integration of IBM systems with the total infrastructure
- Facilitates reduced training cost by means of a consistent and unified platform management foundation and interface
- Manages non-IBM x86-based systems through a dedicated agent

IBM Systems Director is the next generation platform management solution of IBM Director that can improve the total cost of ownership by decreasing management costs and improving the utilization of existing IT resources within a datacenter by eliminating the need to maintain multiple tools.

1.3.2 IBM Systems Director components

IBM Systems Director is designed to manage a complex environment that contains numerous servers, desktop computers, workstations, notebook computers, storage subsystems, and various types of SNMP-based devices. Figure 1-1 on page 12 shows a simple diagram of the major components that you might find in a Systems Director managed environment, as well as the Systems Director software components that might be installed on each type of hardware.

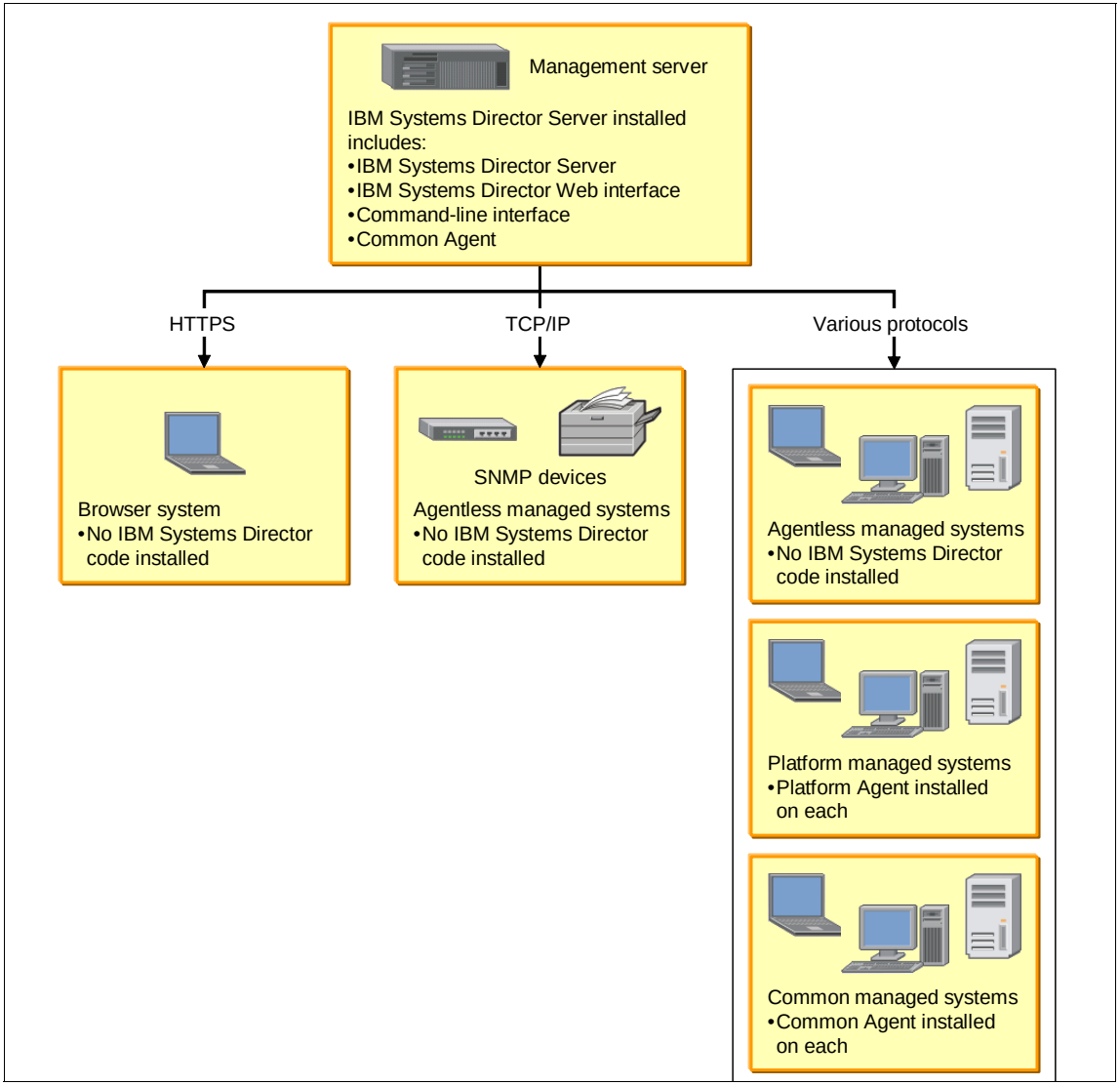


Figure 1-1 IBM Systems Director management environment showing components

Like IBM Director 5.20, IBM Systems Director 6.1 includes a management server component, as well as a choice between multiple management agents. However, there is no management console component in a Systems Director environment. The console function is provided entirely through a supported Web browser.

The hardware in a Systems Director environment can be divided into the following categories:

- *Management servers*: One or more servers on which IBM Systems Director Server is installed
- *Managed systems*: Servers, workstations, desktop computers, and notebook computers that are managed by Systems Director
- *SNMP devices*: Network devices, printers, or computers that have SNMP agents installed or embedded

In today's rapidly changing and complex IT environments, it is common to find a mixture of system types, wiring structures, and network protocols used within a single corporate IT infrastructure. In addition, it is becoming very common to find virtual systems contributing an increasingly significant portion of the overall IT resource. IBM Systems Director supports hardware from the entire IBM Systems family, Intel-based hardware from many manufacturers, virtual systems from all the leading virtualization engines, as well as multiple network connection types and protocols, enabling you to manage a heterogeneous environment.

IBM Systems Director software has three main components:

- Platform Agent
- Common Agent
- IBM Systems Director Server

Each managed endpoint in a Systems Director environment may have one or more of these components installed, each of which is described in the following sections.

Systems Director can manage some endpoints on which none of the above components are installed. Such a managed system is now referred to as an agentless-managed system. This is equivalent to the *Level-0 managed object* terminology of a Director 5 environment.

These endpoints must at a minimum support either Secure Shell (SSH), Distributed Component Object Model (DCOM), or Simple Network Management Protocol (SNMP) in order for the Systems Director server to discover them. The function available to agentless-managed systems is limited to the following tasks, and varies based on operating system and hardware:

- Discover systems.
- Collect limited operating-system inventory data.
- Remotely deploy and install Platform Agent.
- Remotely deploy and install Common Agent.
- Perform limited remote access.
- Perform limited restart capabilities.

For additional information about determining whether to install Platform Agent or Common Agent on your managed systems, see the next two sections, as well as 2.3.2, “Agents” on page 65.

Platform Agent

Platform Agent is installed on managed systems where the smallest agent footprint is critical and management requirements are fairly simple. This agent communicates directly with both the operating system and the hardware (that is, the service processor) to surface problems via Director Native Events, CIM indications, and SNMP traps to the management server. Platform Agent also is responsible for communicating with other systems management environments, which is referred to as *upward integration*. Platform Agent is equivalent to the Level-1 Agent or IBM Director Core Services component of a Director 5 environment.

Platform Agent provides a base set of management functionality that is used to communicate with and administer a managed endpoint. Systems that have Platform Agent (but not Common Agent) installed on them are referred to as Platform Agent managed systems.

Tip: Platform Agent Version 6.1 and IBM Director Core Services Version 5.20.3 are the same agent. If Core Services 5.20.3 is already installed on an endpoint, it is not necessary to install Platform Agent 6.1 on the system.

Platform Agent provides management entirely through standard protocols. This includes discovery, authentication, and management. The Platform Agent package installs an SLP service agent, an SSL-enabled CIMOM (on Linux), or CIM mapping libraries to Windows Management Instrumentation (WMI) (on Windows), an optional SSH server, and platform-specific instrumentation.

The function available for Platform Agent managed systems is limited to the following tasks, and varies based on operating system and hardware:

- Discover systems.
- Collect limited platform inventory data.
- Monitor health and status.
- Manage alerts.
- Remotely deploy and install Common Agent.
- Perform limited remote access.
- Perform limited restart capabilities.

Note: Platform Agent will not surface hardware events from non-IBM hardware, since the IBM CIM mapping libraries do not understand CIM indications from non-IBM hardware. The single exception to this rule is that SMART drive events should be surfaced, since there is an industry standard method developed specifically for this purpose.

Common Agent

Common Agent is the full-function management agent designed to provide comprehensive systems management capabilities. Once Common Agent is installed on an endpoint, additional agent-side plug-ins can be installed to add advanced management functionality to the endpoint. For example, once Common Agent is installed on a VMware VirtualCenter Server, the IBM Systems Director Virtualization Manager plug-in can be pushed to that system to support advanced Virtualization Manager functionality that is particular to VirtualCenter. Common Agent is equivalent to the Level-2 Agent or IBM Director Agent component of a Director 5 environment.

Note: If Common Agent is installed on an endpoint, then Platform Agent is also installed on that endpoint.

Common Agent is installed on a managed endpoint to provide enhanced functionality for IBM Systems Director to communicate with and administer the system. Common Agent communicates with the management server through a single port (9510). This is an improvement over the number of ports required for server-agent communication in Director 5, although additional ports are required for certain types of functions. For example, remote command-line access to a Linux-managed system uses port 22, which is standard for the SSH protocol used for this operation.

Systems (IBM and non-IBM servers, desktop computers, workstations, and mobile computers, as well as virtual systems) that have Common Agent installed on them are referred to as Common Agent managed systems.

The function available for Common Agent managed systems varies based on operating system and hardware, and includes the following tasks:

- Discover systems.
- Collect comprehensive platform and operating system inventory data.
- Monitor health and status.
- Manage alerts.
- Remotely deploy and install Common Agent.
- Perform remote access, including transferring files.
- Perform power management function.

- Has additional event support.
- Monitor processes and resources.
- Set critical thresholds that send notifications when triggered.
- Manage operating system resources and processes.

IBM Systems Director Server

IBM Systems Director Server is installed on the system that is to become the management server. Ideally, this is a single system in the environment, but this is not always possible. In the case where multiple management servers are required, you must decide whether to install an Agent Manager on each Systems Director Server or to share a single Agent Manager between multiple management servers. The Agent Manager is new to IBM Systems Director 6.1 and is responsible for credentials and authentication between the IBM Systems Director Server and the Common Agent.

For more about the Agent Manager and its role in an IBM Systems Director environment, see 1.5, “Common Agent Services” on page 35.

Note: If IBM Systems Director Server is installed on an endpoint, then both Common Agent and Platform Agent are also installed on that endpoint.

IBM Systems Director Server is the main component of IBM Systems Director and has been completely rewritten for the Version 6.1 release. Systems Director Server contains the management data, the server engine, and the application logic. It provides basic functions such as discovery of the managed endpoints, persistent storage of inventory data, SQL database support, presence checking, security and authentication, Web service, and administrative tasks.

In the basic installation, Systems Director Server stores management information in an embedded Apache Derby database. You can access information that is stored in this integrated, centralized, relational database even when the managed endpoints are not available. For large-scale Systems Director solutions, you can use a stand-alone database application, such as IBM DB2® Universal Database™, Oracle®, or Microsoft SQL Server®. A complete list of supported databases can be found in 4.8, “Uninstalling IBM Systems Director components” on page 235.

1.3.3 Licensing

All IBM Systems Director components require a license. All supported IBM hardware comes with a license for Common Agent. In addition, every server in the IBM Systems family (System i, System p, System x, System z, and BladeCenter) comes with a license for IBM Systems Director Server. In order to

install Systems Director components on non-IBM systems, appropriate licenses must be purchased.

Common Agent

If you want to install Common Agent on a non-IBM system, you must purchase an IBM Systems Director Agent for non-IBM x86 license (part number 5765-DRA). This license includes a 1-year software subscription, which entitles you to all upgrades released for Common Agent for one year from the date of purchase.

Tip: As in Director 5, each IBM Systems Director Server license includes 20 agent licenses for non-IBM hardware. If you install the management server code on IBM hardware, you can legally manage up to 20 non-IBM systems *from that management server* using Common Agent without purchasing additional licenses. This is meant primarily to allow users to evaluate the effectiveness of Common Agent to manage non-IBM systems.

IBM Systems Director Server

If you want to install IBM Systems Director Server on a non-IBM system, you must purchase an IBM Systems Director on x86, V6.1 license (part number 5765-DRX). This license includes a one year software subscription, which entitles you to all upgrades released for IBM Systems Director Server for one year from the date of purchase.

1.4 What is new in IBM Systems Director 6.1

IBM Systems Director 6.1 provides many new features and enhancements. There are additional supported hardware platforms and operating systems for installation and management. Many functional enhancements have been incorporated and entirely new capabilities have been added.

The extensible architecture of the product has been leveraged to provide *managers* as the basis for management functionality. Terminology has been modified to take into account the product redesign. As with many software product updates, support for some operating systems has been withdrawn and some features have been discontinued.

1.4.1 Functional enhancements

This section describes key functional enhancements.

Web-based user interface

The first enhancement that a user of previous versions of IBM Director is likely to notice is the lack of a separate management console product. A Web browser is your console, connecting directly to IBM Systems Director Server. This makes it much easier to access the management server and perform updates of Systems Director since there is no dedicated Console code to install and maintain.

An example of the new browser interface is shown in Figure 1-2. In this interface, the left column is used to navigate to a desired function. The right side of the window generally shows a table with a list of groups or systems that can be acted upon.

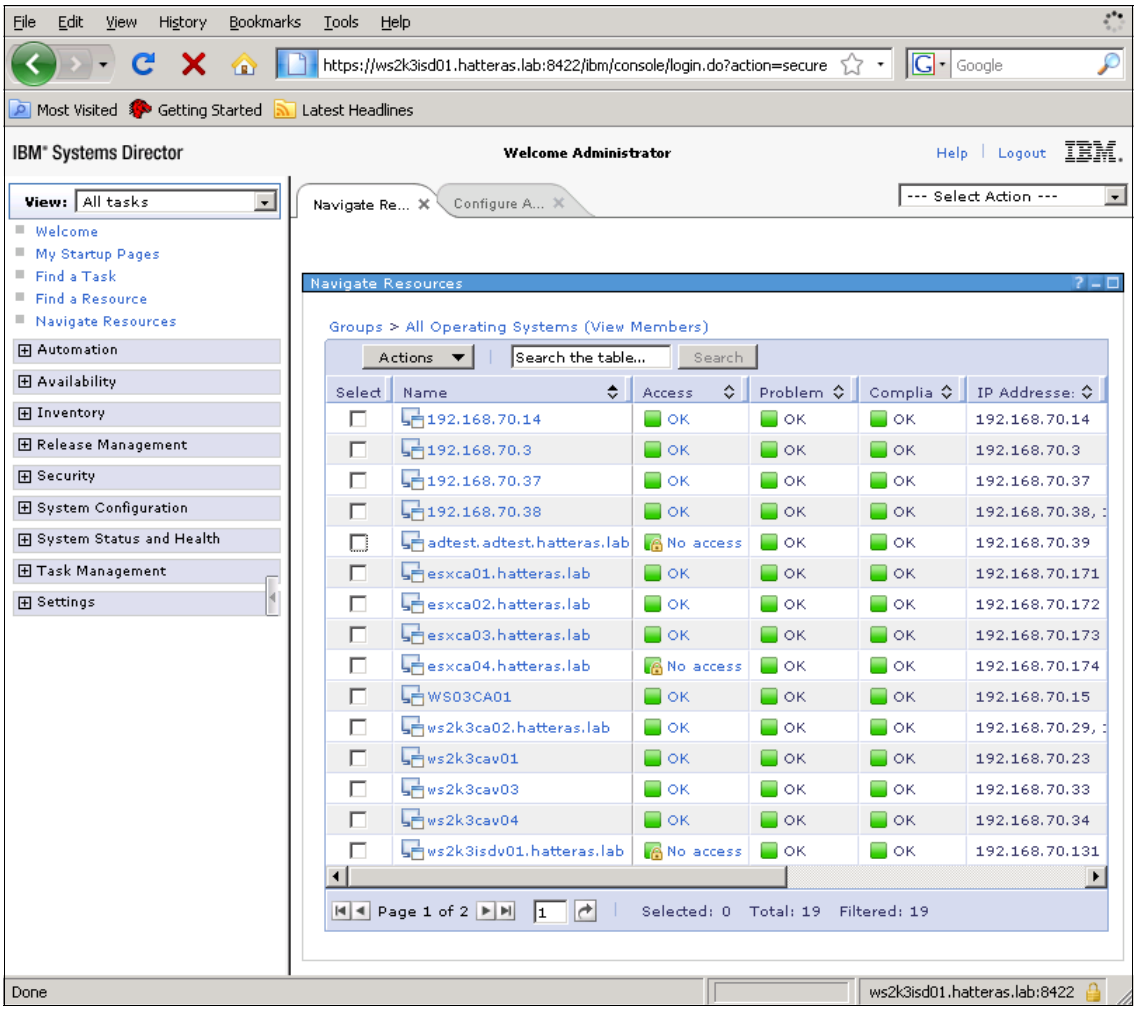


Figure 1-2 IBM Systems Director 6.1 Web interface

A new flexible, intuitive user interface is integrated with the IBM Systems Director Server and is accessible through any supported Web browser that is connected to the management server. Improvements include:

- Welcome pages to assist with setting up IBM Systems Director Server and to determine whether actions are needed after IBM Systems Director Server is up and running
- Resource views that list systems and groups, show relationships between resources, and list resource properties
- Navigation links to help quickly find and perform tasks
- New wizards that walk through certain tasks, such as creating groups
- Create and manage resource groups
- Tutorials to help learn how to use features and functions available with IBM Systems Director

Some tasks have not been ported to the new Web interface but can be launched from the Web interface. These launched tasks are dynamically uploaded to the system on which the browser is running to seamlessly perform the launch-in-context of the task.

Simplified installation and deployment

New functions include:

- Standard and custom installation options and enhanced unattended installation streamlines the base installation of IBM Systems Director Server.
- Automatic start of IBM Systems Director Server after successful installation (Windows only).
- Migration tool that imports custom data from a previous release (available sometime after the initial release date).

Online help system enhancements

A new help system is available with advanced search capabilities and an integrated table of contents. Organization and related links have also been improved. Links from the Web interface display context-sensitive help for the panel that you are currently viewing and also the full help system.

Discovery and inventory data collection enhancements

New functions include:

- Basic discovery to find systems with a specific network address or range of addresses
- Advanced discovery to find systems using a discovery profile, which identifies the type of resources to discover and the discovery protocols to use, automatically authenticates discovered systems, and collects inventory data
- Improved support for IBM Power, System z, and IBM System Storage systems

System status and health enhancements

New functions include:

- Scoreboard to easily monitor the health of your systems, including hardware, thresholds, and compliance status
- Dashboard to view graphical representations of live-data monitors for critical resources
- Health summary to monitor the resources that you care about most
- LED status of System x and blade servers
- Drilling down to the root cause or problems

Agent management enhancements

New tasks are available to deploy, install, and configure Common Agent and manage Common Agent Services (CAS). For more information about CAS, see 1.5, “Common Agent Services” on page 35.

Update management enhancements

New functions include:

- Compliance policies to verify the currency of updates on systems
- Search capabilities for update documentation files

Event Automation Plans enhancements

New functions include:

- Simplified interface for managing Event Automation Plans, including new wizards to easily set up e-mail notifications or run a task
- Common event schema for heterogeneous systems
- New commands for managing Event Automation Plans, event actions, event filters, and event logs

Note: Event Automation Plans were known as *event action plans* in previous releases of IBM Director.

Security enhancements

New functions include:

- Role-based authorization allows users to perform specific GUI and command-line interface CLI tasks and access specific resources
- Authorization through Lightweight Directory Access Protocol (LDAP) groups
- New set of default user roles
- Single sign-on (SSO) authentication using credentials for local and target systems
- Ability to specify credentials for a specific protocol or system, and to view and edit credentials on specific systems
- New command-line support for user groups, roles, and permissions

System configuration enhancements

New functions include:

- Integrated operating-system configurations settings for network, user administration, SNMP agent settings, and inventory data
- Ability to create, view, and edit template settings per system and integrate into a configuration plan
- Improved support for IBM BladeCenter and IBM System Storage systems

Remote management enhancements

Several new tools are available for performing remote tasks, including launching Virtual Network Computing (VNC) and Remote Desktop (RDP), from the IBM Systems Director Web interface.

Virtualization enhancements

IBM Virtualization Manager has been integrated into the IBM Systems Director base suite of tools to support the discovery, health, and life-cycle tasks.

Platform management enhancements

New functions include:

- Support has been improved for managing your storage products, including the seamless integration of Storage Configuration Manager and the ability to launch external applications from the Web interface.
- The ability to launch IBM Systems Director Console for AIX from the IBM Systems Director Web interface.
- Integration of IBM Systems Director Navigator for i5/OS into the IBM Systems Director Web interface.

Storage management enhancements

New functions include:

- Seamless integration of Storage Configuration Manager (SCM) function
- Ability to launch storage management application, such as TotalStorage® Productivity Center (TPC), from the Web interface
- Support for additional storage systems

Command-line interface enhancements

The name of the command-line interface has changed to smcli (systems management command-line interface). The **`dircli`** command-line interface is supported in this release for backward compatibility. All smcli commands will run using either smcli or dircli. However, to use the command syntax supported in IBM Director Version 5.20 and earlier, you must set the CLILEGACY environment variable.

The command-line interface has been enhanced with new commands to support systems, inventory, status, scheduler, user administration, automation, process management, and resource monitoring. For more information about the new smcli commands, see Chapter 16, “Command-line interface (CLI)” on page 729.

1.4.2 Enhanced plug-in architecture

Many functions have been grouped into components, called plug-ins. The following base plug-in managers are provided with IBM Systems Director 6.1:

- Discovery Manager

  This discovers both virtual and physical systems in your network, collects inventory data about hardware and software, and visualizes relationships to other systems in the network. This includes simple unicast discovery and more advanced discovery workflows to discover, authenticate, and inventory one or more specific systems in the network.

For more information about Discovery Manager, see Chapter 6, “Discovery Manager” on page 315.

- Status Manager

  This monitors hardware status, power status, and update compliance status on discovered systems. Using status manager, you can create, view, and customize the resources and processes to monitor and generate notifications when a custom threshold is reached.

  For more information about Status Manager, see Chapter 7, “Status Manager” on page 335.

- Configuration Manager

  This configures system parameters and hardware settings on systems, including BladeCenter chassis and its installed components, in your network. You can also set up configuration manager to automatically configure newly discovered systems.

  For more information about Configuration Manager, see Chapter 8, “Configuration Manager” on page 387.

- Automation Manager

  This automatically performs predefined actions in response to events that occur in your environment using Event Automation Plans. Actions can include sending an e-mail, running a task on the management server, or running a task on the system where the event was generated.

  For more information about Automation Manager, see Chapter 9, “Automation Manager” on page 405.

- Update Manager

  This acquires, distributes, and installs required firmware, device drivers, and operating system updates using predefined policies and workflows. Using update manager, you can also update IBM Systems Director Server and agents and get updates to support hardware changes without an upgrade or migration of the installed product.

  For more information about Update Manager, see Chapter 10, “Update Manager” on page 449.

- Remote Access

  This provides a set of integrated tools that support remote access, including remote control tools (such as VNC, RDP, and Web-based remote control for IBM BladeCenter and RSA), hardware command line, remote command line, and file transfer tools.

  For more information about Remote Access, see Chapter 11, “Remote Access” on page 515.

- Virtualization Manager

  This manages the life-cycle of your virtual resources (such as virtual servers and virtual farms) from a single interface for many of the different virtualization technologies. The virtualization tasks can be included in Event Automation Plans.

  For more information about Virtualization Manager, see Chapter 12, “Virtualization Manager” on page 549.

- Storage Management

  This provides full life-cycle management of your storage resources including discovery, status, configuration, and updates.

  For more information about Storage Management, see Chapter 13, “Storage Management” on page 637.

- IBM BladeCenter and System x management

  This provides full life-cycle management of your modular System x, IBM BladeCenter Chassis, and related resources including discovery, status, configuration, updates, and virtualization.

- IBM Power systems management

  This provides full life-cycle management of your IBM Power systems and related resources including discovery, status, configuration, updates, and virtualization.

- IBM System z management

  This provides the capability to discover System z systems and their associated virtual servers, and to access status information about them.

1.4.3 Terminology changes

Several terms have changed in IBM Systems Director 6.1 and should be noted in order to avoid confusion when working with the new version.

A Level-0 managed object is now referred to as an *agentless-managed system*. This is a system that does not have an agent installed, but can be discovered by IBM Systems Director using SSH, DCOM, or SNMP.

IBM Director Core Services is now referred to as *Platform Agent*. Platform Agent provides a lighter footprint and fewer management functions than the Common Agent. A system on which Platform Agent is installed is now known as a Platform-Agent managed system rather than a Level-1 managed object.

IBM Director Agent is now referred to as *Common Agent*. Common Agent provides a rich set of security, deployment, and management function. A system

on which Common Agent is installed is now known as a Common Agent managed system rather than a Level-2 managed object.

Managed objects are now called *systems*, which are hardware endpoints that can be discovered and managed by IBM Systems Director. For example, storage devices, network devices, physical servers, virtual servers, and virtual farms are systems.

Extensions are now known as *plug-ins*, which are free or for-fee software that is downloaded and installed on top of IBM Systems Director to provide additional function.

Job activation is now referred to as *job instance*, which is a specific occurrence of a job that is running or has completed running.

Event action plans are now called *Event Automation Plans*. These are user-defined policies that determine how IBM Systems Director automatically handles certain events. An event action plan comprises one or more event filters and one or more customized event actions.

Hardware control points are now known as *platform managers*. A platform manager is software that manages one or more host systems and their associated virtual servers and operating systems. Platform managers can be started from the IBM Systems Director Web interface. For example, BladeCenter Management Module, IBM Hardware Management Console (HMC), IBM Integrated Virtualization Manager (IVM), and VMware VirtualCenter are platform managers.

What was previously called a *configuration profile* is now called a *configuration plan*, which is a collection of templates used to configure hardware and operating systems.

Components are now referred to as *templates*. These are stored versions of definition parameters for the configuration of specific systems.

Remote session is now called the *remote command line* and still refers to initiating a command-line interface to a remote managed system.

1.4.4 Withdrawn operating system support

The operating systems listed here are ones that were supported by IBM Director 5.2 but are no longer supported by the Common Agent or Platform Agent in IBM Systems Director 6.1. These operating systems can be managed by IBM Systems Director using the appropriate IBM Director 5.2 Agent. The operating systems that are effected are:

- Thirty-two-bit System x and non-IBM x86 hardware platforms:
  - Windows 2000, all editions and versions
  - Windows Small Business Server 2003, all versions
  - RHEL Advanced Server and Enterprise Server V3.0
  - RHEL Workstation V3.0
  - VMware ESX Server Versions 2.5, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 2.5.5, 3.0.2 U1, 3.0.3
  - VMware GSX Server, v3.1 3.2
- Sixty-four-bit System x and non-IBM x86 hardware platforms:
  - Windows Server® 2003 Datacenter Edition for Itanium® systems
  - Windows Server 2003 Enterprise Edition for Itanium systems
  - RHEL Advanced Server V3.0 for Intel Itanium®
  - RHEL Workstation V3.0 for AMD64 and EM64T
  - RHEL Advanced Server V4., for Intel Itanium
  - SLES 9 for Itanium Processor Family
  - Microsoft Virtual Server 2005
- IBM Power Systems hardware platforms:
  - AIX 5L™ V5.2 TL06 SP4
  - i5/OS, V5R3, V5R4, V6R1
  - RHEL Advanced Server V4.3, 4.4, 4.5, 5.0
- IBM System z hardware platform: RHEL for Mainframe Computing V5.1, 5.0

Note: Even though there is no current version of the Common Agent or Platform Agent for the operating systems listed above, they can be managed by IBM Systems Director using the previous Version 5.20 Director Agent or Core Services.

For further information about supported operating systems, see 2.4, “Operating system support” on page 72.

For a complete list of supported operating systems (including those supported using IBM Director 5.2 agent software or equivalent software such as the i5/OS 5722-UME component) see the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.plan_6.1/fqm0_r_os_supported_by_ibm_director_61.html

1.4.5 Discontinued functions

Several Director 5 management functions have been discontinued in IBM Systems Director 6.1 either because the function is no longer needed or because it has been replaced with an equivalent capability.

IBM Director base functions

The following base functions that were available in IBM Director 5.20 are not supported in IBM Systems Director 6.1:

- License Administrator

  License Administrator is no longer supported in IBM Systems Director. In the previous release you used License Administration to view the total number of product licenses, the number of used licenses, and the number of available licenses.

- Rack Manager

  Rack Manager is no longer supported in IBM Systems Director. In the previous release, you used Rack Manager to group your systems in visual representations of rack suites.

- Remote Control

  Remote Control function has been replaced with third-party tools, including Virtual Network Computing (VNC) and RDP.

- Associations

  Associations changed the organization of a group of managed objects. This is no longer supported.

- High availability

  High availability configurations are not currently supported by IBM Systems Director.

- Microsoft Cluster Management

  You can no longer monitor the status of clusters in your network using the Microsoft Cluster Browser.

- Inventory monitors

  You can no longer create a monitor that will generate an event based on a change in inventory.

- Discontinued event actions

  The following event actions are no longer available:

  - Add a message to the console ticker tape.
  - Send an event message to a console user.
  - Update the status of the event system.

IBM Director 5.20 extensions

The following extensions that were available in IBM Director 5.20 are not supported in IBM Systems Director 6.1:

- Capacity Manager

  Capacity Manager is no longer a supported plug-in for IBM Systems Director. Capacity Manager was a resource-management planning tool that you could use to monitor critical resources, identify current or potential bottlenecks, generate performance-analysis reports, recommend ways to improve performance and prevent diminished performance or downtime, and forecast performance trends.

- Electronic Service Agent™

  The Electronic Service Agent extension has been replaced by the Service and Support Manager plug-in for IBM Systems Director. This plug-in includes the Electronic Service Agent tool, which identifies and reports hardware problems and service information automatically to IBM for service and support.

- Remote Deployment Manager

  Remote Deployment Manager (RDM) is no longer a supported plug-in for IBM Systems Director. RDM is replaced by Tivoli Provisioning Manager for OS Deployment (TPM for OSD). At the time of writing, you can launch TPM for OSD as an external application from the IBM Systems Director Web interface.

- Server Storage Provisioning Tool

  Server Storage Provisioning Tool function and commands have been integrated into IBM Systems Director in the Storage Manager plug-in. The commands are now called storage commands.

- ServeRAID Manager

  ServeRAID Manager is no longer a supported plug-in for IBM Systems Director. Systems Director does perform inventory collection, monitor status, and raise events for RAID controllers.

  Tip: You can launch the ServeRAID Manager as an external application from the IBM Systems Director Web interface. However, the application does not recognize IBM Systems Director systems, groups, or clusters.

- Software Distribution Premium Edition

  Software Distribution Premium Edition is no longer a supported plug-in for IBM Systems Director. Software Distribution Premium Edition was used to import applications and data, build a software package, and distribute the package to managed systems. The Update Manager plug-in for IBM Systems Director 6.1 can perform BIOS, firmware, and driver updates for managed systems, as well as push Common Agent and Platform Agent to any discovered operating system for which the agent is supported.

- System Availability

  System Availability is no longer a supported extension of IBM Systems Director. System Availability was an analysis tool that you used to view statistics about system uptime and downtime, identify problematic systems that have had too many unplanned outages over a specified period of time, identify system that have old availability data, and identify systems that fail to report data.

- z/VM® Center

  z/VM Center is no longer a supported extension of IBM Systems Director. z/VM Center used the z/VM hypervisor to provision System z resources in the form of z/VM virtual servers.

- The dircmd command-line interface

  All dircmd commands and several dircli commands that were supported in IBM Director Version 5.20 and earlier are no longer supported. In most cases, equivalent functionality is implemented through commands in the smcli command-line interface.

1.4.6 How to

This section highlights a few of the major differences between IBM Systems Director 6.1 and previous versions of IBM Director. These differences will be readily apparent to anyone who has a working knowledge of the earlier versions.

Start managing systems

In IBM Director Console Version 5.20, limited status information was displayed along the bottom of the window. This information included:

- The number of managed objects that had critical, warning, or information alerts
- The status of IBM Director
- The host and login information for IBM Director Server
- The number of managed objects in the Group Contents pane.

In the IBM Systems Director 6.1 Web interface, the Welcome page gives you at-a-glance status information.

The Welcome page lets you start your work with a clear picture of your current systems-management environment. Immediately after the first login, the Welcome page suggests next steps for configuring Systems Director, as seen in Figure 1-3 on page 31.

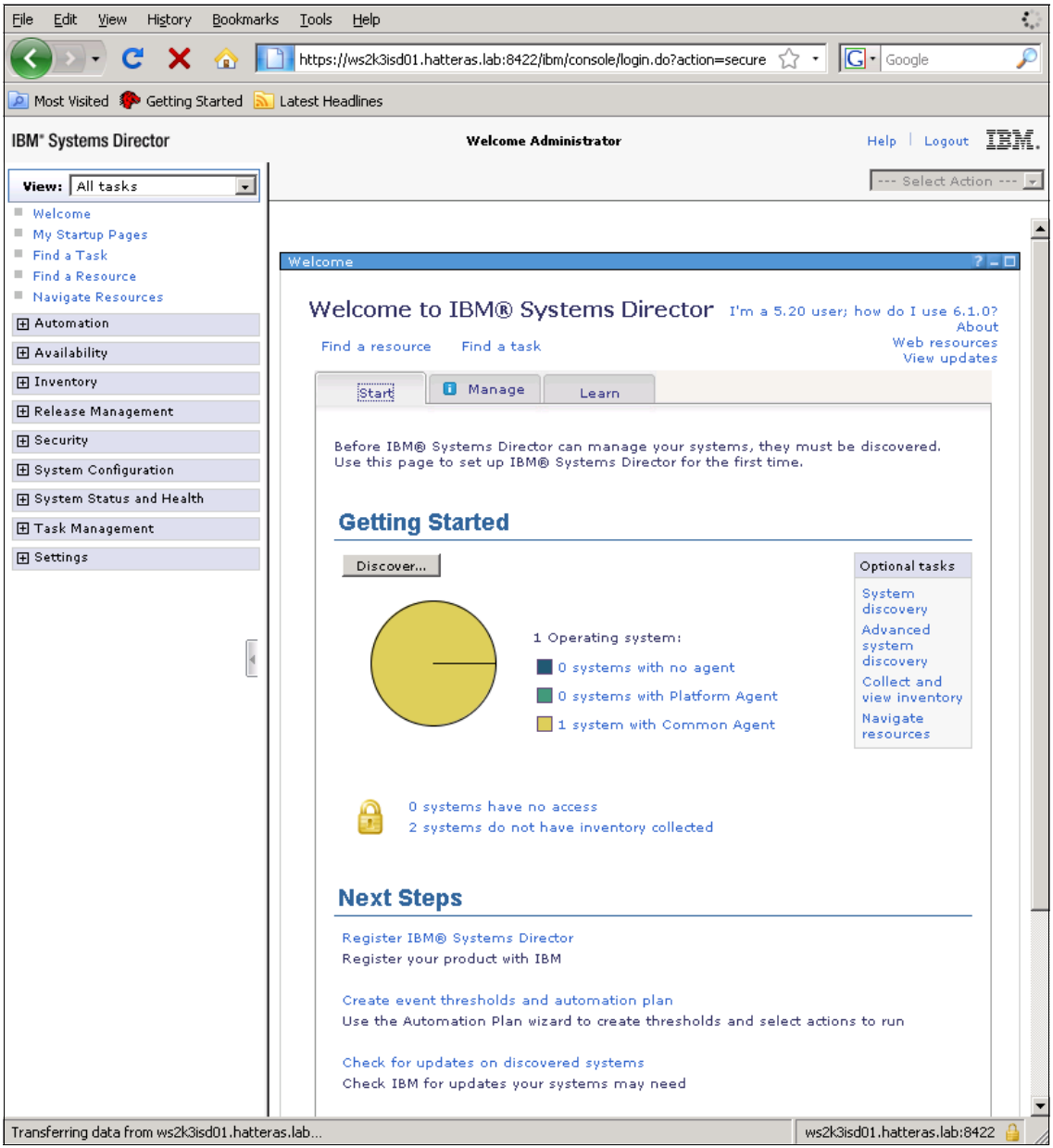


Figure 1-3 IBM Systems Director Welcome page

Discover systems

In IBM Director Console Version 5.20 you could manually discover an individual system or use discovery preferences. In the IBM Systems Director 6.1 Web

interface, you can perform an initial discovery of your subnet from the Start tab on the Welcome page.

From the Start tab, you can also link to tasks to discover individual systems as well as create discovery profiles for advanced system discovery. Alternatively, these tasks are available from the inventory section of the navigation area.

View systems and groups

In IBM Director Console Version 5.20, you viewed groups in the Groups pane. When you clicked a group, its members were displayed in the Group Contents pane. In the IBM Systems Director 6.1 Web interface, you no longer use panes. Instead, you view your groups in Navigate Resources, which displays groups in resource views.

As shown in Figure 1-4, the default resource view is a table view. When you select a group, you drill down to the group members which can be more groups or individual systems and their resources. Navigate Resources is available in the navigation pane and from the Welcome page. The All Systems group is equivalent to All Managed Objects group in IBM Director 5.20.

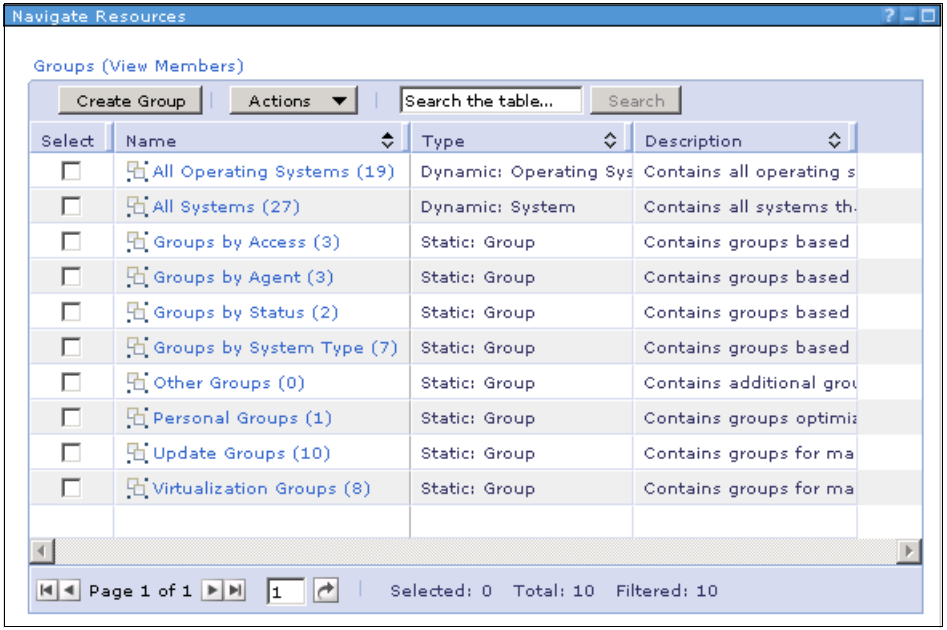


Figure 1-4 The default resource view in IBM Systems Director 6.1

The IBM Systems Director Web interface provides a number of ways to view information about your resources as well as manage the resources. The most typical ways are through tables and the properties view. Most tasks and plug-ins

provide information and function using tables, although the amount of information and function varies depending on the task or plug-in.

Information and functions also are provided using the properties view. The properties view is always available for any resource by selecting the resource and clicking **Actions** → **Properties**.

Some tasks and plug-ins, most notably Navigate Resources, also provide topology perspectives. When you select this feature, you can view a collection of related resources, such as systems and their storage, and see the relationships among the resources using a topology map. You also can toggle from the map view to a resource view or relationship view.

View system inventory

In IBM Director Console 5.20 you could view inventory by dragging the task onto a managed system or group. In the IBM Systems Director 6.1 Web interface, the Inventory section of the navigation area provides a task to view and collect inventory for a system or group.

You can choose from several predefined inventory profiles that filter only the inventory items that you want to display.

Use the View and Collect Inventory task to view and manage an extended set of resources and relationships for systems that have already been discovered. The inventory that is displayed includes:

- Physical, logical, and virtual hardware
- Software applications, operating systems, middleware, firmware, BIOS, and diagnostics
- Network information
- System-contained resources

Also, IBM Systems Director displays the inventory data for the inventory items that are collected.

Start tasks

In IBM Director Console 5.20, you clicked tasks in the Tasks pane, dragged tasks from the Tasks pane to a system or group, dragged systems or a group to a task, or right-clicked a system. In the IBM Systems Director 6.1 Web interface, you no longer drag tasks, systems, or anything else. Instead, tasks are available in the navigation area and the content area. When you right-click a resource a set of applicable tasks is displayed.

You can start a task from the Systems Director Web interface navigation area in any of the following ways:

- Click **Find a Task**. On the Find a Task page, you can search for and start a specific task.
- Expand the sections in the navigation pane to view and click available tasks.
- Expand **Task Management** and click **External Application Launch**. You can configure other applications to run from the Systems Director Web interface.
- Click **My Startup Pages**. Any pages that you have saved to your Startup page are displayed here. A saved page includes any tasks that can be run from that page.
- Click any of the tasks available in the navigation area.

You can start a task from the IBM Systems Director Web interface content area in any of the following ways:

- In a table view, right-click a resource and select a task.

  Tip: You can run some tasks on multiple resources simultaneously. To perform a task on multiple resources, select one or more resources. Then right-click one of the selected resources and select a task.

- In a table or topology map view, select one or more resources. Then click **Actions** and click a task.
- In the topology map view, right-click a resource and select a task.
- In the topology map view, select the resource. Then in the Details palette, right-click the resource and select a task.
- For applicable tasks, you can select **Run Now** or **Schedule**. You can schedule a task to start immediately or at a later time.

If you have been using a previous version of IBM Director for some time, it might not be obvious where certain tasks in IBM Systems Director can be found. Table 1-1 shows a list of tasks from IBM Director 5.20, and the corresponding path to access those tasks in IBM Systems Director 6.1.

Table 1-1 IBM Director 5.20 tasks mapped to IBM Systems Director 6.1

IBM Director 5.20 task	How to access the equivalent Systems Director task
Discover systems	On the Welcome page, click **System Discovery.**
Event action plans	Automation → Automation Plans.
Event log	Right-click a system and select **System Status** and **Health** → **Event Log**.
File transfer	Right-click a system and select **System Configuration** → **Remote Access** → **File Transfer**.
Hardware status	**System Status and Health** → **Health Summary**.
Inventory	Right-click a system and select **Inventory** → **View and Collect Inventory**.
Process management	**Automation** → **Command Automation**.
Remote control	Right-click a system and select **System Configuration** → **Remote Access** → **Remote Control**.
Remote session	Right-click a system and select **System Configuration** → **Remote Access** → **Remote Command Line**.
Resource monitors	Right-click a system and select **Monitor Resources**.
ServeRAID manager	System **Configuration** → **External Storage Applications**.
Scheduler	Right-click a system and select a task. If the task can be scheduled, the window is displayed for creating a schedule.
Software distribution	Release Management → Updates. Note: Most function from Software Distribution (Standard Edition) is now provided by Updates.

1.5 Common Agent Services

IBM Systems Director uses the Common Agent Services (CAS) architecture, which provides a shared infrastructure for managing systems. This infrastructure

is also used by Tivoli Provisioning Manager products. The components in the CAS include the following:

- Common Agent
- Agent Manager
- Resource Manager

Figure 1-5 shows how these components are implemented in an IBM Systems Director environment.

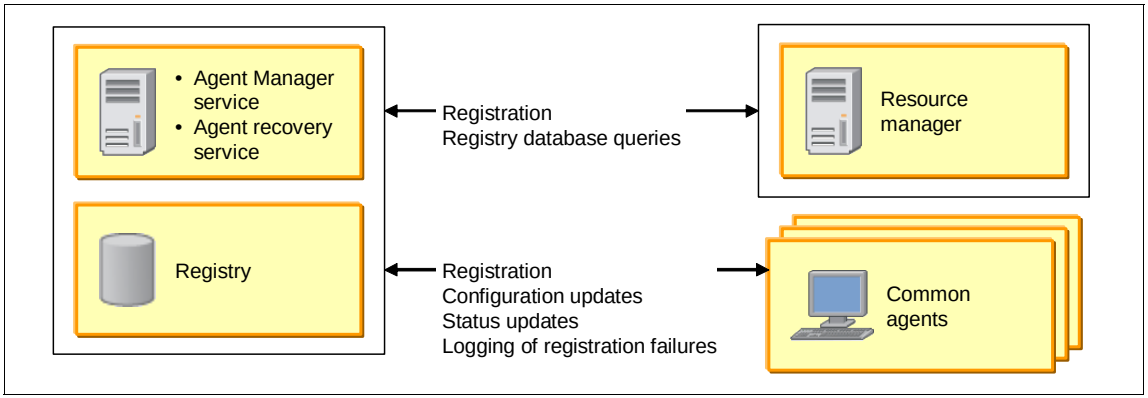


Figure 1-5 Common Agent Services as implemented by IBM Systems Director

The goal of CAS is to reduce infrastructure cost, complexity, and redundancy by providing a Common Agent that can be used by multiple management products instead of multiple separate agents that each provide essentially the same functionality.

To achieve this goal, Resource Managers (such as IBM Systems Director Server) use an Agent Manager to communicate with Common Agents that are installed on managed resources. We describe these three types of components here.

Resource Manager

A component of the management server, the Resource Manager is the management application, such as IBM Systems Director Server. It uses the services of the Agent Manager for security and credential management.

Note: Systems management communications between IBM Systems Director Server and Common Agents do not go through the Agent Manager except for security and credential management. All other server-to-agent communication is directly between the management server and the managed agents, just as it has always been.

Multiple Resource Managers can use the same Agent Manager and manage the same Common Agents. In addition, each Resource Manager can manage many Common Agents. However, each Resource Manager can use exactly one Agent Manager, although many Resource Managers can register with a single Agent Manager.

Agent Manager

The Agent Manager service is a network service, or servlet, that serves as a certificate and registration authority to provide authentication and authorization using X.509 digital certificates and the Secure Sockets Layer (SSL) protocol. It also processes queries against its registry of configuration information about Common Agents and Resource Managers.

Resource Managers and Common Agents must register with the Agent Manager before they can use its services to communicate with each other. Registration is password protected to prevent a Trojan horse Common Agent or Resource Manager from registering and gaining a valid identity. There are separate passwords for the registration of Common Agents and Resource Managers.

Each Agent Manager can be used by many Resource Managers and each Agent Manager can be used to manage many Common Agents.

IBM Systems Director Server includes an embedded Agent Manager as part of the *basic* installation. However, through the *custom* installation of Systems Director Server, you can specify that it use an existing external Agent Manager instead of the embedded one.

You might consider using an external Agent Manager for a couple of reasons:

- Doing so will allow this instance of IBM Systems Director Server to manage all Common Agents that register with the external Agent Manager.
- Installing Systems Director Server and Agent Manager on separate servers can improve performance of both the Agent Manager and IBM Systems Director Server.

It is therefore reasonable to install one instance of IBM Systems Director Server in the environment simply to make use of its embedded Agent Manager, with no intention of ever launching the Web management console against it. Using this model, multiple management servers could register with this *dedicated* Agent Manager system.

Note: The Agent Manager that is embedded with IBM Systems Director Server can be used by any instance of IBM Systems Director Server, but it is not configured for use with other management applications.

You can have multiple installations of the Agent Manager in your IT environment, but there is no communication between them. That is, the Agent Manager, Common Agents, and Resource Managers from one installation cannot interact with the Agent Manager, Common Agents, and Resource Managers in another installation. If you plan to have separate production and test environments, specify a different name for the certificate authority and security domain when you install each Agent Manager.

The Agent Manager has the following parts:

- Agent Manager service

  The Agent Manager service provides authentication and authorization using X.509 digital certificates and the Secure Sockets Layer protocol. It also processes queries against its registry of configuration information about Common Agents and Resource Managers. Resource Managers and Common Agents must each register with the Agent Manager before they can use its services to communicate with each other.

- Agent Manager registry

  The Agent Manager registry stores the following information in a database:

  - The identity, digital certificates, and communication information for each Resource Manager
  - The identity, digital certificate, and status for each Common Agent
  - The status of each Common Agent
  - Basic configuration information about each Common Agent, including information about the type and version of the hardware and operating system
  - The last error or, optionally, a configurable number of errors, reported by each Common Agent
  - Communication parameters for the Common Agent, including IP address, the ports for which the Common Agent is configured, and the supported protocol

- Agent recovery service

  The agent recovery service is a network service that provides error logging for Common Agents that cannot communicate with other Agent Manager services. This can occur because of configuration or network problems, because of missing, expired, or revoked security certificates, or because the Common Agent is not yet registered.

  Common Agents use an unsecured (non-SSL-encrypted) HTTP connection on port 9513 to communicate with the agent recovery service embedded in IBM Systems Director. Because the connection is unsecured, a Common

Agent can always communicate with the agent recovery service, even when the Common Agent is incorrectly configured or has expired or revoked certificates.

Common Agent

Installed on managed systems, the Common Agent reports information about the managed system to the Resource Manager and performs tasks on the managed system as directed by the Resource Manager.

Each Common Agent can use exactly one Agent Manager, but can be managed by one or more instances of IBM Systems Director Server.

Common Agent contacts the Agent Manager and reports its status and any configuration changes at the following times:

- When Common Agent starts or stops
- Any time Common Agent or a subagent is installed, upgraded, or removed
- After a configurable period of time (the default is 24 hours)

The Common Agent provides these features:

- Continuous operation

  The Common Agent has self-healing features that make sure the Common Agent and IBM Systems Director subagents are always available. If the Common Agent stops, a *watchdog* process called the *nonstop service* automatically restarts it.

- Automated management of security credentials

  The CAS model provides a single set of security credentials and a common security infrastructure for all management applications. When Common Agent certificates near their expiration date, they are automatically renewed.

- Deployment and life-cycle management

  Resource Managers can remotely install, upgrade, patch, or uninstall Common Agents and subagents. This helps keep the Common Agent services deployment current without having to take explicit action on each Common Agent system.

1.5.1 CAS in an IBM Systems Director environment

Applying the CAS model to a Systems Director management environment is straightforward. However, there are a few things that you should keep in mind, especially if you are a Director 5 user. Figure 1-6 shows how all the pieces of CAS work in an IBM Systems Director environment.

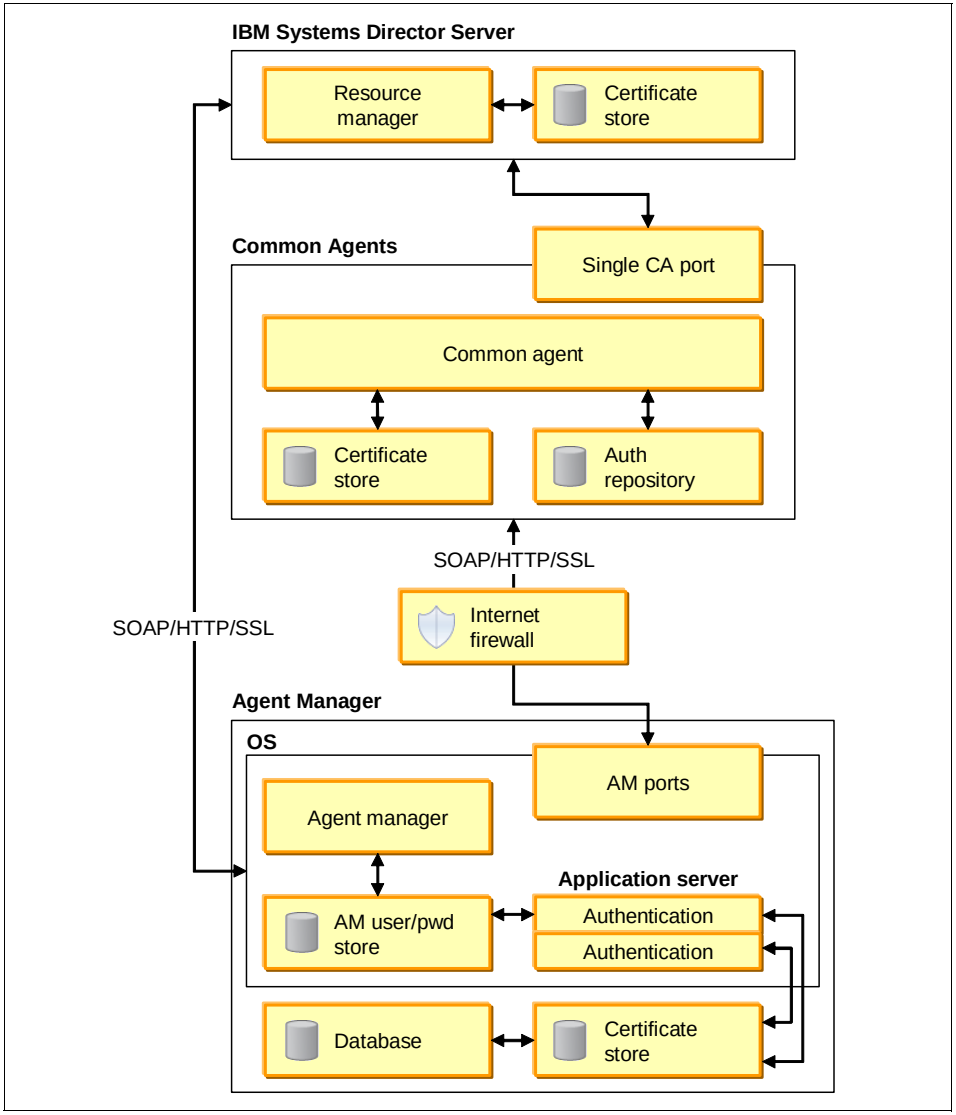


Figure 1-6 CAS components and IBM Systems Director

If you compare a Director 5 managed environment with one managed by IBM Systems Director, you will see that planning is important if multiple management servers are required. This is true since all authentication and authorization services are provided by CAS rather than by each management server.

In Director 5, management servers negotiate security keys with managed systems on an individual basis. When you successfully request access to an agent from a Director 5 server, the management server provides its public DSA encryption key to the agent for subsequent access and management. If multiple Director 5 servers have successfully gained access to a managed agent, the agent system will possess multiple keys, one from each management server.

CAS changes this paradigm for IBM Systems Director. Responsibility for authentication and authorization services lies with the Agent Manager, which can be shared between multiple management servers. However, both the Resource Manager and Common Agent can register with only one Agent Manager to provide these services. The result is illustrated in Figure 1-7 to Figure 1-10 on page 44.

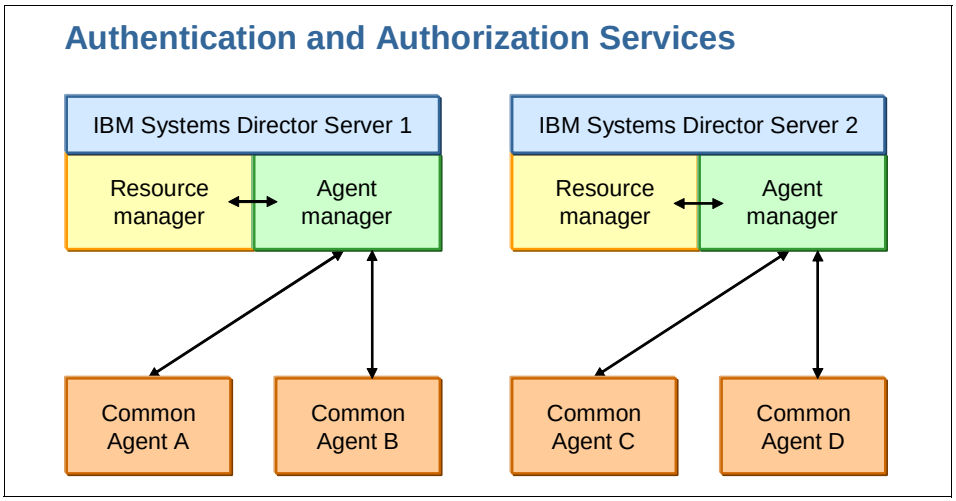


Figure 1-7 Authentication and authorization services flow in a basic IBM Systems Director Server installation

As shown in Figure 1-7 on page 41, installing IBM Systems Director Server with an embedded Agent Manager (the method used in the *basic* installation) results in an environment where the Common Agents discovered and accessed by one management server talk to the corresponding Agent Manager for matters pertaining to security.

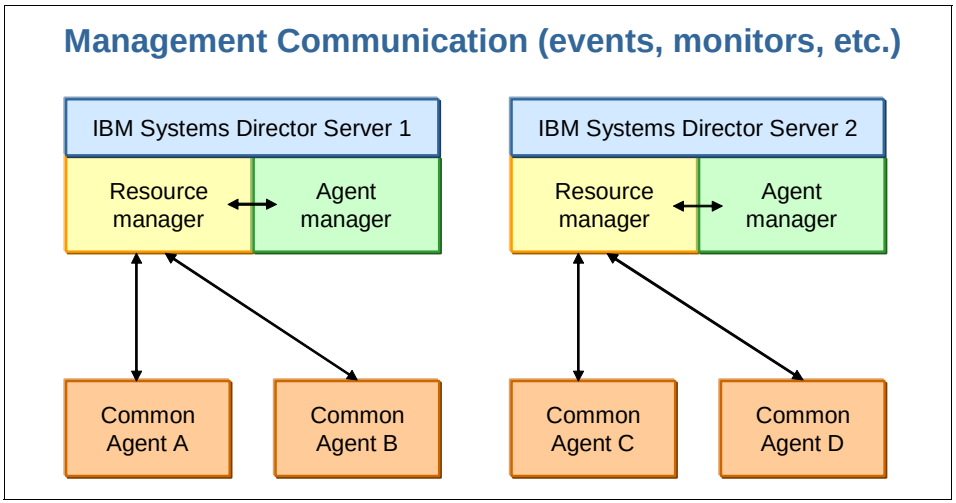


Figure 1-8 Management communication flow in a basic IBM Systems Director Server installation

Since these security matters include certificate management, each management server can access only the Common Agents registered with its embedded Agent Manager. That is, IBM Systems Director Server 1 can only access and manage Common Agent A and Common Agent B, while IBM Systems Director Server 2 can only access and manage Common Agent C and Common Agent D, as shown in Figure 1-8 on page 42.

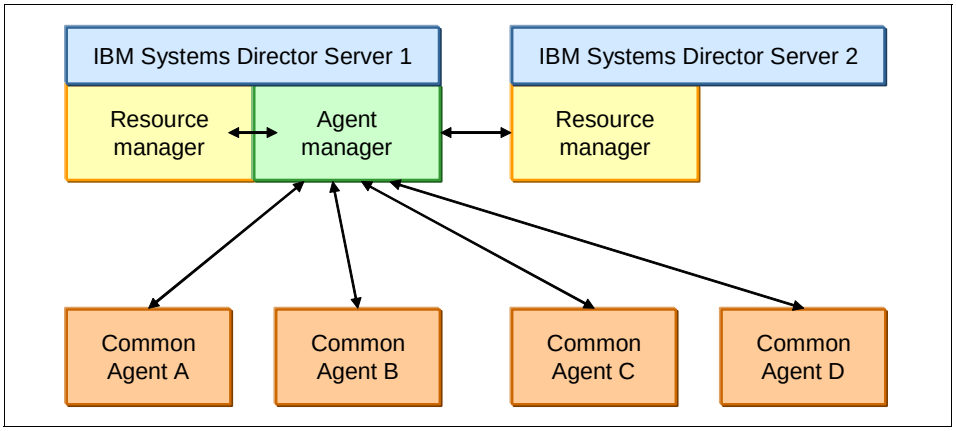


Figure 1-9 Authentication and authorization services flow in a custom installation of IBM Systems Director Server with a single shared Agent Manager

This limited access and management (as shown in Figure 1-9) is because the secure communication between IBM Systems Director Server and the Common Agent is based on the certificates managed by the Agent Manager. Any given Common Agent can register with only one Agent Manager. The same holds true for Resource Managers in the CAS model. Each IBM Systems Director Server can register with only one Agent Manager.

In order to implement an environment where multiple IBM Systems Director Servers can manage all Common Agents in the enterprise, only one management server supplies an embedded Agent Manager. All others register with that single embedded Agent Manager. This is performed during a *custom* installation of IBM Systems Director Server. In this case, all Common Agents and management servers talk to a single Agent Manager, as shown in Figure 1-9.

In this case, since IBM Systems Director Server 2 has registered with the Agent Manager embedded in IBM Systems Director Server 1, it has access to the security certificates stored there. As a result, it can manage all Common Agents that have also registered with the same Agent Manager. In order for IBM Systems Director Server 2 to manage these Common Agents, you must create an Agent Manager discovery profile, as discussed in 6.5, “Advanced system discovery” on page 324.

Management communication in this case flows between both management servers and all four Common Agents, as shown in Figure 1-10. Note that only *generic* events (that is, those events that have not been configured from a specific management server, such as hardware status events) are passed from Common Agent to all known management servers. Events from process monitors, resource monitors, thresholds, and so on, will only pass from Common Agent to the management server on which they were configured.

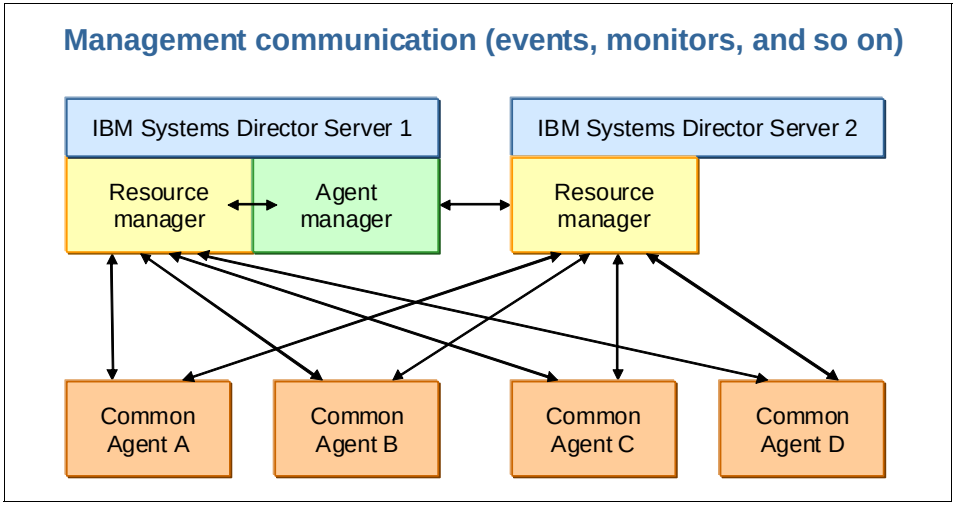


Figure 1-10 Management communication flow in a custom installation of IBM Systems Director Server with a single shared Agent Manager

1.5.2 Agent Manager registration

One final point to discuss before leaving the CAS topic is Agent Manager registration. Both Resource Managers and Common Agents must register with an Agent Manager in order to open communication between management servers and managed systems running Common Agent. Both types of registration can be accomplished during installation or at some later point in time. Furthermore, once registration is accomplished, it can be modified to suit changing infrastructure requirements.

Management server

The most straightforward way to register a Resource Manager with an Agent Manager is during installation of IBM Systems Director Server. If you perform a basic installation, an embedded Agent Manager is created and registration is handled automatically using the credentials supplied in the installation wizard. If multiple management servers are installed in this manner, you will be left with islands of management, as discussed in the previous section. Each management

server will be able to access and manage only those Common Agents that have registered with its own embedded Agent Manager.

In order to create a management environment where multiple IBM Systems Director Servers can manage any system, you must perform a custom installation of the management server. During a custom installation, you will see an option for Agent Manager configuration. By choosing the **Reuse an existing Agent Manager** option, your new management server will be able to register with an existing Agent Manager, likely embedded in another IBM Systems Director Server, and be able to access and manage any Common Agents known to that Agent Manager. See 4.1, “Management server installation” on page 164, for more information about registering the management server with an Agent Manager during installation.

In addition to registering the management server with an Agent Manager during installation, you can perform this operation after installation by selecting the **Agent Manager Configuration** function from the Systems Director Web console. For details see 4.1, “Management server installation” on page 164.

Managed systems

Managed systems running Common Agent must register with an Agent Manager in order to be accessed and managed by IBM Systems Director Server. As with management server registration, agent registration can be accomplished during installation or at a later time.

Registration during Common Agent installation occurs when the **Check only if you want to register CAS Agent with Common Agent** option is selected on the Registering Common Agent Services page of the installation wizard. In this manner you can *preregister* the Common Agent so that it is automatically discovered and unlocked (access is granted) by all management servers that are also registered with the same Agent Manager. For more about this see 4.6, “Installing Common Agent” on page 210.

Note: This is equivalent to the AddKnownServerAddress feature, which can be invoked during an unattended installation of the Director 5 Agent.

If the “Check only if you want to register CAS Agent with Common Agent” option is not selected during Common Agent installation, the managed system waits for a management server to discover it and request access. Assuming that proper credentials are entered during the request access process, the management server provides the location (IP address) and agent registration password for its Agent Manager to the Common Agent. These details are used by that system to register with its management server’s Agent Manager. Any other management

servers that are registered with the same Agent Manager will automatically discover and be able to access and manage this system.

Finally, if you want to change the Agent Manager with which a particular Common Agent is registered, you must use a special process from the command line. For more on this see 3.9, “Managing Agent Manager credentials” on page 150.

1.6 Systems Director resources

Many sources of additional information about IBM Systems Director are available, including Web sites and forums, official IBM Systems Director publications, and various IBM Service and Support offerings.

1.6.1 Web sites

Various Web sites have been created to provide additional information and troubleshooting support, as well as sources for software downloads.

IBM Systems Director home page

View the IBM Systems Director Web site on ibm.com for links to downloads and documentation for all currently supported versions of IBM Systems Director:

http://www.ibm.com/systems/management/director/

IBM Systems Director Downloads

View the IBM Systems Director Downloads Web site on ibm.com for links to download code IBM Systems Director, IBM Systems Director plug-ins, and IBM Systems Director upward integration modules:

http://www.ibm.com/systems/management/director/downloads/

IBM Systems Director Documentation and Resources

View the IBM Systems Director Documentation and Resources Web site on ibm.com for links to product documentation, IBM Redbooks publications, white papers, and learning modules related to IBM Systems Director, IBM Systems Director plug-ins, and IBM Systems Director upward integration modules:

http://www.ibm.com/systems/management/director/resources/

IBM Systems Director Upward Integration

View the IBM Systems Director Upward Integration Web site on ibm.com for more information about IBM Systems Director upward integration modules created by IBM and other companies. IBM Systems Director UIMs enable third-party workgroup and enterprise systems-management products to interpret and display data that is provided by IBM Systems Director Platform-Agent managed system.

http://www.ibm.com/systems/management/director/upward/

IBM Servers

View the IBM Servers Web site to learn about IBM Systems server and storage products.

http://www.ibm.com/servers/

IBM ServerProven

View the IBM ServerProven® Web site to learn about hardware compatibility of IBM System x and BladeCenter systems with IBM applications and middleware, including IBM Systems Director:

http://www.ibm.com/servers/eserver/serverproven/compat/us/

1.6.2 Forums

Web forums are also a good source of information and troubleshooting regarding IBM Systems Director, the IBM Systems Director Software Developers Kit (SDK), and IBM Systems in general.

IBM Systems Director forum

View the IBM Systems Director forum Web site on ibm.com to discuss product-related issues pertaining to IBM Systems Director, Systems Director UIMs, and Systems Director extensions. This Web site includes a link for obtaining the forum using a Rich Site Summary (RSS) feed.

http://www.ibm.com/developerworks/forums/forum.jspa?forumID=759

IBM Systems Director SDK forum

View the IBM Systems Director SDK forum Web site to discuss issues pertaining to the IBM Systems Director Software Development Kit (SDK). This Web site includes a link for obtaining the forum using an RSS feed:

http://www.ibm.com/developerworks/forums/dw_esforums.jspa

IBM Systems forums

View the IBM Systems forums Web site on ibm.com to learn about various forums that are available to discuss technology-related and product-related issues pertaining to IBM Systems hardware and software products. This Web site includes a link for obtaining the forum using an RSS feed:

http://www.ibm.com/developerworks/forums/dw_esforums.jsp

1.6.3 IBM Systems Director publications

There is a significant number of publications that have been written specifically to guide users through the installation, configuration, and use of IBM Systems Director 6.1:

- Release Notes

  These provide information about hardware requirements for running Systems Director components, supported Systems Director hardware, operating systems, databases, and workgroup and enterprise systems-management software.

- Hardware and Software Support Guide

  This provides information about hardware requirements for running Systems Director components, supported Systems Director hardware, operating systems, databases, and workgroup and enterprise systems-management software.

- Planning, installation, and configuration guides

  These provide detailed instructions about how to install and configure each component of IBM Systems Director on systems running various supported operating systems using the standard installation option. The following guides are available:

  - *Planning, Installation, and Configuration Guide for AIX*
  - *Planning, Installation, and Configuration Guide for IBM i*
  - *Planning, Installation, and Configuration Guide for Linux on Power Systems*
  - *Planning, Installation, and Configuration Guide for Linux on x86*
  - *Planning, Installation, and Configuration Guide for Linux on System z*
  - *Planning, Installation, and Configuration Guide for Windows*

- Systems Management Guide

  This provides detailed instructions for using the Web interface and managing systems and resources in your environment.

- Troubleshooting Guide

  This provides information about problems and how to solve them, and strategies for troubleshooting common problems.

- Events Reference

  This provides information about IBM Systems Director events, including the event type, description, severity, and extended attributes.

- Commands Reference

  This provides detailed information about the systems management command-line interface (smcli) commands, and other commands that can be run directly from the command line, including configuring the database and starting and stopping IBM Systems Director.

- Hardware Command Line User's Guide

  This document provides information about installing and using the Hardware Command Line (formerly known as the IBM Management Processor Command-Line Interface). Command output in this release might vary from command output in previous releases.

- Systems Director plug-in guides

  In addition to the publications listed above, many Systems Director plug-ins have their own sets of manuals or guides. See all documents in the IBM Systems Software Information Center under **Product listing** in the tree view:

  http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/einfo/icmain.htm

1.6.4 Information Centers and topic collections

IBM Information Centers are a rich source of up-to-date reference information about many relevant topics.

IBM Systems

The IBM Systems Information Center provides integrated information for multiple IBM Systems products, including operating systems, hardware, storage, and software. This Information Center also contains scenarios to help you use multiple IBM Systems products in the same environment:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp

IBM Systems Director

Updated periodically, the IBM Systems Director topic collection contains the most up-to-date documentation available for IBM Systems Director:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

IBM Systems Director plug-ins

View the IBM Systems Information Center for information about installing and using plug-ins that extend the functionality of IBM Systems Director”

http://publib.boulder.ibm.com/infocenter/systems/index.jsp

IBM Systems Director Upward Integration Modules

Read the this topic collection to learn about how to install and use upward integration modules and management packs that enable non-IBM workgroup and enterprise-management products to interpret and display data that is provided by Common Agent and Platform Agent:

http://publib.boulder.ibm.com/infocenter/systems/topic/uims_6.1/fqs0_main.html

IBM Systems Director Software Development Kit

View the IBM Systems Director SDK Information Center to learn about the APIs and CLIs that you can use to extend the capabilities of IBM Systems Director:

http://publib.boulder.ibm.com/infocenter/dirinfo/toolkit/index.jsp

1.6.5 IBM Redbooks

You might find the following IBM Redbooks publications relevant:

- *Tuning IBM System x Servers for Performance*, SG24-5287
- *Virtualization on System x*, REDP-4480
- *Hyper-V on System x*, REDP-4481
- *IBM eServer xSeries and BladeCenter Server Management*, SG24-6495
- *Integrating IBM Director with Enterprise Management Solutions*, SG24-5388

You can download these books and search for other pertinent books from the IBM Redbooks Web site:

http://ibm.com/redbooks

1.6.6 IBM Service and support offerings

No support contract is included with any IBM Systems Director product. Such contracts are available, but must be purchased separately from any licenses or software subscriptions already acquired. A variety of Systems Director service and support offerings are available from IBM and our business partners.

For IBM System x, BladeCenter, and non-IBM Intel processor-based systems, customers can get support in a variety of ways including the following:

- *IBM Systems Director support forum* is a no-charge IBM-hosted forum staffed by IBM technical specialists familiar with Systems Director. This forum provides an excellent avenue to research Systems Director questions and to learn what others are doing with the product:

  http://www.ibm.com/developerworks/forums/forum.jspa?forumID=759

- *Electronic Support* through the IBM Support Web site is available at no charge for all IBM clients. This support is provided on a best-effort basis. To ask a question or submit a request, go to the following Web site and click **Open a service request** in the left column:

  http://www.ibm.com/support

- *IBM Remote Technical Support Services - ServicePac®* offers hardware and software support for System x, BladeCenter, and Storage systems. Coverage includes hardware questions as well as support for Microsoft Windows, Linux, IBM Systems Director, VMware, and Storage Manager.

  Access to answers is available 24 hours a day, 365 days a year for severity 1 problems, and Monday through Friday, 8:00 a.m. to 5:00 p.m. in your local time zone for all other questions and problems. With unlimited calls and unlimited callers, almost anyone at your company can call as often as needed and receive quick and efficient responses.

  This service is conveniently packaged in ServicePac part numbers and provides the flexibility that customers need for smaller environments. For more information about IBM Remote Technical Support Services refer to:

  http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000016&lndocid=MIGR-43272

- *IBM Operational Support Services - Support Line* is an annual service contract that provides unlimited calls and unlimited callers at a fixed price. The support line provides the flexibility to choose the support groups (select operating systems, software, and hardware products) that best meet your business coverage needs.

  Basic support includes prime-shift coverage, defined as normal business hours, Monday through Friday, excluding national holidays. If you require support beyond prime-shift hours, IBM offers extended/full-shift coverage,

available around the clock. For more information about IBM Operational Support Services - Support Line, refer to:

http://www.ibm.com/services/us/index.wss/offering/its/a1000030

- *STG Lab Services for System x* brings the skills, experience, and expertise of the development lab to your environment through on-site consulting and technical skills transfer to your personnel. Whether IBM Systems Director is your first systems management tool implementation or an addition to your existing systems management environment, STG Lab Services for System x can assist with IBM Systems Director Accelerator services. In as few as three days, you can receive expert implementation, solution integration, and customized technical skills transfer to speed and simplify your implementation of IBM Systems Director, as well as accelerate the return on investment of your IBM system purchase. For more details see:

  http://www.ibm.com/servers/eserver/services/xseriesservices.html

- *STG Lab Services for Power Systems* will provide implementation services to help you install, configure, and exploit the capabilities of IBM Systems Director. IBM will work with your team to identify platform management requirements, issues, and strategies for your Power Systems environment and architect a solution to address those objectives. Such strategies and objectives will incorporate many features of IBM Systems Director and may include, but are not limited to, managing your virtualized environment, cross platform management, system resource monitoring and alerting with automation plans, update management, and inventory and device discovery. For more details see:

  http://ibm.com/systems/services/labservices/platforms/labservices_power.html

- Many IBM Business Partners throughout the world offer services to help our customers implement IBM systems management solution. Contact your local IBM Business Partner for more information.

1.7 This book

This book describes how to plan for and implement IBM Systems Director 6.1 in a variety of IT environments. While its heritage is with System x and BladeCenter servers, Systems Director can manage various aspects of all IBM server platforms, including IBM System i, System p, and System z, as well as IBM Storage Systems. We focus primarily on the management of IBM server hardware, although we provide some insight into using Systems Director to manage desktop systems, IBM Storage Systems, and non-IBM Intel-based hardware.

Throughout this book we describe various best practices that we have learned to apply from our own experience, as well as those of the many clients with whom we have worked. We focus on those concepts, functions, and processes that are entirely new from a Director 5 user's perspective. Finally, we provide example scenarios that are meant to describe how these products can be made to work together in the real world to provide a solid systems management environment.

Systems Director general planning, installation, configuration, and product usage is comprehensively covered in the publications that are provided in PDF format, either on the Systems Director DVD or the online IBM Systems Director Information Center Web site, found at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

Anyone interested in establishing a Systems Director managed environment will find the publications listed in 1.6.3, "IBM Systems Director publications" on page 48, particularly useful.

In general, we avoid duplicating these topics, describing only those steps that we believe require special attention. We highly recommend that you read these guides and have them handy while using this book, because we refer to them often.

2

Planning

Whether you are new to IBM Systems Director or have been using IBM Director for years, taking the time to plan your deployment will greatly improve your chances of success.

This chapter describes the items to consider when planning your Systems Director implementation:

2.1 New terminology in IBM Systems Director 6.1

If you are a current IBM Director user this section will help you make the transition to IBM Systems Director 6.1 easier. The old (Director 5.x) terms and what they are called now in IBM Systems Director 6.1 are:

- IBM Director Agent (now called Common Agent)

  Common Agent provides a rich set of security, deployment, and management function. The function available for Common Agent-managed systems varies based on operating system and hardware, and includes the following tasks:

  - Discover systems.
  - Collect comprehensive platform and operating system inventory data.
  - Monitor health and status.
  - Manage alerts.
  - Remotely deploy and install Common Agent.
  - Perform remote access, including transferring files.
  - Perform power management function.
  - Provide additional event support.
  - Monitor processes and resources, and set critical thresholds that send notifications when triggered.
  - Manage operating system resources and processes.

  See “Agent Manager” on page 58 for how Common Agents use the new Agent Manager.

- IBM Director Core Services (now called Platform Agent)

  Platform Agent provides a lighter footprint and fewer management functions than the Common Agent. The function available for Platform Agent managed systems is limited to the following tasks, and varies based on operating system and hardware:

  - Discover systems.
  - Collect limited platform inventory data.
  - Monitor health and status.
  - Manage alerts.
  - Remotely deploy and install Common Agent.
  - Perform limited remote access.
  - Perform limited restart capabilities.

- Level-2 managed object (now called Common-Agent managed system)

  This is a system on which Common Agent is installed.

- Level-1 managed object (now called Platform-Agent managed system)

  This is a system on which Platform Agent is installed.

- Level-0 managed object (now called Agentless-managed system)

  This is a system that does not have an agent installed, but can be discovered by IBM Systems Director using Secure Shell (SSH), Distributed Component Object Model (DCOM), or Simple Network Management Protocol (SNMP).

  The function available to Agentless-managed systems is limited to the following tasks, and varies based on operating system and hardware:

  - Discover systems.
  - Collect limited operating-system inventory data.
  - Remotely deploy and install Common Agent and Platform Agent.
  - Perform limited remote access.
  - Perform limited restart capabilities.

- Managed object (now called system)

  This is a hardware endpoint that can be discovered and managed by IBM Systems Director. For example, storage devices, network devices, physical servers, virtual servers, and virtual farms are systems.

- Extension (now called plug-in)

  This is free or for-fee software that is downloaded and installed on top of IBM Systems Director to provide additional function.

- Job activation (now called job instance)

  This is a specific occurrence of a job that is running or has completed running.

- Event action plan (now called Event Automation Plan)

  This is a user-defined plan that determines how IBM Systems Director automatically handles certain events. An event action plan comprises one or more event filters and one or more customized event actions.

- Hardware control point (now called patform manager)

  This is software that manages one or more host systems and their associated virtual servers and operating systems. Platform managers can be started from the IBM Systems Director Web interface. For example, BladeCenter Management Module, IBM Hardware Management Console (HMC), IBM Integrated Virtualization Manager (IVM), and VMware VirtualCenter are platform managers.

- Configuration profile (now called configuration plan)

  This is a collection of templates used to configure hardware and operating systems.

- Component (now called template)

  This is a stored version of definition parameters for the configuration of a specific system.

- Remote session (now called remote command line)

  This is a command-line interface to a remote system.

Agent Manager

New to IBM Systems Director 6.1 is the concept of an Agent Manager. In IBM Systems Director, the Agent Manager handles credentials and authentication between IBM Systems Director and the Common Agent. A Common Agent can only authenticate with one Agent Manager. For this reason, if a Common Agent is to be managed by more than one IBM Systems Director server those servers must use the same Agent Manager.]

Groups

In IBM Systems Director 6.1 you have nested groups (one group within another) and a favorites group. Nested groups allow you to include one group inside another. The favorites group allows you to keep all of your favorite systems together in one group. See 7.2, “Health summary” on page 340, to see one way that the favorites group is used in IBM Systems Director.

2.2 What you need before you start

When you first start your IBM Systems Director 6.1 deployment you may be tempted to jump right in and start installing. If yours is a small test environment and you are just looking to get familiar with IBM Systems Director 6.1 this may work. However, taking some time to determine what you will need and planning your deployment will not only make it easier to get IBM Systems Director up and running, but will leave you with a more stable environment.

2.2.1 The size of your deployment

While many of the tasks and considerations that are included in this chapter are the same whether you’re deploying five systems or 5,000 systems, planning based on the size of your environment will help save you from redundant or unnecessary tasks. Some of the things that you must consider are:

- How many systems must be installed?
- What types of agents will you be using (Common Agents, Platform Agents, storage devices, IBM BladeCenter chassis, and so on)?

- Will you need to install any optional features (for example, Remote Control Agent or BladeCenter Management)?
- How many people will need access to your IBM Systems Director server?
- How will users authenticate with IBM Systems Director?
- Does your IBM Systems Director environment need to communicate with other management systems?
- How many subnets does your IBM Systems Director system need to access?

Having this information readily available will not only make it easier to plan your deployment, but will also minimize the chance of having to go back and redo some tasks.

2.2.2 Consider how you will deploy your solution

Setting proper and realistic goals can help your deployment of IBM Systems Director go smoothly and maximize the usefulness of the tool once deployed. We recommend that you follow the guidelines discussed in this section.

Development, integration, and production (DIP) environments

DIP refers to a 3-phased approach commonly used in corporate IT environments:

- *Development* means the initial phase of testing and configuring. This step usually takes place in an isolated environment to avoid harming production systems or interrupting production services. The development environment need not be a mirror of the production environment.
- *Integration* means the phase of porting a product from your development environment to your production platform. The integration environment must be a mirror of your production environment. This ensures that potential problems are identified before they can do harm to the production environment and your business.
- *Production* refers to the IT environment that you are running to support your daily business. A downtime caused by a faulty implementation can cause significant trouble. This is the reason new and untested products, whatever they might be, should never be introduced into the production environment without going through the integration phase.

Depending on the size of the systems management infrastructure you plan to implement, going through these three steps might require an unreasonable investment. However, in most cases, following this approach produces much better results.

We recommend having at least a testing platform in place that incorporates development and integration into one step. This precaution is based on the architecture of Intel-based computer systems. There might be dependencies between the products that you plan to implement and the ones that you already run on your corporate network. Dependencies often are customer-specific and might not have been discovered by the manufacturer.

Figure 2-1 shows the PDI approach to implementing IBM Systems Director Server.

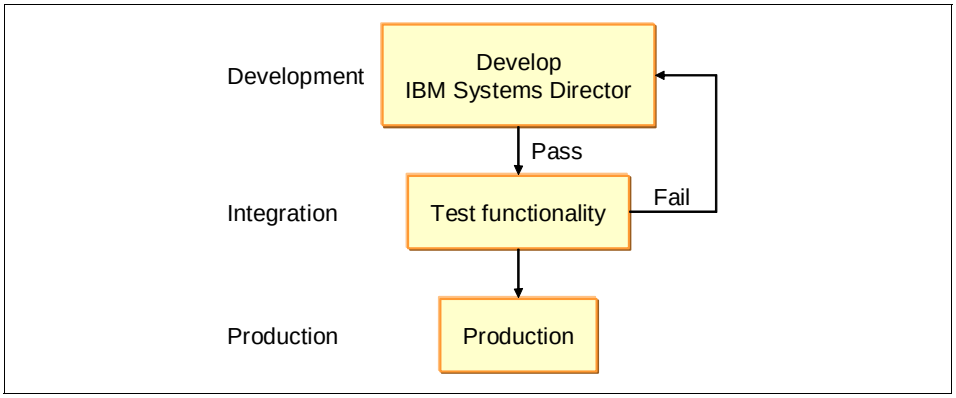


Figure 2-1 DIP approach to implementing IBM Systems Director Server

Figure 2-2 shows the DPI® approach to implementing IBM Systems Director Agent.

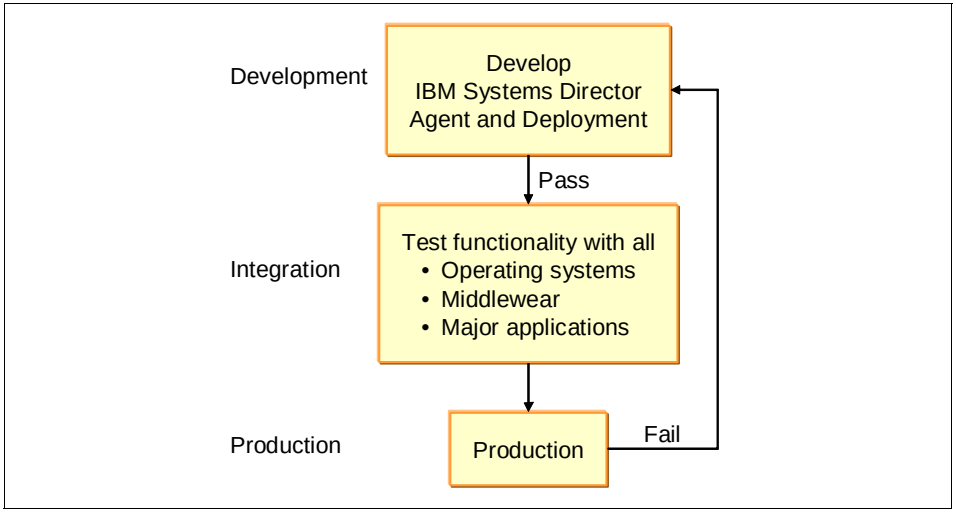


Figure 2-2 DIP approach to implementing IBM Systems Director Agent

Keep it simple

Many people see all that IBM Systems Director can do and try to deploy it all at once. While Systems Director is a powerful and feature rich tool, starting your deployment plan with the basics will greatly increase your chance of success.

We recommend creating a prioritized list of features that you need to deploy and focusing on them in order. For example, you probably put a high priority on receiving hardware alerts, but may put a lower priority on virtualization integration. Focusing on the high priority items will help you have a successful deployment and allow you to devote attention to the other features when time is available.

Take small steps

Similar to *keep it simple*, planing to deploy Systems Director in small manageable steps not only helps you get your system up faster, but improves the likelihood of success when you deploy the more advanced features.

We have found it best to have a stable installation of Systems Director (both server and agents) with the basic tools configured for hardware monitoring and alerting before taking on additional capabilities. You can then add additional functionality in a logical step-by-step process. While you may be tempted to install all the function that you want all at once, you are more likely to complicate your testing and delay crucial functionality.

Read the manual

It is important to read the manuals and guides available. The fact that you are reading this book is a step in the right direction. In particular, look through the planning, installation, and configuration guides that are appropriate for your environment. Also, bookmark the IBM Systems Director Information Center. It is the official authoritative reference on Systems Director. You can find the Information Center at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

Write it down

The most often neglected step in deploying a solution like IBM Systems Director is to maintain proper documentation. Whether to help someone who comes after you to maintain the environment or simply to remember how you configured the environment, documentation will save you time and effort in the long run. We recommend creating a list of systems, user IDs, passwords, and so on, that you will use in your deployment. Your deployment will go more smoothly if you do not need to stop to have an ID created, security profile updated, or open change control window to close.

Important: We do not recommend writing down passwords, not only because it is a security issue, but hopefully because these passwords change regularly. We recommend recording references to passwords such as *current root password* or *See Admin team for the password for this account*.

2.3 Hardware and infrastructure requirements

Using supported systems helps ensure a smooth deployment and operation of your IBM Systems Director environment. One area often overlooked is the network infrastructure that Systems Director will use.

The basic requirements for both the hardware-based service processors and Systems Director are described in their respective product manuals (see 1.6, “Systems Director resources” on page 46). This section discusses requirements that are not covered in those documents or that warrant further discussion.

2.3.1 IBM Systems Director Server

In addition to making sure that the hardware and operating system are supported, consider the topics discussed in this section for your IBM Systems Director server.

Windows Active Directory domain

In order for an IBM Systems Director Server to use Active Directory® for user authentication the server must be a member of the Active Directory domain.

Note: You should not install the IBM Systems Director Server on an Active Directory Domain Controller. Doing so would require Domain Administrator privileges to perform administrative tasks on the server.

LDAP

If you want your IBM Systems Director Server to authenticate users against an LDAP directory you must have information about accessing and logging onto the directory.

Centralized network access

The amount of network traffic that an IBM Systems Director environment will generate depends on the number of systems being managed, how often and what type of inventory is being collected, how many events are being generated from the agents, and what additional managers are installed. With this many variables it is difficult to specify how much network bandwidth will be needed. We have determined that the following are best practices:

- IBM Systems Director Server should be as close to the hub of the network as possible.
- As much as possible, minimize the number of firewalls between the management server and the majority of the managed systems.
- The Systems Director Server should have redundant Network Interface Cards (NICs) and paths to the managed systems.

> **Note:** While we recommend redundant NICs, your environment will be easier to maintain if the they are bonded together using one IP address.

CPU, memory, and disk requirements

While the Systems Director documentation lists recommended processor, memory, and disk requirements for the management server and agents, based on our experience we recommend installing additional memory in the Systems Director Server when possible.

Given our experience with IBM Systems Director Server installed on Windows Server 2003, we recommend, at a minimum, the hardware configurations listed in Table 2-1.

Table 2-1 Minimum hardware recommendations for Systems Director Server (Windows)

	Small	**Medium**	**Large**
Number of Common Agent managed systems	< 500	500–1,000	1,000–5,000
Processors	1 CPU, 3 GHz	2 CPUs, 3 GHz	4 CPUs, 3 GHz
Memory	1.5 GB	2 GB	4 GB
Disk space	4 GB	6 GB	8 GB

For further information about the hardware requirements of IBM Systems Director, see the following section of the IBM Systems Director Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

User account

What user account will the IBM Systems Director Server use? Unlike IBM Director 5.x, the IBM Director service in Windows does not log on as a user. However, you do need to specify one user account, which IBM Systems Director will use as your first smadmin account. See 2.5.1, “User accounts” on page 73, for more information about the default IBM Systems Director groups.

Encryption

Will you use encryption when communicating with Common Agents, and if so which type of encryption? By default all communications between the IBM Systems Director and its agents are encrypted using triple Data Encryption Standard (triple DES). You can also choose Data Encryption Standard or Advanced Encryption Standard.

Update management packages

IBM Systems Director Update Manager stores its update packages in a repository in the installation directory structure. Be sure that you install IBM Systems Director on a disk with enough room to store these updates.

Note: By default, IBM Systems Director limits the size of its update repository to 10 GB. You can change this in the Update Manager settings page.

Database

IBM Systems Director supports multiple database applications. If your installation is relatively small (500 agents or less) you can use the Apache Derby database included with IBM Systems Director or Microsoft SQL Server Express Edition. If you have a larger network you will need to install a larger supported database server.

The other consideration for databases is whether the database should be installed on the management server or remotely. While putting the database server on the same system as the IBM Systems Director Server eliminates the need for an additional server, it does put a much higher load on the system. Putting the database on a remote system does reduce the overall resource utilization on the management server, but connectivity issues may arise

depending on the location of the database server and the network between the two systems.

Web browser

The IBM Systems Director Web console takes advantage of JavaScript™ to improve usability and functionality. In our testing, we found both Firefox 2 and Firefox 3 JavaScript performance to be superior to Internet Explorer® 6 and Internet Explorer 7. Third-party benchmarks of Internet Explorer 8 Beta have demonstrated better JavaScript performance than Internet Explorer 7, with performance similar to Firefox 2. Therefore, at this time we recommend using the latest version of Firefox if Web console response is a critical factor.

2.3.2 Agents

There are also a number of things to consider when planning for installation of the management agents supported by IBM Systems Director, as discussed in this section.

Required drivers

In order for the agents to communicate with any management hardware installed in your systems the proper drivers must be installed. One of the most common reasons for missing alerts from systems that we have encountered are missing drivers for the Baseboard Management Controller (BMC) or the Remote Supervisor Adapter. It is a best practice to use tools like IBM UpdateXpress to ensure that all applicable and required drivers are installed properly. This applies to x86-based non-IBM hardware that you plan to manage as well. Use the appropriate vendor tool to check for drivers.

Management level

There are three levels of agent management supported by Systems Director:

- No agent: No IBM Systems Director components are installed on the endpoint.
- Platform Agent: Basic hardware alerting and management.
- Common Agent: Full management of the endpoint.

Depending on the type of managed object and the management tasks that you want to perform, you must decide which agent to install.

Choose no agent if:

- You do not want to install additional software on the system.
- You do not require any of the functionality provided by one of the agents.
- You want to be able to restart the system.
- You want to be able to open a remote session to the system.
- You want to upgrade easily to either Platform Agent or Common Agent.
- You do not have a Systems Director Agent license for a non-IBM system.
- Your system is already memory constrained.

Choose to install Platform Agent if:

- You want to get the hardware status (IBM systems only).
- You want to record events in the event log.
- You want to use Event Automation Plans.
- Your system is already memory constrained.
- You already have a supported workgroup or enterprise management agent installed.
- You want to manage Xen virtual environments.

Choose to install Common Agent if:

- You want to use Monitors or Process Management.
- You want to use Service and Support Manager (Linux and Windows).
- You want to use the Virtualization Manager to manage a VMware ESX environment.

Note: VMware ESXi is managed through VMware VirtualCenter. The VirtualCenter server requires the Common Agent plus the Virtualization Manager subagent, but ESXi servers do not require any agent software.

Other upstream management servers

If your environment includes another upstream management server (for example, Tivoli, Microsoft System Center, CA Unicenter) you must consider how you will communicate with these products. For example, the most common way to communicate with a CA Unicenter environment is via SNMP, while communication with Tivoli is via native APIs. Also, you must decide which management server (IBM Systems Director or the upstream manager) will handle different tasks like monitoring and alerting.

For more information about Upward Integration Modules, check the IBM Systems Director UIMs topic of the Information Center at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

Additional managers

If your implementation will include additional plug-in managers such as BladeCenter Open Fabric Manager or Active Energy Manager, subagents may need to be deployed to certain managed systems in order for the plug-in to function properly. Check the IBM Systems Director documentation for details on the requirements for the managers that you need. You can access the IBM Systems Director 6.1 Information Center at the above URL.

Agent installation

You can install either Common Agent or Platform Agent on your managed systems in several ways, depending on your current software deployment and installation strategy and the operating systems on which you will install IBM Systems Director Agent.

Important: Before installing either IBM Systems Director Agent on a System x server or IBM blade server, you must first install the system management processor drivers. If you do not install the driver, you will not have in-band access to the service processor on that system.

Recommended: When installing IBM Systems Director on a Linux system with SELinux (such as Red Hat® Enterprise Linux), SELinux is only supported when the enforce security policy is set to either *permissive* or *disabled*. However, during our testing we encountered issues when SELinux enforce security policy is set to *permissive*. We recommend disabling SELinux before installing IBM Systems Director. You cannot re-enable SELinux after installation.

The choices for agent installation are:

- Manual installation (all operating systems)

  Manual installation is the basic method of installing IBM Systems Director. The source can be the IBM Systems Director DVD shipped with your system or downloaded from the IBM Web site. Either way, you will perform the installation process manually.

  While this method of deployment makes sense in development scenarios or in smaller or specialized scenarios, it is too much manual work for larger

installations. If you plan to install IBM Systems Director Agent on more than 20 systems, you may want to use one of the other deployment methods.

- Deployment using Tivoli Provisioning Manager for Operating System Deployment (TPM for OSD)

  TPM for OSD is a fee-based tool that enables you to perform a native (unattended) operating system install or create an image (clone) of an entire donor system. Note that cloning a system that already has IBM Systems Director agent installed is not supported. To install an IBM Systems Director agent with TPM for OSD you must script an unattended install that runs after the image is installed. See 4.6.4, “Unattended Common Agent installation” on page 225, for more information about unattended agent installation.

  For more information about TPM for OSD go to:

  `http://ibm.com/software/tivoli/products/prov-mgr-os-deploy/`

- Installation using Release Management

  For systems that already have an operating system installed, you can use the Release Management tool in IBM Systems Director to perform an unattended installation of the agent. As long as a system has been discovered, you can push the agent to the system. This includes systems that do not already have any IBM Systems Director Agent installed (agentless) or upgrading a Platform Agent to a Common Agent.

  Using the Release Management tool is also the preferred method when upgrading from a previous version of the agent, including a Director 5 Level-2 agent.

  See Chapter 10, “Update Manager” on page 449, for more information about Release Management and pushing out agents.

- Unattended installation (Windows)

  The IBM Systems Director Agent installation routine supports the use of a response file for the unattended installation of the software. This enables you to run a silent installation that requires no user input. This way of deploying the agent will probably suit most demands and deployment strategies.

  An advantage of this deployment method is that it can be used equally in new installations (for example, as a **`RunOnce`** command in a Windows Server 2003 unattended installation) and in existing installations (such as running a batch file that launches the installation).

  The process of implementing an unattended installation is described in 4.6.4, “Unattended Common Agent installation” on page 225.

- Scripted installation (Linux, AIX)

  The easiest way to install the IBM Systems Director Agent on multiple Linux or AIX-based systems is to use an installation script. Installation scripts are

easy to create and, compared with unattended script files for Windows-based machines, scripts pay off when planning to install as few as five systems.

See 4.6.4, “Unattended Common Agent installation” on page 225, for more information.

2.3.3 BladeCenter and service processors

IBM Systems Director 6.1 can communicate directly with IBM BladeCenter management modules as well as the service processors (BMCs and Remote Supervisor Adapter (RSA) IIs) in both IBM blade servers and System x servers. For the management server to be able to communicate with the service processors directly (that is, not through the operating system but directly to the management port) the service processor must be on an accessible network and at a fixed address. (By fixed address we mean either a static address or a *reserved* DHCP address.)

2.3.4 Storage

IBM Systems Director can manage supported local storage and networked storage (like IBM DS3000 series, DS4000 series, and DS6000 products). To manage supported local storage, the proper drivers and providers must be installed. (Supported local storage providers are normally included with the IBM Systems Director agent.) IBM Systems Director communicates with networked storage via the Storage Management Initiative Specification (SMI-S). Some devices include an SMI-S provider in the hardware, while others use separate SMI-S provider software. See the Managing SMI-S providers section of the IBM Systems Director Information Center for details on downloading and installed SMI-S providers for your system:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

2.3.5 Networks

Subnetting networks is quite common, even in small to medium-sized environments. Communications and discovery issues are most often related either to the routers or firewalls between the subnets. You will need a list of subnets where you have devices that IBM Systems Director will be managing so you can ensure that you have the necessary connectivity.

Depending on the type of device being managed and the level of management agent installed on systems, several network ports must be open between the server and the agent. In addition to the basic networking protocols like FTP,

HTTP, and SNMP, you may need to open ports for Common Information Model (CIM), Common Agents, and any other sub-agents that you have installed. Do not forget that if you are using a remote database you must open ports for communication with your database server. Refer to the IBM Systems Director 6.1 Information Center for specific ports that you must open:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

2.3.6 Discovery

Before a system can be managed by IBM Systems Director, it first must be *discovered* by the Systems Director Server. During discovery, the management server learns about resources for it to manage. The management server then stores the resources IP addresses and adds them to the management console.

To discover managed systems, IBM Systems Director can use either push or pull algorithms. Depending on the complexity of your network, you should spend some time planning how your managed systems will be discovered.

You must have detailed information about the layout of your network, especially the information about subnets and VLANs. We also suggest that you plan the discovery method used by IBM Systems Director with your network staff to ensure that no unwanted side effects (for example, high unicast traffic) occur.

The different discovery methods supported by IBM Systems Director are discussed in the following sections.

Agent-initiated discovery (Common Agent only)

The term *agent-initiated discovery* in IBM Systems Director refers to managed systems contacting the IBM Systems Director Server rather than IBM Systems Director Server searching for managed systems. This is a push-based discovery. This implementation has several advantages. First, no matter how complicated your network might be (if you implement VLANs, for example), an agent-initiated discovery will always succeed as long as there is a TCP/IP connection from the management server to the managed system. Also, compared to a server-initiated discovery, the network traffic due to discovery requests will be negligible.

The two available agent-initiated discovery algorithms are:

- Use an existing Agent Manager to register the Common Agent. This involves having a Common Agent register itself with an Agent Manager, which the IBM Systems Director server then checks for new agents. For detailed information about unattended installation, refer to 4.6.4, “Unattended Common Agent installation” on page 225.
- Use a batch file or shell script with the **genevent** command that sends an event to the management server with the managed system’s name and IP address. For detailed information about **genevent**, refer to 16.2, “Single-purpose commands” on page 730.

Server-initiated discovery

The term *server-initiated discovery* refers to IBM Systems Director searching the network for systems and devices. Normally, this is referred to simply as *discovery*. The big advantage of this solution is ease of configuration. You simply enter the discovery settings at the management server. IBM Systems Director allows you to control which protocols the server will use and how it will try to contact systems. Below is a list of methods that an IBM Systems Director server can use to discover devices:

- Discovery methods
  - Broadcast discovery

    Broadcast discovery performs a broadcast in a specified subnet. The subnet will be the one where the management server is installed, but you can also send broadcasts to other subnets if broadcasts are not filtered by your network infrastructure. (By default, most gateways will not permit general broadcasts to pass over subnets.)
  - Multicast discovery

    A multicast discovery sends a request to the standard multicast address 224.0.1.118 and waits for reply from devices in reach (as defined by the TTL of the packet). If your network infrastructure filters broadcast requests (most of them will) but not multicast requests, consider this method.
  - Unicast discovery

    Unicast discovery enables you to specify an exact address or a range of addresses. Each address will be contacted individually. You may want to use this discovery method if your network filters both broadcast and multicast requests. The disadvantage of an unicast discovery is that several protocols must be tried for each individual IP address, increasing network traffic.

- Directory agents

  By using a directory agent you can avoid the disadvantages of a broadcast discovery. The only thing that you will need is one known Common Agent per subnet. IBM Systems Director then contacts these systems in order to perform a broadcast within their respective subnets. When the broadcast is received by Common Agents and Platform Agents, they reply directly to the management server.

- Service Location Protocol (SLP) discovery

  SLP discovery is used for discovering IBM BladeCenter chassis and systems with service processors.

- Discovery protocols

  In addition to the method used by the server to discover devices, there are several protocols used to discover different system types. Here the protocols are listed with the types of systems that each can discover:

  - Agent Manager: Systems already discovered by another Agent Manager
  - Common Agent Services (CAS): Common Agent systems
  - Common Information Model (CIM): CIM-based Platform Agent systems
  - DCOM: Agentless Windows systems
  - IPC: Director 5 agent systems
  - SMI-S: Storage devices
  - SNMP: Generic network devices and switches
  - SSH: Agentless Linux and AIX systems

2.4 Operating system support

The operating systems supported are:

- Windows (32-bit and 64-bit)
- Red Hat Linux (32-bit and 64-bit)
- SUSE® Linux (32-bit and 64-bit)
- VMware ESX
- IBM AIX
- IBM i and IBM i5/OS

The specific versions and platforms of operating systems supported by IBM Systems Director grows with each release. The latest list of specific versions of operating systems supported can be found in the IBM Systems Director Information Center.

For a list of operating systems that are supported by IBM Systems Director 6.1 see:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.plan_6.1/fqm0_r_os_supported_by_ibm_director_61.html

For details related to which IBM Systems Director tasks are supported by a given operating system and agent level see:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.plan_6.1/fqm0_r_os_support_by_ibm_director_task.html

For a list of new operating systems that are supported for the first time in IBM Systems Director 6.1 as well as a list of those operating systems that were supported in IBM Director 5.20, but are no longer supported by IBM Systems Director see:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director_6.1/fqm0_r_whats_new_in_release_610.html

Tip: Those operating systems that were supported by IBM Director Agent 5.20.x or Core Services 5.20.x can be managed by IBM Systems Director 6.1 Server using that older agent even though an equivalent IBM Systems Director Agent may not be available. In addition, versions of IBM i (formerly i5/OS) can be managed at the Platform Agent managed level using the 5722-UME product.

2.5 Features to consider

This section describes other aspects of IBM Systems Director that you should consider when planning an installation.

2.5.1 User accounts

IBM Systems Director user accounts are based on user accounts created in the operating system under which the management server is installed or by authenticating through an LDAP server. When IBM Systems Director Server is installed, four local groups are created automatically in the operating system:

- smadmin: Administrators
- smmgr: Managers
- smmon: Monitors
- smuser: Users

These groups map to user roles within IBM Systems Director. See 3.6.2, “Roles” on page 120, for more information about user roles.

Special consideration must be given to IBM i users. These users must have a user profile on the management server that is running IBM i and be registered in a function usage group. For more about this, refer to the *IBM Systems Director for IBM i Planning, Installation, and Configuration Guide*.

Under Windows, the account specified during installation is added to the smadmin group. Under other operating systems the root account is added to smadmin.

When planning your IBM Systems Director environment consider what users will need access on the system, how you might group them together, and what roles they will need.

2.5.2 LDAP support

IBM Systems Director can authenticate user login requests against a Lightweight Directory Access Protocol (LDAP) server. LDAP is an open protocol that uses TCP/IP to provide access to directory services and perform user authentication. Using LDAP for IBM Systems Director 6.1 user authentication has the following advantages:

- Many organizations already have existing LDAP directories that can be used for Systems Director user authentication. This saves the time and effort required to create user accounts on management servers.
- User access can be immediately modified or terminated on all instances of Systems Director Server by changing the user’s LDAP group memberships.
- Users only need a single ID and password, which can centralize user administration for multiple management servers.

Note: LDAP administrators should note that IBM Systems Director determines group membership using only the *members* attribute of the group entry. Systems Director ignores other methods of specifying group membership, including attributes (such as memberOf) on user entries.

LDAP considerations

Before deploying IBM Systems Director, you should determine what IBM Systems Director user roles need to be defined for your organization. In addition, you should determine the user authentication type that will best meet your needs.

Decide what kind of user authentication to use for Systems Director:

- LDAP server
- Using accounts on the operating system of the management server

Note: IBM Systems Director can authenticate users either via the local operating system (including directory authentication like Active Directory or Network Information Service) or via LDAP but not both at the same time.

With LDAP authentication, it is easy to implement common roles and access for users across multiple instances of Systems Director Server. However, the LDAP server must be secure in order to avoid unauthorized access to management tasks and managed objects in IBM Systems Director.

Before you attempt to have IBM Systems Director authenticate users via LDAP make sure that you have the following information:

- What LDAP directory you use
- Address of the LDAP server
- Port used by LDAP
- Whether you need to use SSL to communicate with the LDAP server
- What user and password you will need to bind to the LDAP service
- The search base (or root) that you need to use to find user accounts

User groups

Consider how Systems Director will be used to manage systems and objects in various locations:

- How many users will be authorized to access IBM Systems Director?
- Will a single management server be used for the entire organization, or will multiple management servers be used?
- If multiple management servers will be used, will the same user accounts be needed on more than one of the management servers, or should user accounts be unique for each management server?
- Is there an existing LDAP directory, such as IBM Directory Server or Microsoft Active Directory, for your organization?

Refer to 3.1.5, “Standard systems management protocols” on page 91, for more details on LDAP support.

2.5.3 Database

IBM Systems Director stores all inventory in a database. Before you install IBM Systems Director Server, you should decide which database you want to use.

Important: Consider your database choice carefully. Changing the database configuration requires you to reset your IBM Systems Director server, which will wipe out any systems, inventory, and Event Automation Plans that you have created.

IBM Systems Director Servers support several databases on several platforms. Depending on your current environment, select the best platform for your database:

- Linux (System x, System p, System z)
  - Apache Derby (included with Systems Director) (embedded only)
  - IBM DB2
  - Oracle
- Windows
  - Apache Derby (included with Systems Director) (embedded only)
  - IBM DB2
  - Microsoft SQL Server 2005
  - Microsoft SQL Server 2005 Express Edition (local install only)
  - Oracle
- AIX
  - Apache Derby (included with Systems Director) (embedded only)
  - IBM DB2
  - Oracle

See the Planning, Installation, and Configuration Guide publication for the platform that you are interested in to view details of specific database versions supported on various platforms and operating systems.

If you already have an existing database system, you may want to configure IBM Systems Director to use that database.

Apache Derby is the default management database and is bundled with the product. It is supported on all operating systems on which IBM Systems Director Server can be installed.

The Apache Derby database is an open source Java™ relational database engine, with zero administration and a small memory footprint. Although Apache Derby is a full functional relational database, the version IBM Systems Director uses is an embedded version with limited functionality. This means that the database tables are not accessible externally. Only the management server can access information stored in the Apache Derby database.

2.5.4 Agent Manager

With IBM Systems Director 6.1 there is the concept of an Agent Manager. The Agent Manager handles credentials and certificates between an IBM Systems Director Server (referred to as the resource manager in the Agent Manager) and the Common Agent.

How must you plan for an Agent Manager? An IBM Systems Director server or Common Agent can be registered with one and only one Agent Manager. If you try to request access to a Common Agent that is already registered with an Agent Manager it will fail.

IBM Systems Director Server can use its embedded Agent Manager or can use another Agent Manager, which can be another IBM Systems Director Server or a stand-alone Agent Manager like the one included with WebSphere® Application Manager. If you are planning on having more than one IBM Systems Director Server, or already use a supported Agent Manager, you must register all of your Common Agents and IBM Systems Director Servers with one Agent Manager. See the Information Center for information about using a remote Agent Manager and supported remote Agent Managers:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director_6.1/fqm0_main.html

Note: Only the IBM Systems Director Server and Common Agent use the Agent Manager. This does not effect Platform Agents or Agentless or other resource types.

2.5.5 Backups and disaster recovery

Like any other system you should regularly back you IBM Systems Director server.

Note: This section talks about backing up data for disaster recovery, not for migration (for example, backing up a Systems Director Server on Windows and restoring it to another Windows system). If you want to migrate between different platforms, operating systems, or versions of IBM Systems Director, see 2.5.6, “Migration versus upgrading” on page 78.

smsave and smrestore

smsave is used to back up the persistent data (file system and database) of an IBM Systems Director server. **smrestore** is used to restore the persistent data (file system and database) from an IBM Systems Director server backed up with

the **smsave** command. See 16.2.9, “smsave” on page 735 and 16.2.8, “smrestore” on page 734 for more information about these commands.

We recommend as a best practice to schedule regular backups of the management server and store at least one copy of the data off-site. Most backup software allows you to run a script before backing up the system. We recommend either having your backup software run **smsave** before backing up the server or scheduling the **smsave** command and using the -targetDirector and -dbTargetDirector options to save the data to a different server.

2.5.6 Migration versus upgrading

You cannot upgrade an IBM Director 5.x server or earlier to IBM Systems Director 6.1. Also, we advise that you not try to install IBM Systems Director 6.1 on an existing Director 5 system. We recommend using the manual migration process.

Note: At time of writing, if you have systems running IBM Director 5.20 (either IBM Director Core Services or IBM Director Agent) they can be managed by IBM Systems Director 6.1.

Manual migration

IBM plans to release a tool to help migrate data from an IBM Director Server 5.20 to IBM Systems Director 6.1 some time after initial product release.

As of the writing of this book, to manually upgrade from IBM Director Server 5.20 to IBM Systems Director Server 6.1 and migrate the 5.20 data to 6.1, complete the following steps:

1. Install IBM Systems Director Server 6.1 on a different management server from the one on which you have installed IBM Director Server 5.20.

   Tip: There is no need to upgrade IBM Director Console 5.20. In Version 6.1 the IBM Systems Director Web interface uses a Web browser and does not require a separate installation.

2. Export the IBM Director 5.20 data from the 5.20 management server.
3. Import the saved IBM Director 5.20 data to IBM Systems Director Server 6.1.

4. *System x only:* To migrate the storage provisioning settings from IBM Server Storage Provisioning Tool, use the following procedure (where <*install_root*> is the directory where IBM Director 5.20 is installed):

   a. Locate this file on the IBM Director 5.20 system:

      <*install_root*>/data/SSPTSetting.xml

   b. Copy the file to this location on the IBM Systems Director 6.1 system:

      <*install_root*>\lwi\runtime\director\eclipse\plugins\com.ibm.director.services.storage.sspt_1.0.0

5. Start IBM Systems Director Server 6.1.

6. To upgrade managed systems running IBM Director Core Services Version 5.20 and IBM Director Agent Version 5.20, use the Agent Installation Wizard to deploy either Platform Agent or Common Agent on the managed systems.

Important: Do not use **smsave** and **smrestore** to attempt to save the data from an IBM Director 5.20 management server and restore to an IBM Systems Director 6.1 Server.

2.5.7 Groups

Groups are a powerful instrument within IBM Systems Director 6.1. You can use groups to ease administration, for security purposes, and for event automation. For example, you can use groups to enable a Web administrator to only access a group of Web servers or for the management server to send an e-mail alert to the Wed administrator when an event is received from systems in that group.

We highly recommend a proper planning of groups, especially when using groups for security purposes. The attributes of dynamic groups should be planned and tested carefully. If your attributes have not been planned thoroughly, it is possible, for example, that a mission-critical database server could be manipulated by someone who should not have the authority.

Refer to the Planning, Installation, ad Configuration Guide for your platform available in the Publications and related information section of the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

2.5.8 Update Manager

Maintaining updates on systems is an ongoing task. IBM Systems Director makes this easier with Update Manager. There are two things that you must plan for before beginning to use Update Manager:

- Repository disk space

  Update Manager downloads updates from IBM and stores them in a local repository. This repository is under the IBM Systems Director installation directory, so you must allow enough disk space for the repository. By default, Update Manager does not use more than 10 GB of space, but you can adjust this upward or downward as required.

- Internet connection

  Update Manager must connect to the internet using HTTP (port 80) to check for and download updates. IBM Systems Director Server must have direct access to the internet or be able to connect through a proxy. If your proxy server requires user authentication you can specify that in the Update Manager Connection tab.

2.5.9 Event automation

One of the most powerful features of IBM Systems Director is the Event Automation Plan tool. This function allows you to react to events in your managed environment in a variety of ways. But like many power features, a little planning can go a long way to getting the most out of the system with the least effort.

Planning for Event Automation Plans

There are many ways to implement Event Automation Plans (EAPs), but we recommend that you keep them simple. This makes the EAPs easy to maintain and update without having to restructure an entire EAP.

Before you create an EAP for the first time, start by planning the EAP. How you configure your EAPs is based on your infrastructure. A small company with one or two IT staff members and a few managed systems and applications will need different EAPs than a company with hundreds or thousands of managed systems and applications, and many locations and IT departments.

The managed systems that are servers are the most critical systems because if they have a problem more users can be affected. Single-user managed systems (desktop and notebook computers) are generally not considered as important because a failure will only affect a single user.

Consider the following for your EAPs:

- Make your EAPs as generic as possible. Rather than creating a plan for each threshold, monitor, alert, or system think of how you want to handle alerts as a whole. For example, if you create an EAP for each server that you monitor they could quickly become very numerous and hard to maintain. A best practice would be to organize your systems into group and create a plan for that group. (See “Event Automation Plan examples” on page 81.) Also, rather than creating filters for each threshold or monitor that you create, try using filters based on severity. Unless you have a need to handle critical CPU utilization events differently from critical disk space events, using one filter and plan will make your life easier.
- Consider any specialized needs for your EAPs. Do you have multiple locations with different staff that must be notified of a local event? Do you have different groups (such as DBAs and e-mail administrators) that must be notified of events based on what software the system is running rather than where it is located?
- Consider modularizing your EAPs. Since one event can trigger multiple EAPs based on where those EAPs are targeted, we often find it easier to break down EAPs into logical modules. See “Modular Event Automation Plans” on page 82 for more about this.

The following section contains examples to show you how you might use this information.

Event Automation Plan examples

Here are some examples of what you must consider when planning your EAPs:

- Multiple locations

  If your IBM Systems Director implementation will have devices in multiple locations, you may need to notify different people based on where those devices are. For example, say you have data centers in New York, London, Berlin, and Beijing. Each location has its own staff and the London data center is responsible for monitoring the health not only of its local systems, but those in the other locations as well. Since these locations probably have different subnets, you could create a dynamic group for each of them based on those subnets. Then you could create an EAP for each location that would alert the appropriate personnel for that location. You could also create an EAP for the *all systems* group that would handle events for the London administrators.

- Different administrators

  Many IBM Systems Director 6.1 installations have different administrative teams based on the operating system (Windows, Linux, AIX, and so on), the applications running on the system (database versus e-mail), or even a

separate group for the test and development lab versus the production environment. In each of these cases you could create different IBM Systems Director groups for the different systems and have separate EAPs for each.

- Modular Event Automation Plans

  Whether or not your deployment will have multiple locations, different administrative teams, or just one administrator for the entire environment, consider modularizing your EAPs. That is, consider a few small EAPs that work together rather than trying to make one large EAP do all things for all systems. For example, you may want all Hardware Predictive Failure Analysis events to page an administrator regardless of the system. You may also want to make a database administrator aware of an issue on a database server or a Domino® administrator aware of an issue on a Domino server. By creating separate plans for each of these you can target them to the appropriate groups of systems, and if those groups are dynamic you do not have to modify anything when a new system comes online.

  While breaking your EAPs into modular units can be helpful, avoid creating too many small EAPs. You must balance the usefulness of modular EAPs against the overhead of having to maintain so many individual EAPs.

  As we said before, do not make your Event Automation Plans more complicated then necessary. If you are the only administrator, managing five servers in one location with one simple EAP would work much better than a larger set of them.

2.5.10 Upward integration

IBM Systems Director lets you leverage your existing enterprise and workgroup management software by upwardly integrating with those products. IBM Systems Director Upward Integration Modules (UIMs) and management packs allow the supported management systems to interpret and display data provided by Common Agents and Platform Agents. IBM Systems Director UIMs and management packs allow the related products to collect inventory, view IBM Systems Director events, and for some UIMs even distribute IBM Systems Director software packages.

When planning your IBM Systems Director installation, determine what features you already have implemented in another system, whether that system is supported by an IBM Systems Director UIM or management pack, and whether you want information from IBM Systems Director to flow up to that software. For more information see the IBM Systems Director UIMs section of the IBM Systems Director 6.1 Information Center, which can be found at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

2.5.11 Implementation timetables

We have compiled some information that may help you decide when you should deploy IBM Systems Director. This may be different, based on your current level of familiarity with Director 5, whether you intend to manage x86-based Hewlett Packard systems using Systems Director, or whether you are currently using supported enterprise or workgroup managers.

Note: All of the below timetables are based on dates and information available at the time of writing.

Existing IBM Director 5.xx users

For existing IBM Director 5.xx users:

- November 2008: Begin testing IBM Systems Director 6.1.
- December 2008: Begin testing the IBM migration tool, Active Energy Manager, and BladeCenter Open Fabric Manager.
- February 2009: Start managing IBM Director 5.10 Level-2 agents.
- June 2009: Begin managing VMware ESXi and Hyper-V™ systems.

Users new to IBM Systems Director

For users new to IBM Systems Director:

- November 2008: Deploy IBM Systems Director 6.1.
- December 2008: Begin using Active Energy Manager and BladeCenter Open Fabric Manager.
- June 2009: Begin managing VMware ESXi and Hyper-V systems.

HP users deploying System x with IBM Systems Director 6.1

For HP users deploying System x with IBM Systems Director 6.1:

- November 2008: Deploy IBM Systems Director 6.1.
- December 2008: Deploy Active Energy Manager and BladeCenter Open Fabric Manager.
- February 2009: HP Systems Insight Manager (SIM) users can use the HP SIM Transition Manager to manage their HP installed base with IBM Systems Director.
- June 2009: Begin managing VMware ESXi and Hyper-V systems.

Users with upward integration needs

For users with upward integration needs:

- November 2008: Deploy IBM Systems Director 6.1 Platform Agent for integration into Tivoli TME, NetView®, CA Unicenter, HP OpenView, BMC Patrol, Tivoli Netcool®, Microsoft Operations Manager and System Center Operations Manager, and Microsoft Systems Management Server and System Center Configuration Manager.
- February 2009: Improve experience with IBM new integrated Management Module (iMM).

2.6 Performance recommendations

Depending on the version and type of operating system that you are using, you can usually tweak and tune it in many different ways. Many people use performance tuning to gain optimization and speed, but for the IBM Systems Director Server we are more concerned with reliability, usability, stability, and security.

Here are a few tips for how we optimized performance on our IBM Systems Director:

- Database

  Locate the database on a high-speed file system, for example, RAID-1 with as many drives as possible when building the RAID array.

- Memory

  More memory is always good. Our testing showed that IBM Systems Director definitely runs better with more memory. We recommend at least 2 GB of memory on the management server, and more if you plan to manage more than 500 systems.

- Services and daemons

  Stop or disable any services or daemons that are not necessary on your management server. In particular, under Windows this might include the print spooler, zero wireless service, 802.11b access, indexing services, fast user switching, FTP, IMAPI CD burning, and other services that not required.

- Antivirus

  Exclude the directories where IBM Director JAR files reside to speed up Systems Director startup.

3

Security

Systems management agents typically have full access to the hardware and software of the managed system, so they can cause serious problems if not secured properly. It is very important to understand what security risks are present, what security capabilities exist in IBM Systems Director, and how to plan for the safest and most efficient use of these features.

This chapter highlights the security features built into IBM Systems Director and describes in detail how to implement a secure systems management environment. It discusses the following topics:

3.1 Security basics

In order to plan and implement effective security, you must understand a few basic concepts and principles. If you are comfortable with security terminology and practice, you can skip to 3.1.5, “Standard systems management protocols” on page 91.

This section begins with an explanation of a few key concepts, including authentication, encoding, and encryption. Then we discuss various security protocols, and finish with information about other industry-standard protocols used by the IBM systems management solution.

3.1.1 Authentication

Authentication is the process whereby one entity proves its identity to another entity. We do this all the time in the form of IDs. When you go to the airport you are required to prove who you are (authenticate) by showing a photo ID. In this case, a trusted third party, the issuer of the ID, authenticates you by giving you a recognizable ID with your photograph. In a perfect world, if someone steals your ID they cannot use it, as either the picture would not match or the ID would show evidence of tampering. Another example is the user ID and password you provide to access a computer system or the internet. The fact that you are the only person who knows the password is what makes this authentication valid.

3.1.2 Encoding

Encoding is the process of making data compatible with a transfer medium or, as it is used here, making it more difficult for unauthorized individuals to read the data. Many children play a game where they send secret messages by assigning a different number to each letter of the alphabet and writing down the numbers rather than the letters. This is the same thing that we do when we represent telephone numbers as words, such as 1-800-IBM-4YOU. As both of these encoding schemes are fairly well known, they are a poor choice for keeping important secrets. However, using a proper encoding system does provide protection against snooping.

3.1.3 Encryption

Encryption is the process of manipulating data so that it is unrecognizable without a proper *encryption key*. Unlike encoding, which translates a message from one form to another, encryption involves performing a mathematical operation to change the data itself. As a simple example, if you want to encrypt the name lesley bain (we use lower case for simplicity) we could use the

encryption key *123* and the encryption algorithm *for each letter add the number of letters represented in the key*. For the name we have chosen to encrypt, this yields *mgvmgbacdjo*, as shown in Example 3-1.

Example 3-1 Simple encryption example

```
lesley bain
12312312312
-----------
mgvmgbacdjo
```

While this is a very simplistic example, you can see that mgvmgbacdjo does not look much like lesley bain. While even an unsophisticated decryption program could easily crack this code, more complicated systems make it very difficult to decrypt messages, even with massive amounts of computer power.

Data Encryption Standard

The Data Encryption Standard (DES) is the name of the Federal Information Processing Standard (FIPS) 46-3 standard, which describes the data encryption algorithm (DEA). The DEA also is defined in the American National Standards Institute (ANSI) standard X9.32. The terms DES and DEA often are used interchangeably, but we use DES within this book. DES has been studied extensively since its publication and is the best known and the most widely used symmetric encryption algorithm in the world.

DES is a robust algorithm used in many applications where security is a prime concern. The obvious method of attack is a brute-force exhaustive search of the key space. This process takes 255 steps on average. Many experts consider DES to be unsecure, and DES encryption is no longer allowed for U.S. government use.

When using DES, several practical considerations can affect the security of the encrypted data. You should change DES keys frequently to prevent attacks that require sustained data analysis. In addition, you must find a secure way of communicating the DES key from the sender to the receiver. In the IBM Systems Director environment, this is handled by the Diffie-Hellman key exchange protocol. (See “Diffie-Hellman key exchange protocol” on page 91 for more about this.) Using this approach, a different DES key is generated for each session, which increases the level of security by orders of magnitude.

IBM Systems Director can be set to use DES encryption when communicating with IBM Director Agents v5.20.3 and earlier.

Triple-DES

Triple-DES uses three DES algorithms in parallel, which effectively lengthens the key to 168-bit. However, the way Triple-DES works is that the #1 and #3 keys are the same, which results in a 112-bit key (128 bit with parity). The cryptographic community at large feels that Triple-DES is more secure than DES.

IBM Systems Director, by default, uses Triple-DES encryption when communicating with IBM Director Agents v5.20.3 and earlier.

Advanced Encryption Standard (AES)

Advanced Encryption Standard (AES) is a block cipher created as a result of a worldwide call for submissions of encryption algorithms issued by the U.S. Government's National Institute of Standards and Technology (NIST) in 1997. After nearly five years of standardization, AES was adopted by NIST as FIPS-197 in November 2001. In June 2003 the U.S. National Security Agency (NSA) announced that AES is secure enough to protect classified information up to the top secret level, which is the highest security level.

AES was developed to replace DES and Triple-DES. The primary motivation for a new standard was the fact that DES has a relatively small 56-bit key, which was becoming vulnerable to brute force attacks. In addition, DES was designed primarily for hardware implementation and is relatively slow when implemented in software. AES solves these issues, offering:

- A block size of 128 bits
- Key sizes of 128, 192, and 256 bits
- Significantly improved performance

The AES algorithm uses one of three cipher key strengths: a 128-bit, 192-bit, or 256-bit encryption key. Each encryption key size causes the algorithm to behave slightly differently, so increasing the key size not only offers a larger number of bits with which you can scramble the data, but also increases the complexity of the cipher algorithm.

IBM Systems Director can be set to use AES encryption when communicating with IBM Director Agents v5.20.3 and earlier.

Java Cryptography Extension (JCE)

JCE provides ciphers and encryption tools for all Java-based platforms. JCE provides a framework for encryption, key generation and agreement, and authentication algorithms. The JCE implementation in IBM Systems Director can use DES, Triple-DES, and AES (or Blowfish on older agents) algorithms to encrypt the data and Diffie-Hellman to transfer the keys.

IBM Systems Director uses JCE to provide encryption for IBM Director 5.20.3 Agents, Common Agents, and Platform Agents.

3.1.4 Security protocols

As protocols are merely standard ways of doing things, security protocols are standardized ways of performing security tasks. IBM Systems Director uses multiple security protocols, depending on how the management server, management console, and managed systems are configured. These protocols include Challenge-Handshake Authentication Protocol, Digital Signature Algorithm (DSA), and Diffie-Hellman Key Exchange Protocol.

Challenge-Handshake Authentication Protocol (CHAP)

Challenge-Handshake Authentication Protocol is a shared secret authentication method. The iSCSI initiator uses CHAP to issue a challenge to the iSCSI client, which then uses the shared secret to build a hash for the response. (This prevents the secret from being sent across the network.) The iSCSI specification recommends his method of authentication.

iSCSI initiators and targets prove their identity to each other using the CHAP protocol, which includes a mechanism to prevent cleartext passwords from appearing on the wire.

Both CHAP and its Microsoft-extended version, MS-CHAP, work by two systems having a shared secret. Think of it as trying to get into a club with a secret handshake. Everyone in the club knows this secret. If you want to get into the club, you must prove that you know the secret.

It works basically the same way with computers. You and the computer that you want to access share a secret, which is your password. If you want to log on to a computer service such as MSN®, you must prove that you know your password. You do not want your password to be seen by anyone else in the network, so you and your service must agree on a way to share the password so that no one else can discover it. The method used is called a *hash*. A *hash* is simply a mathematical formula that cannot be reversed. You and your service agree on a hash. This occurs between the services server and the client software. When you access the service, you send your hashed password across the network. The service knows how your password was hashed, so you are authenticated without sending your password out in the network in the clear.

Example 3-2 shows how a hashed password might appear if intercepted by a network sniffer program.

Example 3-2 Sample hashed password

```
password = "password"
hashed password = "XO3MO1qnZdYdgyfeuILPmQ"
```

CHAP works basically the same way. When you access a server it *challenges* you to prove who you are. You respond to the challenge with a user name and password. The password is hashed and sent. The server looks up your user name and your hashed password. If everything matches, you are authenticated and allowed access. This allows CHAP to provide basic authentication with a minimum of security.

Digital signature algorithm

Digital signatures provide a more robust method of authenticating users and systems. DSA works using pairs of digital keys, one public and one private. These keys are used with complimentary one-way encryption algorithms, meaning that once something is encrypted with one key it can only be decrypted with the other. One of the most common places where you can see digital signatures is when you download Web browser plug-ins from the internet. This is how it works:

1. You decide to download a piece of software from IBM.
2. IBM has signed the package using its private key.
3. When you install the package the installer finds that IBM is listed as the signing authority and tries to decode the signature block using the IBM public key.
4. Because only the IBM private key can encrypt something that can be decrypted by its public key, if the installer can decode the signature block successfully it knows that the package truly came from IBM.

If you access a secured Web site using SSL, a certificate is generated so that the data can be encrypted and authenticated using digital signatures. Also, when you log on to a Windows 2003 domain using an Active Directory client, every attempt to communicate with a Windows 2003 Server in the domain is authenticated using digital signatures.

Secure Sockets Layer (SSL)

Secure Sockets Layer is a protocol designed to enable secure communications on an insecure network such as the internet. SSL provides encryption and integrity of communications along with strong authentication using digital certificates, such as those provided by DSA encryption.

Most Web-based online purchases and monetary transactions are now secured by SSL. When you submit your credit card information to purchase a product from an online merchant, the order form information is sent through a secure tunnel so that only the merchant's Web server can view it. With online banking, financial institutions use SSL to secure the transmission of your personal identification number (PIN) and other confidential account data.

When you connect to the IBM Systems Director Web console the session is redirected to an SSL encrypted session (as noted by the https:// in the URL.) IBM Systems Director's default SSL configuration uses a self-signed certificate, but can be configured to use a certificate signed by a trusted certificate authority (CA). See 3.3, "Configuring SSL" on page 95, for information about how to install your own certificate.

Certificates

IBM Systems Director Server provides, by default, a SSL certificate that supports HTTPS connections between IBM Systems Director Server and the Web browser client. However, to ensure server authentication, data privacy, and data integrity, we recommend that you replace the default certificate with a certificate that is signed by a trusted CA and change the keystore password.

Diffie-Hellman key exchange protocol

Strictly speaking, this is called the Diffie-Hellman key agreement protocol (also called *exponential key* agreement) and was developed by Whitfield Diffie and Martin Hellman in 1976. This protocol allows two users to exchange a secret digital key over an insecure medium without any prior secrets. Diffie-Hellman is started and used by IBM Systems Director when establishing encrypted sessions between the management server and its managed agents.

3.1.5 Standard systems management protocols

Now we examine other standard protocols used in an IBM Systems Director environment, including the Simple Network Management Protocol, Hypertext Transfer Protocol (HTTP), and Telnet.

Simple Network Management Protocol (SNMP)

The most common management protocol currently in use, the Simple Network Management Protocol, is designed to allow systems to perform management functions in heterogeneous environments. While SNMP is widely used and available for most systems, it is not a strict standard and is not always closely adhered to. In fact, it is not uncommon for the Management Information Base (MIB) from an agent to require modification before it can be implemented on some management servers.

SNMP is an application layer protocol that facilitates the exchange of management information between network devices and is part of the TCP/IP suite.

This book does not cover SNMP in detail. However, because Systems Director and IBM server platforms can use the SNMP standard, the basic implications of SNMP security should be discussed.

The Remote Supervisor Adapter, Remote Supervisor Adapter II, and the Advanced Management Module can use SNMP to send traps and for inventory purposes. To secure SNMP, you should plan the SNMP communities used by these SNMP devices. If your company already uses SNMP you probably will have done this planning step already. You can easily apply the settings in your network to Remote Supervisor Adapters.

Whenever possible, you should use SNMPv3, because it was designed to be highly secure. Note that both SNMPv1 and SNMPv2 have serious security holes, including the following:

- SNMP is based on User Datagram Packet (UDP), which is a connectionless protocol, so there is no guarantee that a message sent is actually received or that the sender is who they say they are.
- Access privileges are controlled by a community name. A community name is simply a string of characters that identifies a group of managed systems. This means that all you need to know to manage a system is the proper community string.

  This is rather like having to specify a user name without a password. To make matters worse, most SNMP devices use the default community name public, which is known to anyone with more than a passing interest in SNMP. Some additional control can be added by removing the public community name and by configuring the SNMP agent to accept only SNMP packets from certain IP addresses, but this is difficult to manage, as each agent must be configured with the proper addresses.
- All SNMPv1 and SNMPv2 traffic is sent in clear text. Many tools exist to help analyze (or sniff) network traffic, including Microsoft Network Monitor and Wireshark.

  Using such a tool, a hacker could pick out the SNMP traffic, look at the community string, then attempt to hack into your systems. Considering how commonly the connectionless properties of UDP are exploited by hackers, this can leave you vulnerable to a serious attack.

If you are not using SNMP at the moment, also consider the following. By default, most SNMP devices give read-only access to the community named public. We recommend that you use an SNMP community other than public. Also, try not to

use SNMP community names that can be guessed easily, such as company names.

In addition, certain SNMP devices, such as the Remote Supervisor Adapter, are able to communicate only with trusted hosts. Consider this option to allow SNMP queries only from the IBM Systems Director Server.

The latest version of SNMP, SNMPv3, is also supported by Systems Director. The SNMPv3 specification primarily adds user-based security and remote configuration capabilities to SNMP, making it much more secure than previous versions. SNMPv3 also supports proxies.

Hypertext Transfer Protocol

With everything becoming Web-enabled these days, it is not uncommon for clients to ask that their management products be Web-enabled as well. On the surface, this sounds good. You get easy access from a variety of systems. You probably already use HTTP traffic for any remote or virtual private network (VPN) access to your environment.

Unfortunately, unless your Web access agent uses some form of security protocol such as SSL or a Java applet to encode the data, all of your management information is being sent in an easily readable format. It takes only a little more work to read an HTTP data stream than it does to read an SNMP data stream.

Pluggable authentication module

On systems running a UNIX®-based operating system (Linux or AIX for this discussion), the pluggable authentication module (PAM) framework provides system administrators with the ability to incorporate multiple authentication mechanisms into an existing system through the use of pluggable modules. Applications enabled to make use of PAM can be plugged in to new technologies without modifying the existing applications.

When IBM Systems Director Server is installed under Linux or AIX, the default authentication uses PAM much like it uses Active Directory when installed under Microsoft Windows. When a user attempts to log on to a UNIX-based IBM Systems Director Server, it simply makes a call to the PAM for authentication. PAM is responsible for the authentication mechanism itself, which varies depending on how the administrator has chosen to configure the environment.

Lightweight Directory Access Protocol (LDAP)

Lightweight Directory Access Protocol is a standard directory protocol. By that we mean that LDAP can be used to store, organize, and retrieve information

using standardize calls. In IBM Systems Director LDAP is used as a potential user registry for authenticating accounts for Web console access.

Secure Shell (SSH)

Secure Shell is a protocol for creating a secure connection between two systems. In the SSH protocol, the client machine initiates a connection with a server machine. After an initial connection, the client verifies its connection to the same server during subsequent sessions, transmitting its authentication information to the server, such as a user name and password, in an encrypted format. All data sent and received during the connection is transferred using 128-bit encryption.

IBM Systems Director uses SSH for communication between the server and UNIX/Linux-based agentless systems. IBM Systems Director also uses SSH by default, rather than the simple and unsecure Telnet protocol when executing the remote command line capability. However, if the SSH server on the system does not respond, the remote command line attempts to connect using the Telnet protocol. For systems running IBM i, the remote command line uses only the Telnet protocol. See 11.3, “Remote command line” on page 521, for more information about this.

Service Location Protocol (SLP)

The Service Location Protocol provides a flexible and scalable framework for providing hosts with access to information about the existence, location, and configuration of network services. Traditionally, users have had to find services by knowing the name of a network host (a human-readable text string), which is an alias for a network address. SLP eliminates the need for a user to know the name of a network host supporting a service.

Telnet

Command-line interfaces are useful to manage systems in bulk. Like HTTP, Telnet is easy to set up and available on most platforms today. And like HTTP, Telnet is easily read by prying eyes. Unlike HTTP though, Telnet does not have an encryption capability such as SSL to help make it more secure. SSH is far more secure than standard Telnet and should be used whenever security is a concern.

3.2 Planning and implementing a secure environment

Before deploying an IBM Systems Director management solution, you are required to plan and determine what steps you need to take to secure your environment and avoid any security attacks.

The specific areas are as follows:

- Planning IBM Systems Director Authentication

  Before deploying IBM Systems Director you must determine the user authentication type that will best meet your needs. For further information about the methods of authentication see 3.5, “Authenticating users” on page 98.

- Planning IBM Systems Director users and groups

  Before deploying IBM Systems Director, you must define user roles for your organization. For more information about defining users and groups see 3.6, “Authorizing users” on page 119.

- Planning Secure Sockets Layer configuration on IBM Systems Director

  To ensure server authentication, data privacy, and data integrity, you must replace the default certificate with a certificate that is signed by a trusted CA and you must change the keystore password. For more information about configuring SSL see 3.3, “Configuring SSL” on page 95.

- Planning password management in IBM Systems Director

  Before deploying IBM Systems Director, plan how you will manage passwords in your environment. See 3.4, “User authentication and authorization” on page 96, for more information.

For other aspects of planning your IBM Systems Director management solution refer to Chapter 2, “Planning” on page 55.

3.3 Configuring SSL

It is not required that you use SSL to secure the network traffic between your management server and client browser. However, configuring SSL ensures data integrity and data confidentiality between the management server and Web browser client. This protection is especially important if you access the IBM Systems Director from outside your network or if you use the launched tasks feature of the IBM Systems Director Web interface.

For details on how to Configure Secure Sockets Layer between IBM Systems Director and the Web browser client see the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.console_6.1/fqm0_t_configuring_ssl.html

3.4 User authentication and authorization

IBM Systems Director offers a number of security features. With the provided authentication and user administration options, system administrators can specify user privileges for particular tasks and resources. User registry integration, integrity, confidentiality, and SSL supported secure data transmission are other key elements of a basic security model.

IBM Systems Director is controlled by two interdependent processes, authentication and authorization. Authentication is used to determine the identity of the user and verify and validate that identity. Authorization checks the permissions of the authenticated user and controls access to resources based on the roles that are assigned to the user.

The IBM Systems Director Server uses a role-based access control (RBAC) service with which an administrator can create custom sets of permissions, known as roles, and assign them to individual users or groups. A set of task, command-line interface (CLI), and application permissions that is applied to one or more resources defines an authorization role. Each role can be applied to many users, and each user can have many roles. Regulating user roles is an effective way to control security for your system as it enables you to control access to every task and CLI command.

By default, the only user ID that is assigned to the SMAdministrator role (the only one that can take any action immediately after installation) is the user ID that was use during the installation of IBM Systems Director Server.

Even if you have other administrators defined on the management server, as a role is not assigned to them, they will be unable to administer IBM Systems Director. They will instead receive a message telling them to contact their system administrator, as shown in Figure 3-1.

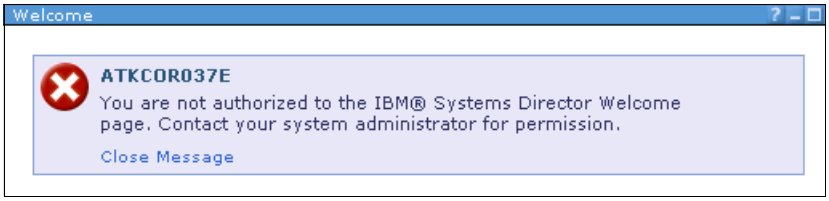


Figure 3-1 Error received if user not authorized to log in to IBM Systems Director

Using the security features in Systems Director, an administrator can perform the following functions:

- View and manage authorized users and groups.
- Assign roles and resources to users.
- Manage user properties.
- Create and modify roles.
- Manage permissions that are grouped within a role.
- Use roles to control access to a system.
- Request access to a system.
- Manage credentials and their associated mappings.

To use IBM Systems Director to access or manage a system, the following steps are taken:

1. A user authenticates to the IBM Systems Director Web interface using his user ID and password (as shown in Figure 3-2), which is then verified with the user ID and password stored in the user registry that is configured by Systems Director.

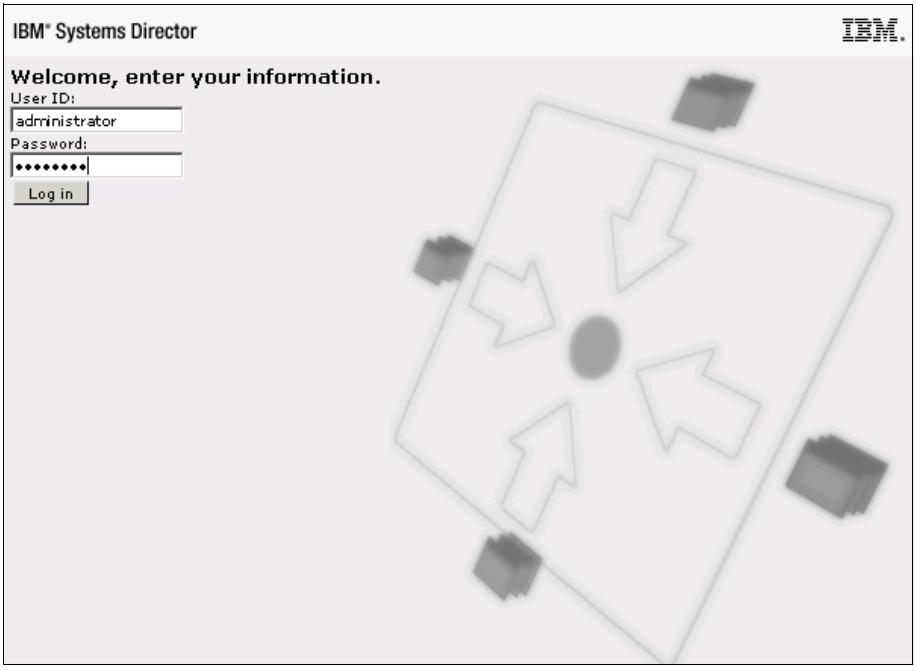


Figure 3-2 Login page to IBM Systems Director

The user registry is configured by default on the local operating system, but it can also reside on a domain controller, in an Active Directory, or in an LDAP

server. IBM Systems Director also finds the user's group membership by associating his user ID with the user ID contained in the group.

2. If the user ID and password entered matches the user ID and password stored in the registry on the target system, then the user is authenticated to the target system.
3. When the user tries to perform a task, the authorization mechanism compares his user ID or the group ID of the group to which he belongs to the associated RBAC settings on the management server. If a role exists that contains the authorizations necessary for that task, then the task is performed.

Note: After five failed login attempts, users are locked from using IBM Systems Director. The command **`smcli lsuser`** shows users that are locked. **`smcli chuser`** can be used to unlock them, as shown below. The Web interface also has this ability. A restart of the server also unlocks users.

To correct this problem, type one of the following commands on the management server to reset the locked-out user ID:

- **`smcli chuser -m unlock`** ***`username`***

  Where *username* is the locked-out user ID.

- **`smcli chuser -m reset`** ***`username`***

  Where *username* is the locked-out user ID.

- **`pam_tally --user`** ***`username`*** **`--reset`**

  Where *username* is the locked-out user ID.

If you want to change the number of permitted login failures, edit the following properties files:

- Linux: `/etc/pam.d/ibmdir` file
- Windows: `lwi\conf\overrides\security.properties` file

3.5 Authenticating users

Authentication is the process that IBM Systems Director uses to determine whether the identity claimed by a user, system, or application is correct. The process of authenticating users involves a user registry and an authentication mechanism. With user authentication, you can access and manage resources with the Systems Director Web interface.

3.5.1 User authentication

User authentication is the security mechanism by which a user's credentials that are used to access a system are verified. After authentication, a user can access the system. However, to access a specific resource or perform a specific task, the user must also have the appropriate authorization. Authentication prevents unauthorized management servers or rogue managed-system applications from accessing the resources.

To be authenticated, users are required to enter a user ID and password for the system that they want to access. The authentication process uses the configured user registry, which is from either the operating system, LDAP, or the domain controller.

The user accounts and groups that are created at the user registry level to log in to a system are also used by IBM Systems Director. For example, to enable successful logging in to the IBM Systems Director Web interface, a user must authenticate by logging in with a user registry level account for the management server. To then use the IBM Systems Director Web interface to gain access to a managed system, the user must enter the appropriate user ID and password to access that other system.

3.5.2 Users and user groups in Systems Director

In IBM Systems Director users and user groups are based on users and groups that are defined in the configured registry, which is associated with either the operating system, LDAP, or domain controller. IBM Systems Director uses the user and group information for the purpose of authentication and authorization.

Systems Director does not provide the capability to create, update, or delete users or groups in a user registry regardless of where the registry resides.

To manage users or groups in the user registry, you must instead use the appropriate tool associated with the registry in which the users or groups are stored. Systems Director does, however, give you the ability to enter and edit information for each user or group that describes each in the context of IBM Systems Director.

Access to particular resources or tasks is governed by restrictions based on the user ID or user group membership and the roles that are defined for each user. For a user to access Systems Director Server, one of the following conditions must exist:

- The user is a member of a user group that is authorized for IBM Systems Director Server.
- The user has administrator privileges on the Windows management server or Windows domain.
- The user is a root user on the AIX or Linux management server.

Users are specific to the systems on which they are created. Each system has its own set of users that is independent of those on any other system in the network or in accounts that are created in Systems Director. The users are placed in either predefined or user-created groups.

In a default IBM Systems Director Server installation scenario that uses the local operating-system registry, the following Systems Director user groups are automatically created at the operating system level on the management server:

- smadmin (administrator group): Members of the smadmin group are authorized for all operations. They have administrative access to IBM Systems Director and can perform all administrative tasks. These members can define the privileges available to the smmgr, smmon, smuser, and groupread groups. The privileges available to members of the smadmin group cannot be restricted.

  Notes: smadmin is the only role that is automatically assigned. The user who is assigned this role is the user ID/password that was entered during the installation of IBM Systems Director. So, initially, no other user is associated with a role. That Systems Director administrator must then associate other users with roles or other users must be added to the smadmin group.

  If you want to use LDAP or another tool that the registry supports, you must manually create all of the user groups on the LDAP server.

- smmgr (Manager group): Members of the smmgr group can perform management operations, which are a subset of the functions that a member of the smadmin group can perform.
- smmon (Monitor group): Members of the smmon group can access those administrative functions that provide read-only access, such as monitoring.
- smuser (User group): The smuser group includes all authenticated users. Members can perform only basic operations.

To authorize additional users and groups to access IBM Systems Director you must use the **smcli authusergp** command. For more information about the **smcli authusergp** command see 3.5.5, “Authenticating users stored in LDAP” on page 105.

3.5.3 Authenticating users stored in the local operating system

IBM Systems Director can authenticate user login requests to the registry for the configured operating system. The local operating system user registry is the one that IBM Systems Director Server uses by default.

To create a local operating system user account that has access to IBM Systems Director Server:

1. Create a user account in the user registry that is associated with the management server.
2. On the Systems Director Server add the user as a member of one of the user groups defined for Systems Director at the user registry level. You can either use one of the predefined groups or create your own.
3. Log in to Systems Director Web interface as an administrator and navigate to **Security** → **Users**. The users that you configured in the previous steps will be displayed in the list.

After users are authenticated to IBM Systems Director, you can configure the authorizations for each user to Systems Director tasks and resources.

3.5.4 Authenticating users stored in the domain server

IBM Systems Director can authenticate user login requests to a domain server.

To create a domain server user account that has access to IBM Systems Director Server, complete the following steps. For this example we use Microsoft Active Directory.

1. Create a user account in the domain server user registry.
2. Join the IBM Systems Director Server to the windows domain.

3. On the Systems Director Server add the user created above as a member of one of the user groups defined for Systems Director at the user registry level, as shown in Figure 3-3. You can either use one of the predefined groups or create your own.

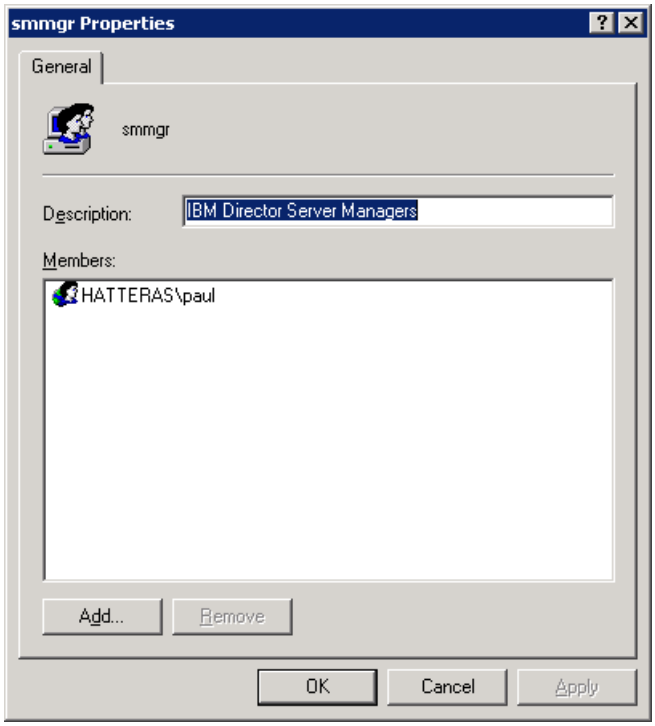


Figure 3-3 Adding domain user paul to IBM Systems Director group smmngr

Complete this step for all new domain users that you want to authorize for access to IBM Systems Director Server, as shown in Figure 3-4.

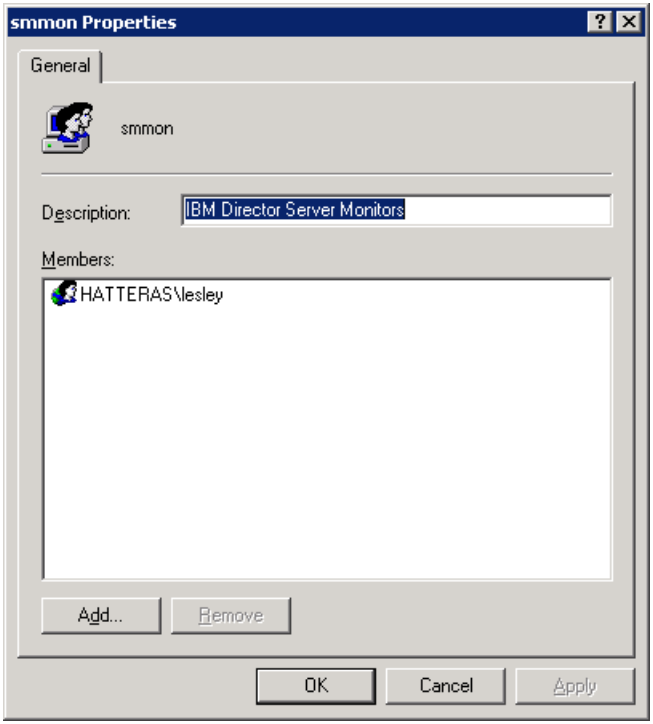


Figure 3-4 Adding domain user lesley to IBM Systems Director group smmon

4. Log in to the IBM Systems Director Web interface as an administrator and navigate to **Security** → **Users**, as shown in Figure 3-5.

Figure 3-5 Security task list showing Users, Roles, and Credentials tasks

The users that you configured in the previous steps will be displayed in the list, as shown in Figure 3-6.

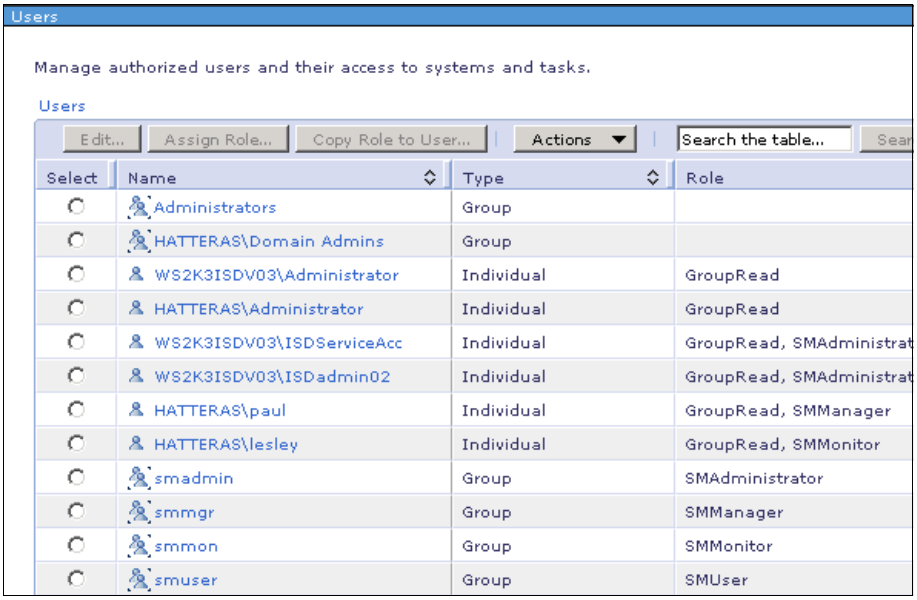


Figure 3-6 Domain users Paul and Lesley shown within users view

5. After users are authenticated to IBM Systems Director Server, you can configure the authorizations for each user to Systems Director tasks and resources.

Note: The user interface login can be slower when the server is a member of a domain, depending on the number of users and groups in the domain. This is due to the IBM Systems Director authentication service searching for users and group membership.

3.5.5 Authenticating users stored in LDAP

IBM Systems Director can authenticate user login requests to an LDAP server. LDAP is an open protocol that uses TCP/IP to provide access to directories that support an X.500 model. Managing your user information with LDAP instead of the local operating system is particularly useful when you have a large number of users who will operate IBM Systems Director.

For Systems Director user authentication, LDAP has a number of advantages:

- Many companies already have existing LDAP directories of employees that can be used for Systems Director user authentication. These existing directories save the time and effort required to create new user accounts on the management server.
- An administrator can immediately modify or terminate a user's access on all instances of Systems Director Server by changing the user's LDAP group memberships or by removing the user's LDAP entry.
- Users need only one user ID and password, as opposed to multiple accounts for each management server.

Important: You will require the following before configuring LDAP authentication for IBM Systems Director 6.1:

- LDAP server host name or IP address.
- LDAP port number: Default open port =389, SSL port =636
- LDAPAdminUser or the binding distinguished name (dn) and password

  This is the user that IBM Systems Director will use to bind to the LDAP Server.
- Search Base information

  In our example this is dc=hatteras,dc=lab. This is the search base or root portion of the directory hierarchy that you want to search.

If you enabled SSL you must know the following information:

- The client keystore file path: The path should be relative to the current LWI working directory (`<LWI_Dir>/runtime/core`) (for example, `/../../security/keystore/clientKeyStore.jks`). This must be set if com.ibm.lwi.ldap.ssl.enable=true.
- Keystore password: The default password for keystore is "ibmpassw0rd" (zero instead of 'o').
- The client truststore file path: The path should be relative to the current LWI working directory (`<LWI_Dir>/runtime/core`) (for example, `/../../security/keystore/clientTrustStore.jks`). This must be set if com.ibm.lwi.ldap.ssl.enable=true.
- Truststore password: The default password for truststore is also "ibmpassw0rd" (zero instead of 'o').

To create an LDAP user account that has access to IBM Systems Director Server complete the steps below.

For this example we use a Windows Active Directory as our LDAP Server and a Windows-based IBM Systems Director management Server, although we include commands for the Linux equivalent for awareness.

1. On the management server change to the following directory:
   - Windows: <isd_install directory>\lwi\conf\overrides
   - Linux: <isd_install directory>/lwi/conf/overrides
2. Locate the file security.LDAP.
3. Copy file security.LDAP and rename it as securityLDAP.properties.

> **Note:** If there are any other security.properties files listed in the overrides directory rename these to secuirty.properties.old or remove them from this directory to a temporary location if you want to keep them.

4. Once the *securityLDAP.properties* file is created, use a text editor to edit this file.
5. Update securityLDAP.properties to instruct IBM Systems Director to use the LDAP server registry instead of the local operating system registry. See the highlighted text in Example 3-3 for details on what the fields should contain.

> **Note:** We recommend that you specify the fully qualified distinguished name for the com.ibm.lwi.LDAPAdminUser. A common name may work, but your results may vary. For our implementation this would be:
>
> cn=Administrator,cn=users dc=hatteras,dc=lab

Example 3-3 The securityLDAP.properties file contents

```
################################################################
# **** WARNING ****
# To enable LDAP based security configuration, follow these steps:
#
# 1. Modify the contents of this file with appropriate
#    LDAP configuration properties.
# 2. Remove 'security.properties' file from current directory and #any
security related properties files
# 3. Rename this file to <filename>.properties
#    eg. securityLDAP.properties
################################################################

################################################################
# Property: com.ibm.lwi.rolemanagerfragment
# ----------------------------------------
#
# Class name of the role manager fragment to use. The built-in #fragment
```

```
# is com.ibm.lwi.security.rolemanagers.os.OSRoleManagerFragment and
provides
# Operating System user/group management.
#
#################################################################
com.ibm.lwi.rolemanagerfragment=com.ibm.lwi.security.rolemanagers.ldap.Role
ManagerLdap

#################################################################
Property: com.ibm.lwi.security.jaas.jaasindex
# ------------------------------------------
#
# Specifies the application name to use when performing JAAS
#authentication.This name must correspond to an application #definition in
the JAAS authentication file(s).
#
#################################################################
com.ibm.lwi.security.jaas.jaasindex=Jaas2.LdapWithHandler
#################################################################
# Property: com.ibm.lwi.security.jaas.failedLoginHandler
# ------------------------------------------
#
# Class name of the failed logins handler implemenation to use.  The
# class specified here must implement the
#com.ibm.security.jaas2lwi.IFailedLoginHandler interface.
#
#################################################################
com.ibm.lwi.security.jaas.failedLoginHandler=com.ibm.security.jaas2lwi.Fail
edLoginHandler
com.ibm.lwi.security.jaas.failedLoginHandler.debug=false
com.ibm.lwi.security.numFailedAttempts=5
#################################################################
# Property:
#com.ibm.lwi.security.jaas.failedLoginHandler.normalizeUsernameClass
# ------------------------------------------
#
# Class name of the normalize username to use.  The
# class specified here must implement the
# com.ibm.security.jaas2lwi.INormalizeUsername interface.
# If user names on LDAP server are configured as a non case #sensitive
fields,then use #com.ibm.security.jaas2lwi.CaseNormalizeUsername  class
# otherwise delete property
#com.ibm.lwi.security.jaas.failedLoginHandler.normalizeUsernameClass
# and failedLoginHandler.normalizeUsernameClass
# from LWI_DIR\security\jaas\jaas.config file.
#
#################################################################
com.ibm.lwi.security.jaas.failedLoginHandler.normalizeUsernameClass=com.ibm
.security.jaas2lwi.CaseNormalizeUsername
```

```
#####################################################################
# Property: com.ibm.lwi.LDAPHost
# ----------------------------------------
#
# Specifies the host name of LDAP server.
#
#####################################################################
com.ibm.lwi.LDAPHost = x236-gateway.hatteras.lab

#####################################################################
# Property: com.ibm.lwi.LDAPPort
# ----------------------------------------
#
# Specifies listening port defined on the LDAP server.
#
#####################################################################
com.ibm.lwi.LDAPPort = 389
#
#
#####################################################################
# Property: com.ibm.lwi.LDAPAdminUser
# ----------------------------------------
#
# Specifies Administrator username defined on the LDAP server
#
#####################################################################
com.ibm.lwi.LDAPAdminUser = cn=Administrator,cn=users,dc=hatteras,dc=lab

#####################################################################
# Property: com.ibm.lwi.LDAPAdminPassword
# ----------------------------------------
#
# Specifies encrypted password of Administrator user defined on the LDAP
server.
# Use lwiencoder command located in the <LWI_Dir>/bin directory.
#
#####################################################################
com.ibm.lwi.LDAPAdminPassword = itso4you

#####################################################################
# Property: com.ibm.lwi.LDAPBase
# ----------------------------------------
#
# Specifies Base (root) distinguish name defined on the LDAP server.
#
#####################################################################
com.ibm.lwi.LDAPBase = dc=hatteras,dc=lab
```

```
#####################################################################
# Property: com.ibm.lwi.searchfilter
# ----------------------------------------
# Specifies user search filter to use on the LDAP server.
#
# Search filter per Active Directory type:
# ---------------------------------------
# Microsoft Active Directory:
#
#  User Filter:(&(sAMAccountName=%v)(objectcategory=user))
#
# IBM Lotus Domino:
#
#  User Filter:(&(uid=%v)(objectclass=Person))
#
# IBM Tivoli Directory Server:
#
#  User Filter:(&(uid=%v)(objectclass=ePerson))
#
# Sun One:
#
#  User Filter:(&(uid=%v)(objectclass=inetOrgPerson))
#
# IBM Secure Way Directory Server:
#
#  User Filter:(&(uid=%v)(objectclass=ePerson))
#
# Novell eDirectory:
#
#  User Filter:(&(cn=%v)(objectclass=Person))
#
#####################################################################
com.ibm.lwi.searchfilter = (&(sAMAccountName=%v)(objectcategory=user))

#####################################################################
# LdapRolemanager authorization fragment properties                 #
#####################################################################

#####################################################################
#   com.ibm.lwi.rolemanager.ldap.filters.usergroup
#---------------------------------------------------
#  Filter string(LDAP) used to search directory for
# groups objects.
#^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
# IBM Tivoli example:
#
#  (|(objectclass=groupOfNames)(objectclass = groupOfUniqueNames))
#
# Microsoft Directory example:
```

```
#
#  (|(objectCategory=group)(objectCategory=groupOfNames))
#
#####################################################################
com.ibm.lwi.rolemanager.ldap.filters.usergroup =
(|(objectCategory=group)(objectCategory=groupOfNames))

#####################################################################
#   com.ibm.lwi.rolemanager.ldap.filters.users
#--------------------------------------------------
#  Filter string(LDAP) used to search directory for
# users objects.
#^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
# IBM Tivoli example:
#
#  (objectclass=person)
#
# Microsoft Directory example:
#
#  (|(objectCategory=person)(objectCategory=user))
#
#####################################################################
com.ibm.lwi.rolemanager.ldap.filters.users =
(|(objectCategory=person)(objectCategory=user))

#####################################################################
# com.ibm.lwi.rolemanager.ldap.names.memberAttribute
#--------------------------------------------------
#  Name of member attribute of role object in
# directory.
# *if there are more then one property value - values
# have to be separated by ','(comma)
#^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
# IBM Tivoli example:
#
#  member
#
# Microsoft Directory example:
#
#  member
#
#####################################################################
com.ibm.lwi.rolemanager.ldap.names.memberAttribute = member

#####################################################################
# com.ibm.lwi.rolemanager.ldap.names.loginName
#--------------------------------------------------
#  Name of login name attribute of user in
# directory.
```

```
#^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
# IBM Tivoli example:
#
#  uid
#
# Microsoft Directory example:
#
#  sAMAccountName
#
######################################################################
com.ibm.lwi.rolemanager.ldap.names.loginName = sAMAccountName

######################################################################
# LDAP with secure connection (SSL) properties                       #
######################################################################

######################################################################
# com.ibm.lwi.ldap.ssl.enable
#---------------------------------------------------
# Enables/Disables LDAP SSL communication
# If true, all "com.ibm.lwi.ldap.ssl.*" properties must be set.
######################################################################
com.ibm.lwi.ldap.ssl.enable = false

######################################################################
# com.ibm.lwi.ldap.ssl.keyStore
#---------------------------------------------------
# The client keystore file path. The path should be relative
# to the current LWI working directory (<LWI_Dir>/runtime/core).
# For example /../../security/keystore/clientKeyStore.jks.
# Must be set if com.ibm.lwi.ldap.ssl.enable=true
#
######################################################################
com.ibm.lwi.ldap.ssl.keyStore =

######################################################################
# com.ibm.lwi.ldap.ssl.keyStorePassword
#---------------------------------------------------
# Password of keystore. The password must be encrypted.
# Use lwiencoder command located in the <LWI_Dir>/bin directory.
#
######################################################################
com.ibm.lwi.ldap.ssl.keyStorePassword  =

######################################################################
# com.ibm.lwi.ldap.ssl.trustStore
#---------------------------------------------------
# The client truststore file path. The path should be relative
# to the current LWI working directory (<LWI_Dir>/runtime/core).
```

```
# For example /../../security/keystore/clientTrustStore.jks.
# Must be set if com.ibm.lwi.ldap.ssl.enable=true
#
#####################################################################
com.ibm.lwi.ldap.ssl.trustStore =

#####################################################################
# com.ibm.lwi.ldap.ssl.trustStorePassword
#-------------------------------------------------
# Password of truststore. The password must be encrypted.
# Use lwiencoder command located in the <LWI_Dir>/bin directory.
#
#####################################################################
com.ibm.lwi.ldap.ssl.trustStorePassword =
```

6. Once you have completed editing the `securityLDAP.properties` file, save it.
7. Encrypt the password field within the `securityLDAP.properties` file, as this is currently in plain text, and the file requires the password to be encrypted as detailed in Example 3-4.

Example 3-4 The securityLDAP.properties file information for LDAPAdminPassword

```
# Specifies encrypted password of Administrator user defined on the # LDAP
server.Use lwiencoder command located in the <LWI_Dir>/bin #directory.
```

To perform this task:

a. Change to the following directory as instructed in Example 3-4:
   - Windows: <isd_install_path>\lwi\bin
   - Linux: <isd_install_path>/lwi/bin

b. Run the following command:
   - Windows: **lwiencoder.bat -filename <isd_install_path>\lwi\conf\overrides\securityLDAP.properties -keylist com.ibm.lwi.LDAPAdminPassword**
   - Linux: **./lwiencoder -filename <isd_install_path>/lwi/conf/overrides/securityLDAP.properties -keylist com.ibm.lwi.LDAPAdminPassword**

c. Once the password is encrypted, the password in the `securityLDAP.properties` file will look something like the highlighted area in Example 3-5.

Example 3-5 Encrypted password within securityLDAP.properties file

```
com.ibm.lwi.LDAPAdminPassword={aes:3C5SnKQL63SjkEy44Gs+vHF6nQzC+Dil1NzNvSiAzzk=}w1QqRHxTUW+lQ+KvimEpJQ===
```

8. In your LDAP registry, create the four IBM Systems Director default user groups smadmin, smmgr, smmon, and smuser.
9. Restart IBM Systems Director Server by performing the following command:
   - Windows: **net stop dirserver**

     Wait for the service to stop (this can take a while), then restart the server by typing **net start dirserver**.
   - Linux: **/etc/init.d/smserver restart**
10. Log in to IBM Systems Director Web interface.

    Note: If IBM Systems Director is authenticating via an LDAP server or a Windows Active Directory domain controller, the login process may be slower than authenticating with a local user account. In the latter case, the time to log in depends on the number of users in the domain, due to a limitation with the Windows APIs available for domains.

11. You can also create and use groups specific to your environment. On the LDAP server create a user account (and, optionally, create a new group) in the LDAP user registry. Add the user to one of the predefined groups already available (for example, one of the smadmin, smmgr, smmon, or smuser groups), or you can also add the user to the new groups created.

    As an example, this would be adding a new system management employee user ID to the system management admin group (a group created to enable a member of this group to manage servers within a company environment).

    In our example we created the following users and groups. Each user is a member of the groups as detailed.

    - UK_group: User Lesley is a member of this group.
    - Mexico_group: User Jesus is a member of this group.
    - USA_group: Users Dave and Paul are members of this group.
    - India_group: User Shripad is a member of this group.
12. To authorize these groups for access to IBM Systems Director you must utilize the **smcli** interface included with the IBM Systems Director server installation. For more information about the smcli interface refer to 16.3, “smcli: Server-based command-line interface” on page 736.
13. First we open a command prompt on the IBM Systems Director server and type:

    ```
    smcli lsbundle
    ```

    This enables us to check whether you are authorized to run this command.

Note: The smcli interface requires that the user is an IBM Systems Director superuser to run the commands.

If you receive the following error message then you are not authorized to run the command:

```
Error: User requires Director Super-user privileges:
HATTERAS\administrator
```

As we are currently logged on as an LDAP user administrator, the smcli utility does not recognize the user logged into the server as a superuser account.

14. At the command prompt type the following:

```
smcli -user <superuser-account> lsbundle
```

You will be prompted to enter the password for this account, and if you are authorized to run this command you will see the output shown in Example 3-6.

Example 3-6 Output of smcli lsbundle command

```
snmp/addsystem
.
.
user/authusergp
.
.
user/rmusergp
.
.
vsmsecurity/chvsmauth
```

The commands that we must utilize for the LDAP configuration are **authusergp** and **rmusergp**.

15. At the command prompt type the following commands to authorize a group:

```
smcli -user <superuser-account> authusergp <group_name>
```

In Example 3-7 we authorized multiple groups within our LDAP server to access the IBM Systems Director server.

Example 3-7 Authorizing UK_Group, USA_Group, India_group, and Mexico_group

```
C:\>smcli -user administrator authusergp UK_group
Password:xxxx
DNZCLI1033I : The group UK_group was successfully authorized.
C:\>smcli -user administrator authusergp USA_group
Password:xxxx
```

```
DNZCLI1033I : The group USA_group was successfully authorized.
C:\>smcli -user administrator authusergp Mexico_group
Password:xxxx
DNZCLI1033I : The group Mexico_group was successfully authorized.
C:\>smcli -user administrator authusergp India_group
Password:xxxx
DNZCLI1033I : The group India_group was successfully authorized.
```

16. Once this is complete go back to the IBM Systems Director Web interface and click **Security** from the tasks available in the navigation area.

    For information about where the navigation area is see 5.3, “Layout of the Web interface” on page 243.

17. Click **Users** to open the Users view and see the added LDAP groups and users, as shown Figure 3-7.

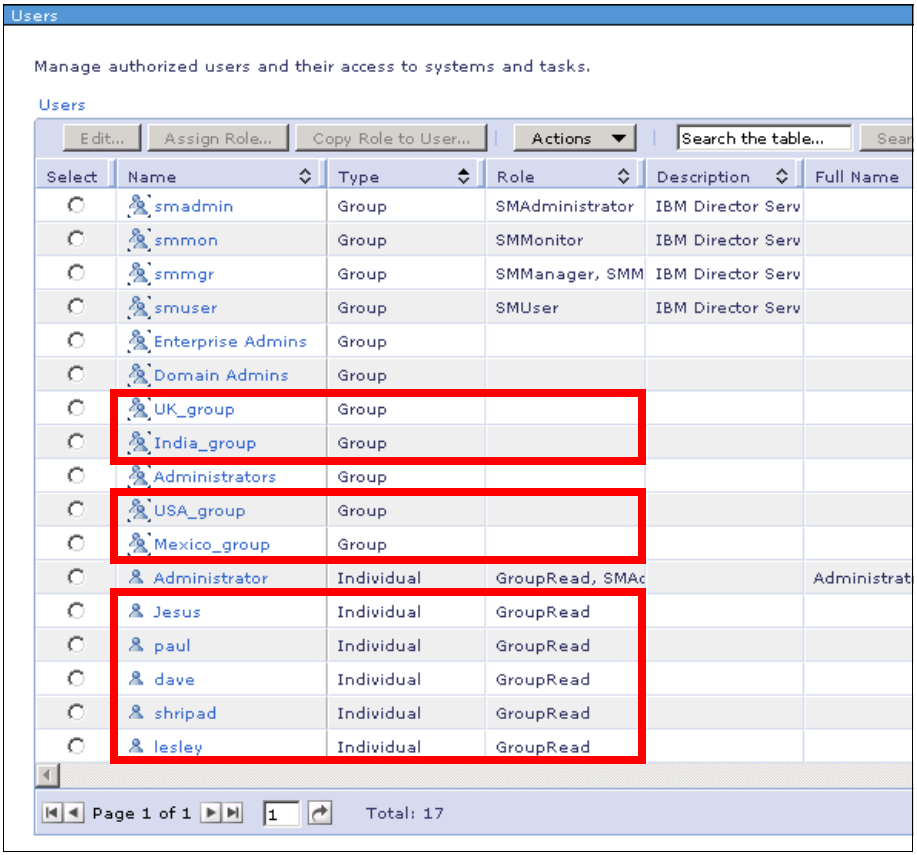


Figure 3-7 LDAP groups and users now visible

Notes: It is important to note that there are no roles assigned to the LDAP groups, and the individual users only have GroupRead roles assigned, as shown in Figure 3-7 highlighted by the boxes. For details on GroupRead see 3.6.2, “Roles” on page 120.

In Figure 3-7 we reordered the columns in the table. For information about how to reorder columns see 5.6.1, “Customizing columns in tables” on page 276.

18. To assign roles to these groups refer to 3.6.5, “Assigning a role to a user or user group” on page 123.

3.5.6 Editing user properties

IBM Systems Director does not provide the capability to create, update, or delete users or groups in a user registry regardless of where the registry resides. To manage users or groups in the user registry, you must instead use the appropriate tool associated with the registry in which the users or groups are stored. Systems Director does, however, give you the ability to enter and edit information for each user or group that describes each in the context of Systems Director.

To edit the properties that IBM Systems Director associates with each user or group:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Users**.
2. Select the user or group that you want to edit.

3. Click **Edit**. The properties page is displayed as seen in Figure 3-8, “User properties page” on page 118.

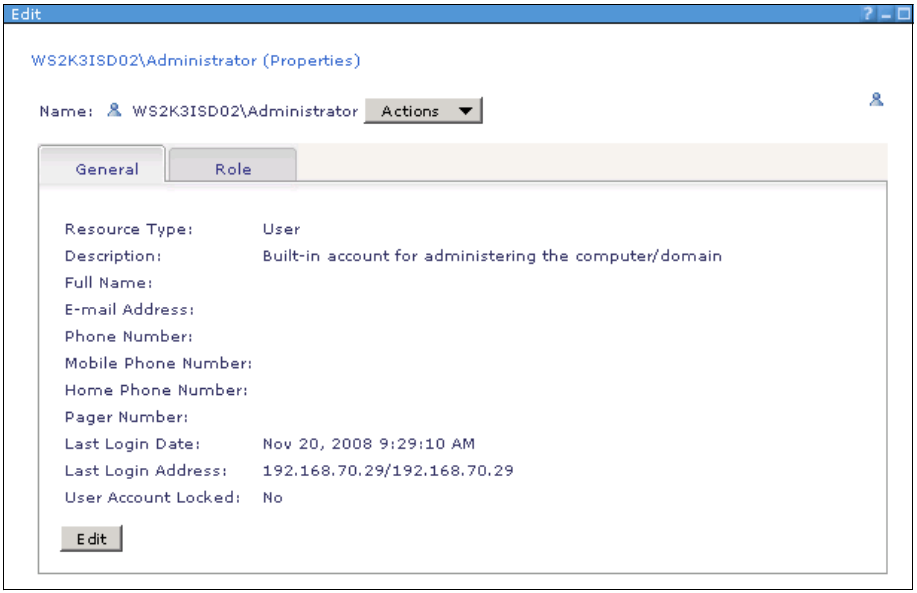


Figure 3-8 User properties page

4. Click **Edit**. The Edit Properties window is displayed (Figure 3-9).

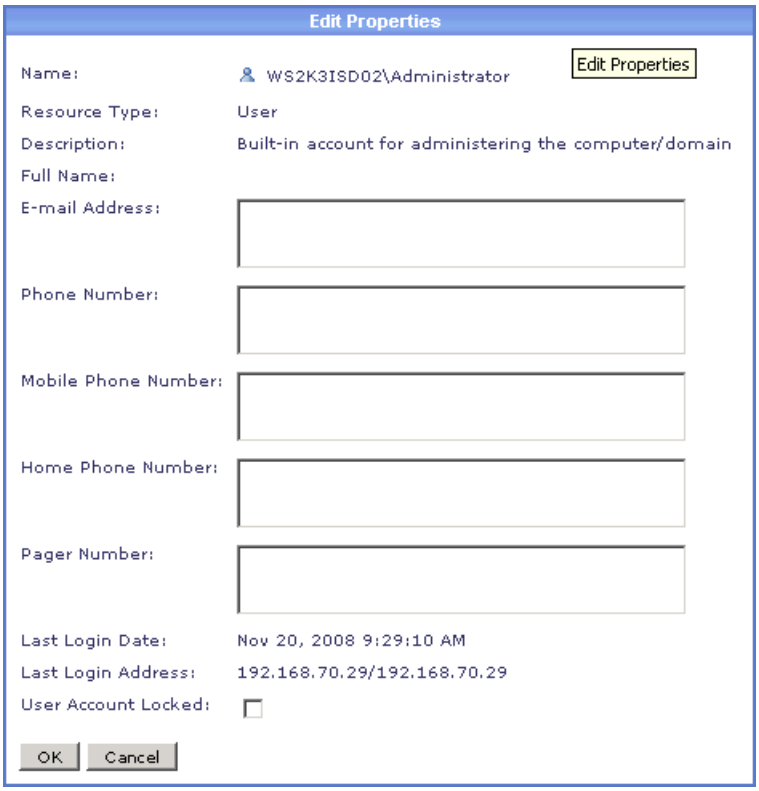


Figure 3-9 Edit user properties page

5. Modify the properties as desired.
6. Click **OK**.

3.6 Authorizing users

Authorization is the process that determines whether an authenticated user or group has the necessary privileges to access specific resources. With user authorization, IBM Systems Director users can perform tasks on specific resources by using the IBM Systems Director Web interface. You must use Systems Director to configure the authorizations that provide access to Systems Director tasks and resources.

Using IBM Systems Director you can create and manage the roles that control authorization for Systems Director users.

3.6.1 User authorization

User authorization occurs when an authenticated user uses IBM Systems Director to perform a task on a resource. The authorization mechanism compares the user account or the group to which the user belongs to the role-based access control settings for that user or group. If a role exists that contains the authorizations necessary to complete that task on that specified resource, then the task proceeds.

Users can access only the applications, tasks, and resources that their user accounts are authorized to access. The authorities that you grant to a user determine the console and resource information that the user can access and the tasks that the user can perform on those resources.

The authorization process that Systems Director performs when accessing a resource is independent of the authentication that is required to access that resource. For example, a user might be able to authenticate to and therefore access the Systems Director Web interface or another resource by using the Systems Director Web interface, but not be able to perform a task on that resource. Both the task and the resource must be authorized in the role settings that are assigned to that user or the authorization group to which the user belongs.

After a user account is added to the applicable IBM Systems Director group to provide access to Systems Director Web interface, you can log in to the Systems Director Web interface as an administrator and configure the authorization policies and rules for Systems Director tasks and resources for that user.

3.6.2 Roles

You can assign roles to IBM Systems Director users to control their access to resources and limit the tasks that they can perform on those resources. The authorities that you configure for a role determine the level of access granted to each user who is assigned to that role. All users or groups of users that access Systems Director must have a user role assignment.

Role-based access control functionality was not available in previous versions of IBM Director. In those versions, you could only edit the access levels on each individual user or group, or you could modify the default access. IBM Systems Director 6.1 adds reusable roles that you can assign more than once and use to build other roles. Systems Director also provides instance-based authorization,

which gives you the ability to define, at a more granular level than before, which tasks apply to which groups in a system.

User roles are preconfigured in IBM Systems Director.

Note: The hierarchical order of the roles in this list is such that the SMAdministrator role has the highest authority and the SMUser role has the lowest authority. Roles with higher authority are permitted to run all operations that roles with lower authority are permitted to run. For example, if the execution of an operation is permitted for SMUser, then all the other roles with higher privileges are also permitted to run the operation.

The predefined user roles are:

- SMAdministrator (administrator role): The SMAdministrator role has full authority to perform all operations and functions, and has full control over permissions. A user assigned to this role can perform all operations (including security administration, product installation, and configuration) with any resource.
- SMManager (manager role): The SMManager role can perform management operations, which are a subset of the functions that a member of the SMAdministrator role can perform. Typically, system administration, system health management, and system configuration tasks are available. This role cannot perform security administration or security configuration tasks, but it has full access to all of the IBM Systems Director functions included within a functional manager or feature. The list of accessible functions include those within the discovery manager, status manager, configuration manager, and update manager.
- SMMonitor (monitor role): The SMMonitor role can access those administrative functions that provide read-only access, such as monitoring, notification, and status. With this role, a user can complete tasks such as monitoring a process, viewing inventory, and viewing hardware status. This role cannot, for example, create virtual servers or reconfigure the IBM BladeCenter.
- SMUser (user role): The SMUser role includes any authenticated user and includes the ability to perform only basic operations such as viewing resources and properties.
- GroupRead (group role): The GroupRead role has a single permission, known as group read, that defines the groups that are visible to each user. The administrator that assigns this role to a user can assign the groups that the user can view. The user then has access to see the groups but not necessarily to see the group contents. For example, in a dynamic group, the

visibility to users can vary based on the assignments to which a user has read-only access.

These default user roles correspond directly with the groups that are created at the operating system level during installation of IBM Systems Director Server. You cannot delete these roles, nor can you modify the permissions associated with them. However, you can add users and other groups to the system-defined roles as needed, and you also can copy the system-defined roles or create new ones for your business needs.

Tasks that require a role with greater permissions than those of the role that you have will not appear in the IBM Systems Director Web interface navigation area or on any of the pages.

3.6.3 Permissions and roles required to run smcli commands

A user ID must be authorized with certain permissions and roles to run the smcli commands. For more information about what these permissions are, refer to the Systems Director Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.security_6.1/fqm0_r_roles_required_to_run_commands.html

3.6.4 Authorizing users to manage resources

To log in to the IBM Systems Director Web interface and manage the resources that are discovered by Systems Director, a user must have a user account that is associated with a role that has the appropriate authority.

To authorize an IBM Systems Director user to manage resources:

1. If the user account that is needed does not already exist, create it on the operating system of the system that you want to manage or within the Active Directory or on the LDAP server.
2. Log in to IBM Systems Director as an SMAdministrator. For example, the user used to install Systems Director Server is an SMAadministrator.
3. Assign an appropriate role to the user account or group to which the user account belongs and associate it with the resources that you want the account to manage. You can use any of the existing initial role groups (smadmin, smmgr, smmon, smuser) or you can create a new role that includes the privileges necessary to access the appropriate resource.

Note: Assigning a role other than smadmin, which is done with the operating system, is performed from within the Systems Director Web interface.

3.6.5 Assigning a role to a user or user group

The roles that are assigned to a user or user group determine the tasks that the user has permission to access. From the Users page, you can assign one or more roles to a user or user group. When you assign a role, you also associate specific resources to which the role will apply for the selected user.

Before you can assign a role to a user, each user or group of users must have a valid user ID or group ID in the IBM Systems Director authenticating user registry. Also, you must make sure that the role that you want to assign to a user already exists. If it does not, you can create a new role from the Roles page.

If you want to associate a role and user with only one resource group, you can create a group that contains all the resources that you will assign to a specific user and then pick that group when you work with the Assign Role Wizard.

To assign a role to a user or group:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Users**.
2. Select the user or group to which you want to assign a role. In our example, we have four groups that require roles assigned as shown in Figure 3-7 on page 116.
3. Click **Assign Role**. The Assign Role Wizard opens as shown in Figure 3-10. If the Welcome page opens, click **Next** to continue.

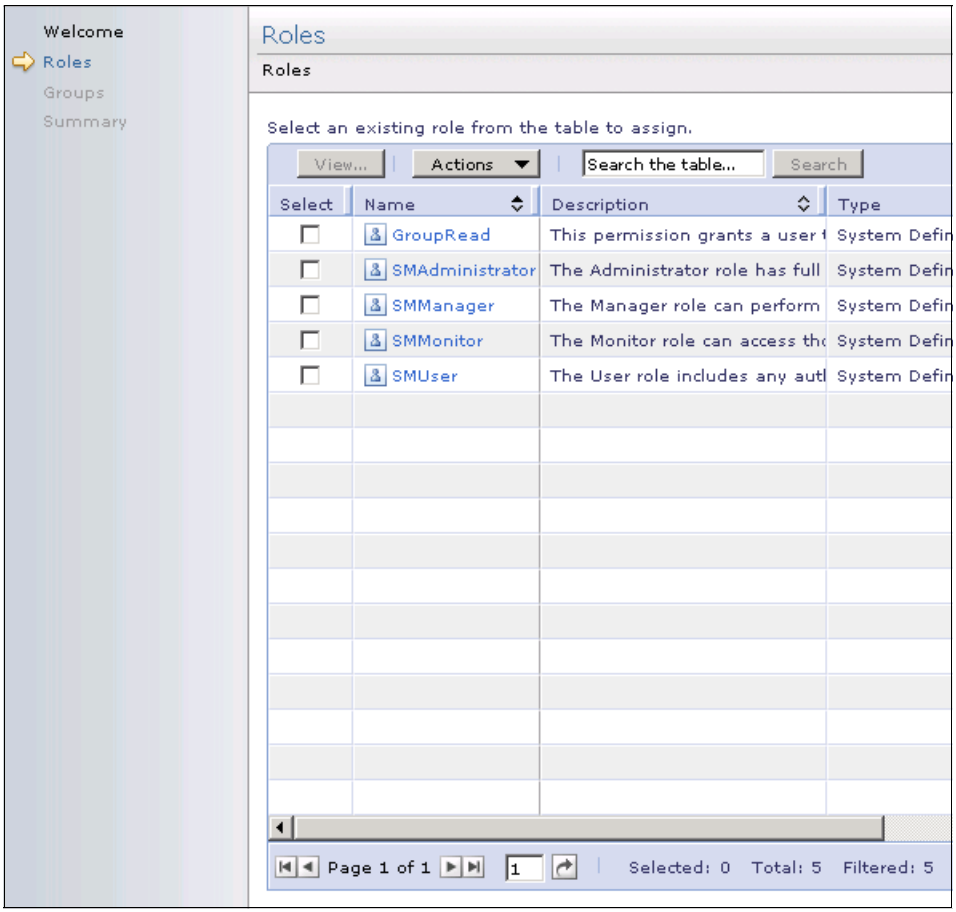


Figure 3-10 Roles available

Note: All the roles above are IBM Systems Director predefined roles. You can create your own roles specific to your environment. For information about creating roles see 3.6.7, “Creating a role” on page 127.

4. Select the role that you want to assign to the user or group. In our example we assign role smmgr to group UK_group. Click **Next**.
5. Select the resource groups that you want to associate with the role and the user or group, then click **Add**.

   In our example we enable group UK_group to manage group System x, as shown in Figure 3-11.

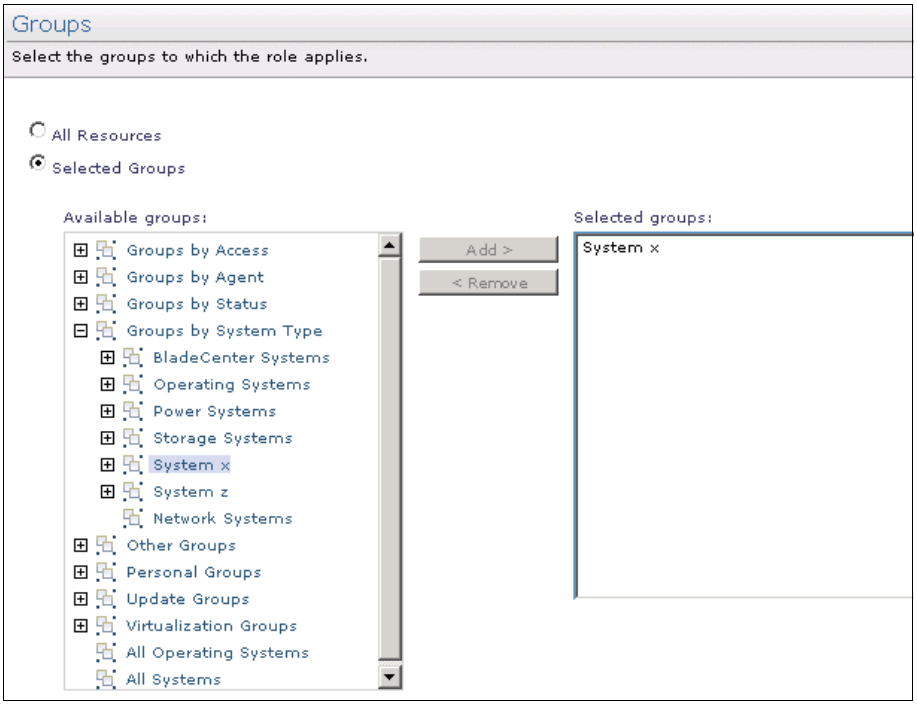


Figure 3-11 Selecting resource groups to be managed by UK_group

Note: The user or group will have access to all the resources contained in the selected groups, including any groups nested underneath, even if any resources are also contained in other groups that are not selected.

6. Click **Next**. The Summary page shown in Figure 3-12 is displayed.

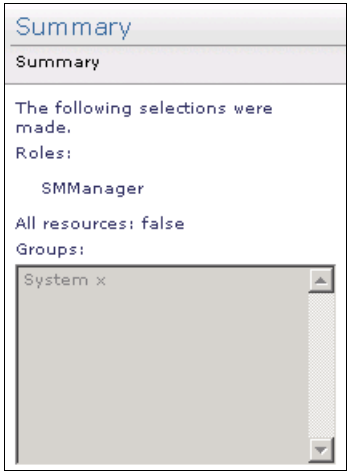


Figure 3-12 UK_Group Role and resources assigned summary

7. Click **Finish**.

> **Note:** To show the updated information close the Users view and reopen it again in order for the Web interface to refresh.

8. In the search box type `SMManager` and click **Search**, as shown in Figure 3-13.

Figure 3-13 Search for SMManager roles

9. In the window shown in Figure 3-14 you see only the users and groups with the SMManager role assigned. Notice that user Lesley who is a member of the group UK_group has also been assigned the SMManager role automatically.

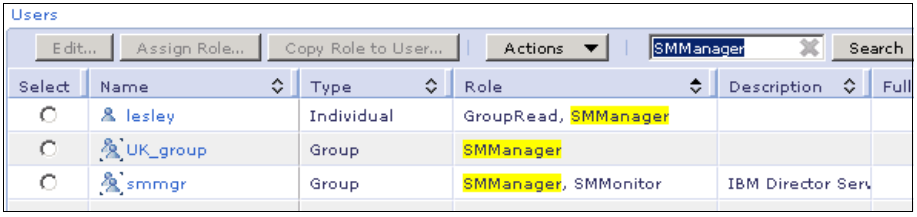


Figure 3-14 Users and groups assigned SMManager role

3.6.6 Copying a role to another user

The roles that are created in IBM Systems Director to control access to tasks and resources can be applied to one or more users or groups. Use the Users page to copy the task and resource assignments in an existing role from one user or group to another user or group.

When you copy a role from one user to another, the task and resource assignments in an existing role are copied and assigned to the new user in one step. As a result, both the task permissions and the associated resources for the selected user are copied to the new user.

Note: The *copy role to user* action does not result in the creation of a new role that matches the selected role. Instead, the task and resource assignments in the selected role are copied to the user or group. In other words, it is the task and resource assignments in the selected role, not the role itself, that are copied to the user or group. If you instead want to copy a role, you can do so using the Roles page detailed in 3.6.8, “Managing roles” on page 130.

To copy a role to another user:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Users**.
2. On the Users page, select the user that has the role that you want to copy and then click **Copy Role to User**. The Copy Role to User page opens.
3. In the Copy to list, select the user to whom you want to copy the role.
4. In the Roles list box, select the roles that you want to copy. Both the task permissions and the associated resources for the selected user are copied to the new user.
5. Click **OK**.

3.6.7 Creating a role

With the Roles page, you can create new roles on your system. IBM Systems Director Server uses a RBAC service with which an administrator can create a set of task permissions that can be applied to one or more resources. The permissions that are configured for a role determine the resources that a user can access and what tasks the user can perform on those resources. Each role can be applied to many users or groups, and each user can have many roles.

To create a role, complete the following steps:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Roles**.
2. On the Roles page, click **Create**. The Create Role wizard opens. If the Welcome page is displayed you can deselect the option to show the Welcome page next time, and click **Next** to continue.
3. The Name page is displayed, as shown in Figure 3-15. In the Name field, type a name for the role that you want to create. In the Description field, type an optional brief description for the role. Click **Next** to continue.

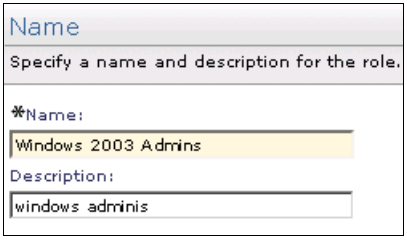


Figure 3-15 Enter the name for the role that you are creating

The Permissions page is then displayed, as seen in Figure 3-16.

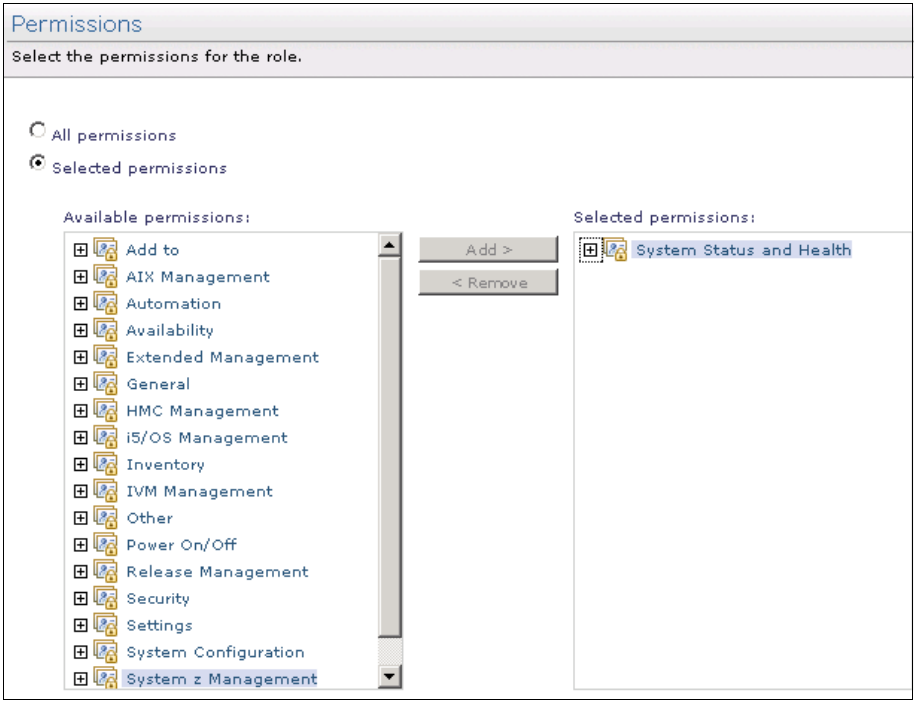


Figure 3-16 Permissions page

4. In the Available permissions field, select a permission that you want to add to the user role and then click **Add**. The selected permission is added to the Selected permissions field and removed from the available permissions field. Continue adding permissions until you have identified all permissions required for the role.

   Note: The permissions are ordered and grouped under specific categories, such as inventory and security, and subcategories within those categories. Under each category, the permissions are sorted alphabetically by permission type. The task permissions are first, followed by the CLI permissions. The different types of permissions are designated by different icons. You can either select a category or subcategory name, which adds all the contained permissions, or you can drill down to select and add an individual permission.

5. To remove a permission from the role, select a permission in the Selected permissions field and then click **Remove**. The selected permission is added back to the Available permissions field.

Click **Next**. The Summary Page is displayed, as shown in Figure 3-17.

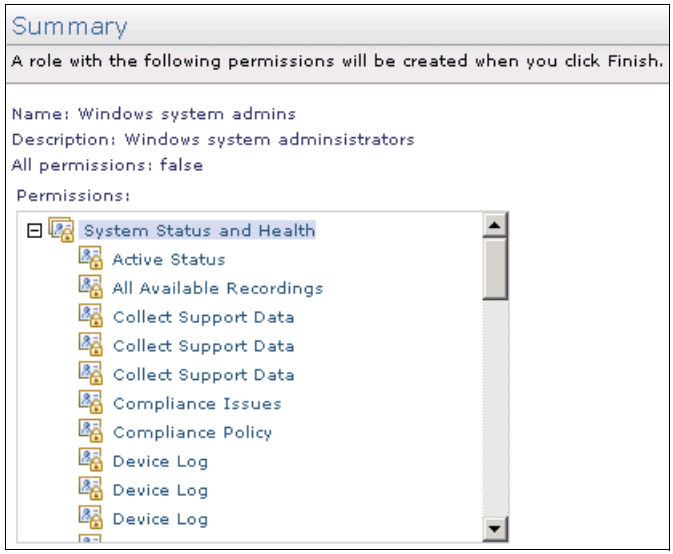


Figure 3-17 Create role Summary view

6. If you are satisfied with the role created click **Finish** to create it and close the Create Role Wizard.
7. After you create a role, use the Assign Role Wizard, as described in 3.6.5, “Assigning a role to a user or user group” on page 123.

3.6.8 Managing roles

Use IBM Systems Director to work with roles and assign individual users and user groups to those roles. From the Roles page, you can view, copy, edit, or delete a role. To view, copy, edit, or delete a role, the role must already exist. You can also use this page to create a new role that you can then manage. See 3.6.7, “Creating a role” on page 127, for instructions.

To view, copy, edit, or delete a role:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Roles**.
2. On the Roles page, select one of the actions detailed in Table 3-1.

Table 3-1 Role actions

To do this task...	Complete these steps
View details about an existing role.	1. Select the role that you want to view. 2. Click **View**. The View page is displayed. 3. View the following details about the role: - Name - Description - Permissions 4. Click **OK**. Note: When you view a role, you will see one of two icons that designate the type of permissions that the role has. One icon indicates that the role applies to tasks in the IBM Systems Director Web interface, and the other indicates that it applies to CLI commands.
Copy an existing role.	1. Select the role that you want to copy. 2. Click **Create like**. The Create Role Like wizard is displayed. The role name defaults to Copy of (original role name), but the rest of the fields are populated with the same entries and selections as is in the original role. 3. Edit the fields as needed. 4. Click **Finish**. The new role based on the original role will appear in the table on the Roles page.
Edit an existing role.	1. Select the role that you want to edit. 2. Click **Edit**. The Create Role wizard is displayed but with the fields already filled out. You can select only certain fields to edit. 3. Edit the role properties as needed, clicking **Next** to continue through the wizard. 4. Click **Finish**. Note: You cannot edit the roles that are shipped with IBM Systems Director, which are designated by the type of system defined.

To do this task...	Complete these steps
Delete an existing role.	1. Select the role that you want to delete. 2. Click **Delete**. A confirmation message is displayed. 3. Click **Delete** in the confirmation message box to confirm the deletion or click **Cancel** to retain the selected role. The selected role is deleted and is no longer displayed in the table on the roles. Note: You cannot delete the roles that are shipped with IBM Systems Director, which are designated by the type of system defined.

3.7 Managing credentials

IBM Systems Director uses credentials and the Credential Transformation Service (CTS) to implement Single Sign-on (SSO) authentication. SSO is an authentication process in which a user can access more than one system or application by entering a single user ID and password. It is used to automate access to multiple resources by requiring a user to authenticate only once.

A user's credentials that access a system are mapped to the appropriate credentials that the user needs for authenticating to that system. With this service, Systems Director users who are managing remote systems over various security domains or realms can authenticate and manage these remote systems by using credentials that are saved in the registries.

When credentials are configured in Systems Director, users are not required to type the user ID and password for the target system each time that they or a task access it. IBM Systems Director Server automatically logs in to the target system as needed.

With IBM Systems Director, you can manage shared, targeted, and Service Access Point (SAP) credentials.

3.7.1 Managing shared credentials

Shared credentials are those credentials that exist in an authentication registry that is not specific to an SAP. They must be of type user ID/password. Shared credentials are created on the local operating system, the domain controller, or LDAP, and are then mapped to other credentials if necessary. In IBM Systems Director, use the **Security** → **Credentials** page to manage shared credentials.

Creating shared credentials

To create a set of shared user ID/password credentials:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Credentials**, as shown in Figure 3-18.

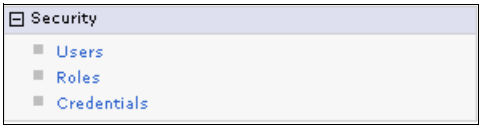


Figure 3-18 security task

The Credentials page is displayed, as shown in Figure 3-19.

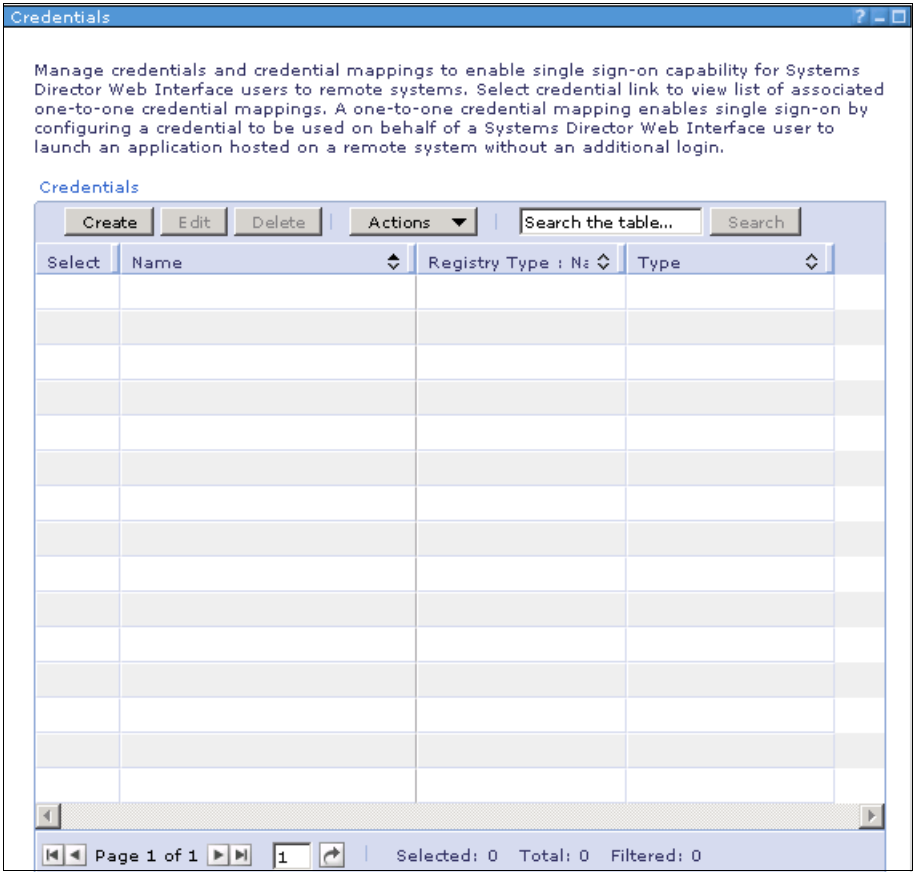


Figure 3-19 Credentials page

2. On the Credentials page, click **Create**. The Credential Wizard opens and the Welcome page is displayed, as shown in Figure 3-20.

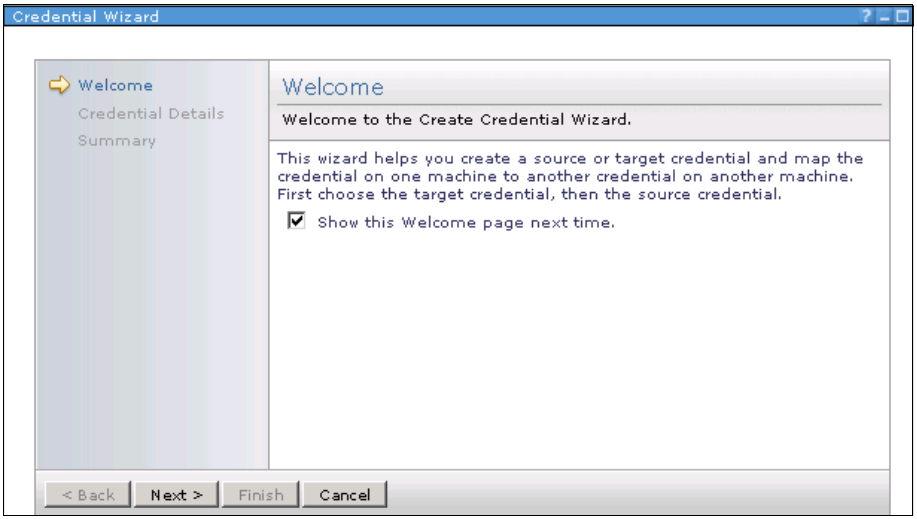


Figure 3-20 Credential wizard

3. Click **Next**. The Credential Details page is displayed, as shown in Figure 3-21.

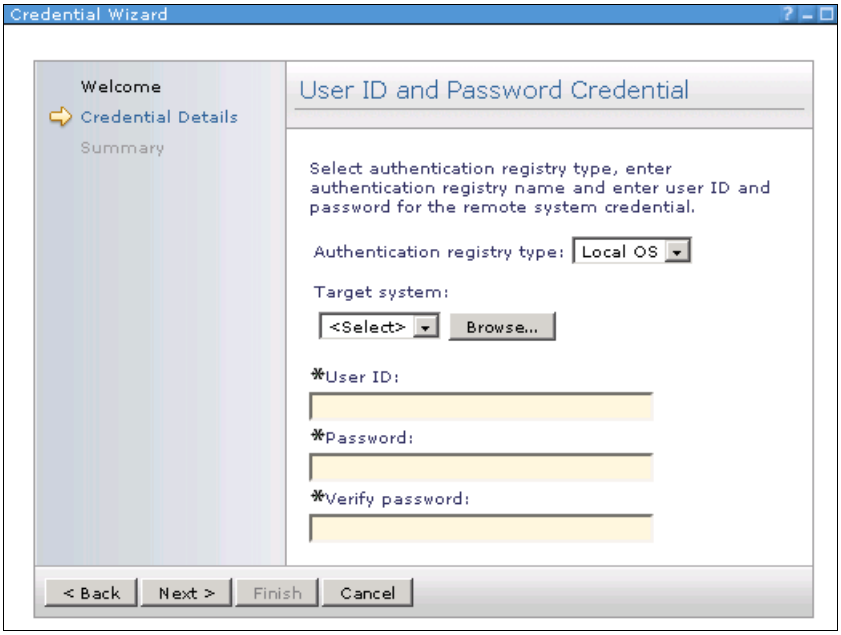


Figure 3-21 Credentials details

4. From the Authentication Registry Type list, select the type of authentication registry that you want to create. The three authentication registry types are:
   - Local OS: Authenticates user login requests with the local operating system of the target system. The target system must have a corresponding user account in the operating-system registry.
   - LDAP: Authenticates user login requests with an LDAP server. Ensure that the LDAP server is configured in your environment and available to the management server.
   - Domain: Authenticates user login requests with a specific domain server. Ensure that the domain server is configured in your environment and available to the management server.

5. From the Target system list, select the name of the target system. If your target system does not appear in the list, click **Browse** to search for it from the content chooser window, as shown in Figure 3-22.

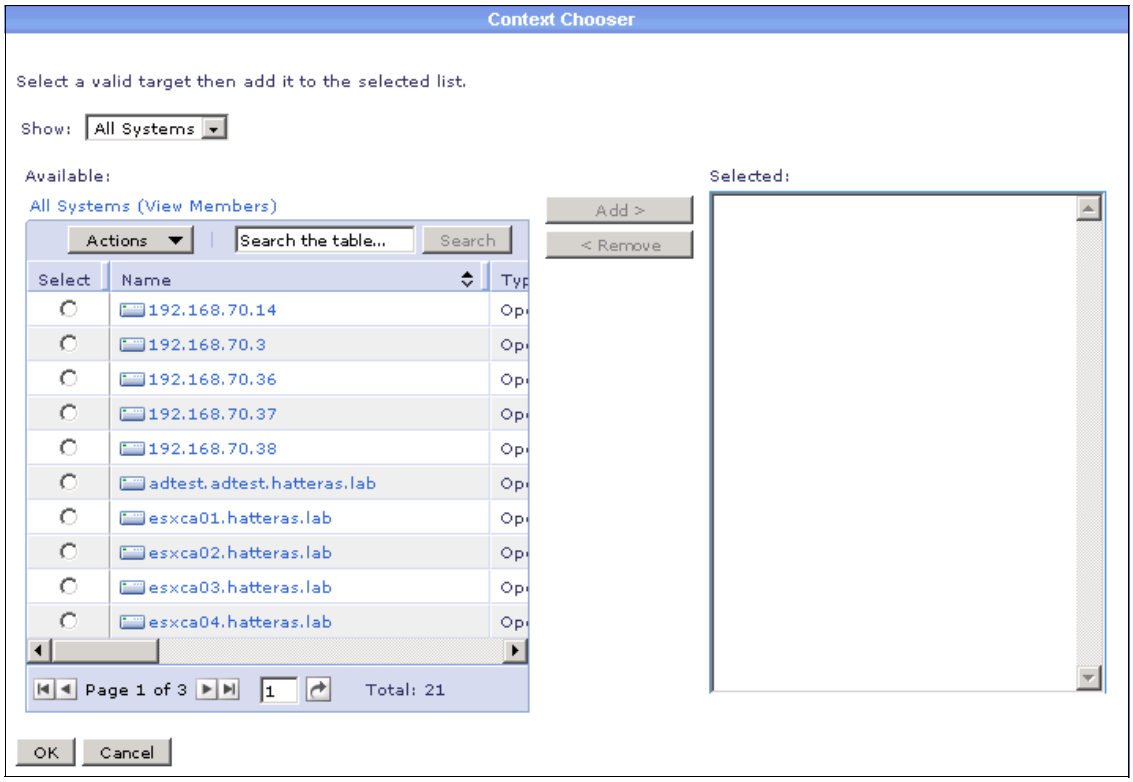


Figure 3-22 Browse for the target systems view

6. Once you select the correct target system, click **Add**.
7. The system selected will now appear in the Target Systems list.
8. Click **OK** to continue.

9. Enter the appropriate login credentials for the system, as shown in Figure 3-23, and click **Next**.

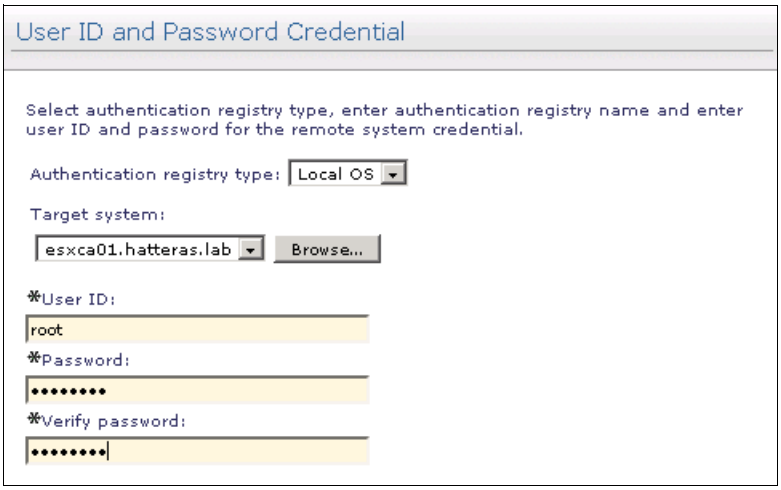


Figure 3-23 Target system user ID and Password Credential view

The Summary page is displayed, as shown in Figure 3-24.

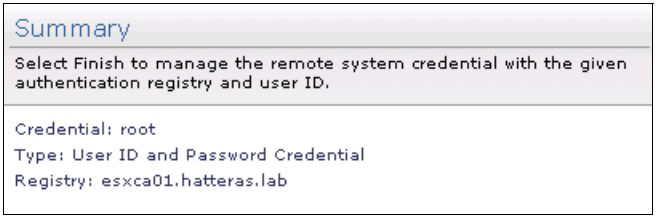


Figure 3-24 View Summary view

10. Ensure that the information is correct and then click **Finish**. The created credential now appears in the Credentials view, as shown in Figure 3-25.

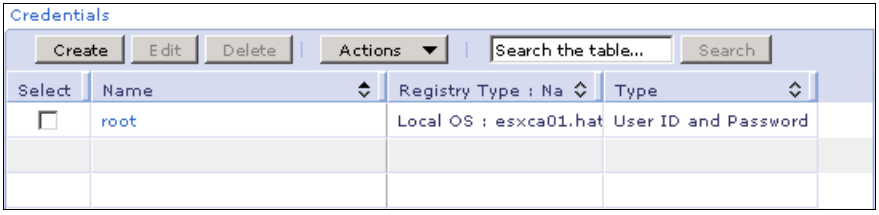


Figure 3-25 Credentials view

Editing shared credentials

To edit a set of shared user ID/password credentials:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Credentials**, as shown in Figure 3-18 on page 133.
2. On the Credentials page, select the shared credential that you want to edit, as shown in Figure 3-26.

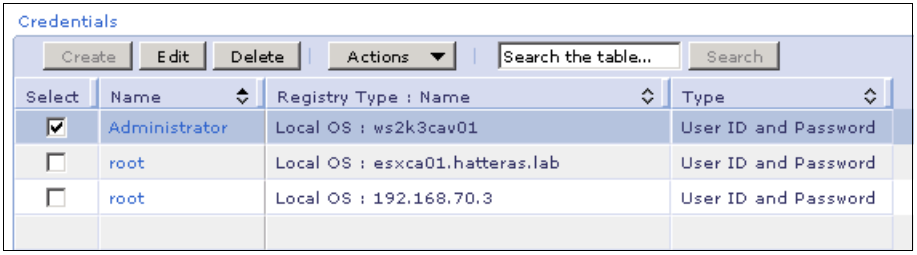


Figure 3-26 Credential to be edited or deleted

3. Click **Edit**. The Edit Credential Wizard opens.
4. If the Welcome page is displayed, click **Next**. The Credential Details page is displayed.
5. Change the password details that are available for changing and verify the password for the credential, as shown in Figure 3-27.

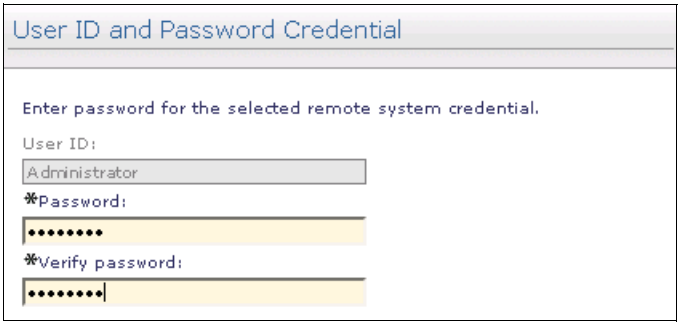


Figure 3-27 Edit details for credentials view

Click **Next**. The Summary page is displayed, as shown in Figure 3-28.

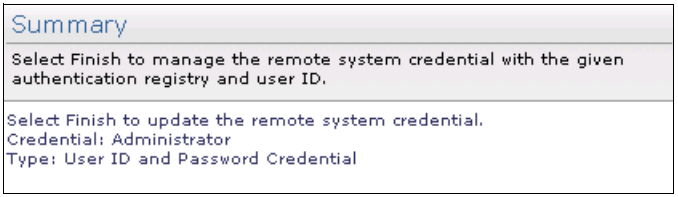


Figure 3-28 Edited credentials summary

6. Click **Finish**.

Deleting shared credentials

The credentials page can also be used to delete shared credentials that are no longer needed.

Note: If you have created any automated tasks in IBM Systems Director, ensure that you check the systems that are the targets of those tasks and the credentials that are used to log into those systems. Some tasks might be configured to use a set of credentials to accomplish the procedures in the task. Deleting the set of credentials that are used by one of these automated tasks prevents the task from accessing targeted systems that are secured.

You do not receive a warning when deleting a credential that is associated with an automated task, and the task is no longer able to access the system.

To delete a set of shared credentials:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Credentials**, as shown in Figure 3-18 on page 133.
2. On the Credentials page, select the credentials that you want to delete, as shown in Figure 3-26 on page 138.
3. Click **Delete**. A confirmation message is displayed, as shown in Figure 3-29.

Figure 3-29 Confirmation message when deleting a credential

4. Click **OK** to confirm removal of the credential. The credential is deleted.

3.7.2 Managing targeted credentials

Targeted credentials are each assigned to only one SAP and are located in an authentication registry that is specific to that SAP. In IBM Systems Director, use **Navigate Resources** → **All systems** to display the list of all managed systems, then right-click a system and select **Security** → **Configure Access** to manage targeted credentials. See 3.7.3, “Managing console service access point credentials” on page 142, for more details.

Use IBM Systems Director to configure the targeted credentials that are used to log into and access SAPs that are managed by Systems Director.

Creating targeted credentials

With IBM Systems Director, you can create targeted credentials that are specific to an agent access point on a resource.

Note: If any CAS or interprocess communication (IPC) access points exist on the resource, you cannot use this process to configure credentials for any of the agent access points, which are all access points that have an access type other than the console. (You can still use this process to configure credentials for console access points.) When the agent access points include CAS or IPC access points, using the request access task to successfully request access to the resource is all that is required to obtain access to all the agent access points. Credentials and mappings are created for the agent access points, but you cannot view or manage them.

To create a set of targeted credentials:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resources** → <group name> → <system name>.
2. Click **Actions** → **Security** → **Configure Access**. The Configure Access page is displayed.
3. Click an access point with an access type other than console. The credentials associated with that access point are listed.
4. Click **Configure Credentials**. The Configure Credential Wizard is displayed.
5. If the Welcome page is displayed, click **Next**. The Credential Type page is displayed.

6. Select the type of credential that you want to create. Table 3-2 details the credential types available.

Table 3-2 Credential types available

Credential type	When to choose this credential
Key pair	Choose this credential type to specify a key pair file and password.
SNMP v1/v2c	Choose this credential type to use either SNMPv1 or SNMPv2c and specify a community name.
SNMP v3	Choose this credential type to manage SNMPv3 profiles.
User ID and password	Choose this credential type to specify a user ID and password for the credential.
X509	Choose this credential type to specify a keystore location and password, and an alias for the credential.
Note: ► This list represents all available credential types. The list of credential types that is displayed depends on the type of access point. ► Two credentials of the same type cannot exist simultaneously on an access point. If one of these types of credentials is already created for this access point, that credential type option will not be displayed. Your only option is to edit the existing credential of that type or delete it before you can create a new one of the same type.	

7. Click **Next**. The Credential Details page that applies to the type of credential that you chose is displayed.
8. Fill in the values for the chosen credential type and click **Next**. The Summary page is then displayed.
9. Click **Finish**.

Editing targeted credentials

To edit a targeted credential:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resources** → <group name> → <system name>.
2. Click **Actions** → **Security** → **Configure Access**. The Configure Access page is displayed.
3. Click an access point with an access type other than console. The credentials associated with that access point are listed.
4. Select the credential that you want to edit.

5. Click **Edit**. The Edit Credential Wizard is displayed.
6. Change the details that are available for changing and click **Next**. The Summary page is then displayed.
7. Click **Finish**.

Deleting targeted credentials

If you have created any automated tasks in IBM Systems Director, ensure that you check the systems that are the targets of those tasks and the credentials that are used to log into those systems. Some tasks might be configured to use a set of credentials to accomplish the procedures in the task. Deleting the set of credentials that is used by one of these automated tasks prevents the task from accessing targeted systems that are secured.

Note: You will not receive a warning when deleting a credential that is associated with an automated tasks, and the task will no longer be able to access the system.

To delete targeted credentials that are no longer necessary:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resources** → <group name> → <system name>.
2. Click **Actions** → **Security** → **Configure Access**. The Configure Access page is displayed.
3. On the Configure Access page, select the credentials that you want to delete.
4. Click **Delete**. A confirmation message is displayed.
5. Click **OK**.

3.7.3 Managing console service access point credentials

A service access point is a logical address that a system uses to route data between a remote device and the appropriate communications support. Service access point credentials incorporate both source and targeted credentials, as well as mappings between the credentials.

In IBM Systems Director, use **Navigate Resources** → **All systems** to display the list of all managed systems, then right-click a system and select **Security** → **Configure Access** to manage the credentials, as shown in Figure 3-30.

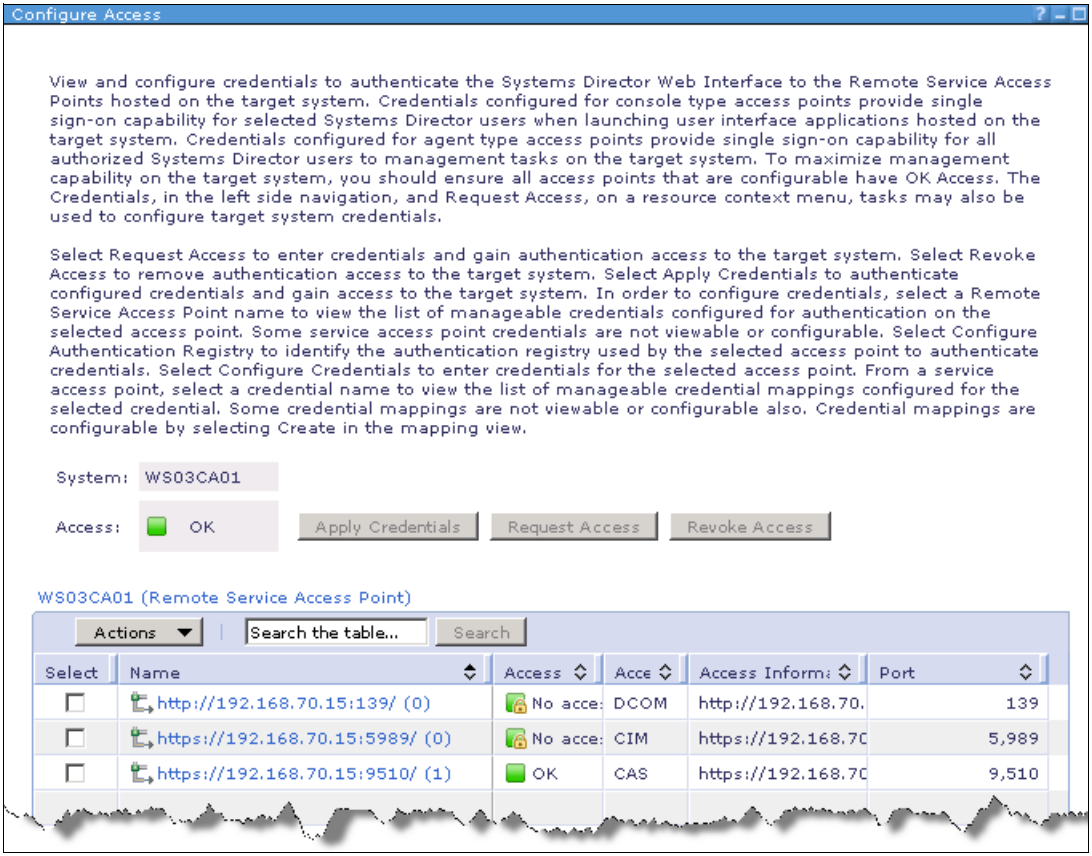


Figure 3-30 Configuring SAP mappings

Creating console access point credentials

Creating an access point credential involves choosing a target credential and then mapping it to a source credential.

To create a set of access point credentials:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resources** → <group name> → <system name>.
2. Click **Actions** → **Security** → **Configure Access**. The Configure Access page is displayed.

3. Click an access point with an access type of console. The credentials associated with that access point are listed.
4. Click **Configure Credentials**. The Configure Credential Wizard is displayed.
5. If the Welcome page is displayed, click **Next**. The Credential Details page is displayed.
6. From the Authentication Registry Type list, select the type of authentication registry that you want to create. The three authentication registry types are:
   - Local OS

     Authenticates user login requests with the local operating system of the target system. The target system must have a corresponding user account in the operating-system registry.
   - LDAP

     Authenticates user login requests with a LDAP server. Ensure that the LDAP server is configured in your environment and available to the target system.
   - Domain

     Authenticates user login requests with a specific domain server. Ensure that the domain server is configured in your environment and available to the target system.
7. Enter the appropriate login credentials for the system. Click **Next**. The Source Credential page is displayed.
8. Select the source credential that you want to use. You can use either the current console credential or choose another credential from the table. Click **Next**. The Summary page is then displayed.
9. Click **Finish**.

Editing console access point credentials

To edit an access point credential:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resources** → <group name> → <system name>.
2. Click **Actions** → **Security** → **Configure Access**. The Configure Access page is displayed.
3. Click an access point with an access type other than console. The credentials associated with that access point are listed.

4. Select the credential that you want to edit. Click **Edit**. The Edit Credential Wizard is displayed.
5. Change the details that are available for changing and click **Next**. The Summary page is then displayed. Click **Finish**.

Deleting console access point credentials

If you have created any automated tasks in IBM Systems Director, ensure that you check the systems that are the targets of those tasks and the credentials that are used to log in to those systems. Some tasks might be configured to use a set of credentials to accomplish the procedures in the task. Deleting the set of credentials that are used by one of these automated tasks will prevent the task from accessing targeted systems that are secured.

Note: You will not receive a warning when deleting a credential that is associated with an automated tasks, and the task will no longer be able to access the system.

To delete a set of access point credentials:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resource**s → <group name> → <system name>.
2. Click **Actions** → **Security** → **Configure Access**. The Configure Access page is displayed.
3. On the Configure Access page, select the credentials that you want to delete and click **Delete**. A confirmation message is displayed. Click **OK**.

3.7.4 Configuring the authentication registry

To configure IBM Systems Director with the authentication registry that the selected console-type access point uses to authenticate credentials on the remote system:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resource**s → <group name> → <system name>.
2. Click **Actions** → **Security** → **Configure Access**. The Configure Access page is displayed.
3. Click an access point with an access type of console. The credentials currently configured for that access point are listed.
4. Click **Configure Authentication Registry**. The Configure Authentication Registry Wizard is displayed.

5. If the Welcome page is displayed, click **Next**. The Authentication Registry Type page is displayed.
6. From the Authentication Registry Type list, select the type of authentication registry that you want to identify. The three authentication registry types are:
   - Local OS

     Authenticates user login requests with the local operating system of the target system. The target system must have a corresponding user account in the operating-system registry.
   - LDAP

     Authenticates user login requests with a LDAP server. Ensure that the LDAP server is configured in your environment and available to the target system.
   - Domain

     Authenticates user login requests with a specific domain server. Ensure that the domain server is configured in your environment and available to the target system.
7. If you chose LDAP or Domain and previously used the credentials or configure access tasks to identify LDAP or domain authentication registries, select the one that you want to use from the list.
8. If you chose LDAP or Domain, enter the IP address or host name of the specific LDAP server or domain and click **Next**. The Summary page is then displayed.
9. Click **Finish**.

Managing mappings

Mappings represent associations between a source credential in one security domain and a target credential in another domain. For example, you can map credentials from your local registry to various other types of authentication registries, such as LDAP.

Depending on the values used in the mapping and how the mapping is associated with an access point, the following three types of mapping associations are possible:

- One-to-one mapping

  This most basic type of mapping is used when a specific user wants to request the services of an access point. A source credential and a target credential are specified, and the target credential must be valid in the same registry that the access point uses for validation. This mapping can be used by any access point that happens to validate to the same registry.

- One-to-one mapping with access point association

  Use one-to-one mapping with access point association if you want to restrict a mapping to a particular access point.

  As with one-to-one mapping, a source credential and a target credential are specified. The target credential must still be valid in the registry that the access point uses for validation. However, the mapping is associated with a specific access point.

- Many-to-one mapping with access point association

  Use many-to-one mapping with access point association if you want to have a mapping with which any user can request the services of a particular access point. This method avoids the administrative overhead of creating many one-to-one mappings when all users must use the same target credential for an access point.

  Note that because this type of mapping can enable broad access, credential transformation service (CTS) requires that this type of mapping associate with an access point.

Create mappings

To create a one-to-one mapping between two credentials:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Credentials**.
2. On the Credentials page, select the credential that you want to map and click **Actions** → **Mapping**.
3. On the Mapping page, click **Create**. The Mapping Wizard opens.
4. If the Welcome page is displayed, click **Next**. The Target credential page is displayed and contains information about the selected credential.
5. Click **Next**. The Source credential page is displayed.
6. Choose whether you would like to use the current console credential or a credential that was previously created and is displayed in the credential table.

If you choose to select a credential from the table, select it and click **Next**. The Summary page is then displayed. Click **Finish**.

Edit mappings

To edit a one-to-one credential mapping:

1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Credentials**.
2. On the Credentials page, select the credential that you want to edit and click **Actions** → **Mapping**.
3. Select the mapping that you want to edit and click **Edit**. The Create Credential Mapping wizard is displayed,
4. If the Welcome page is displayed, click **Next**. The Target credential page is displayed and contains information about the selected credential.
5. Click **Next**. The Source credential page is displayed.
6. Select whether you would like to use the current console credential or a credential that was previously created and is displayed in the credential table. If you choose to select a credential from the table, select it and click **Next**. The Summary page is then displayed.
7. Click **Finish**.

Note: If the Credential Mapping wizard does not finish when editing a credential mapping see the following link describing the issue:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.tbs_6.1/fqm0_r_tbs_security_no_error_when_editing_deleted_credential_mapping.html

Delete mappings

To delete one-to-one credential mappings that are no longer needed:

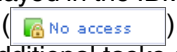
1. In the IBM Systems Director Web interface navigation area, expand **Security** and click **Credentials**.
2. On the Credentials page, select the credential that contains the mapping that you want to delete and click **Actions** → **Mapping**.
3. On the Mapping page, select the mapping that you want to delete and click **Delete**. A confirmation message is displayed. Click **OK**.

3.8 Managing access

You can request access to resources using either the request access task or the configure access task. You can also revoke access to an accessed system.

Accessing a secured system with request access

If the management server to which you are connected has not yet authenticated to the system, you must request access. You must be able to access the system before you can perform tasks or remotely access the system. Also ensure that you have the correct authorization to access the secured system.

Secured systems are displayed in the IBM Systems Director Web interface with a padlock icon beside them (

). After a system is accessed, the padlock disappears and additional tasks and status information is available.

The access attribute for each resource shows the current access status. You cannot request access to resources that have an access status of offline. You must instead use verify access. If the status is OK, you already have access to those resources and no further action is required.

Requesting access to Windows-managed systems provides some challenges if domain credentials are supplied. The format of the user name and domain name varies depending on the level of IBM Director Agent installed on the managed system. Refer to Table 3-3 for acceptable formats for supplying domain credentials to Windows-based systems.

Table 3-3 Windows domain credentials for accessing secured systems

IBM Systems Director Agent level	Domain credential formats accepted
Agentless	username@domain Blank passwords are not acceptable.
Platform Agent	username@domain domain\username Blank passwords are not acceptable.
Common Agent	username@domain domain\username Blank passwords are not acceptable.

To request access to secured managed systems, complete the following steps.

Note: You can select more than one system at a time as long as each requires the same user ID and password.

1. In the IBM Systems Director Web interface, click **Navigate Resources**.
2. Navigate to the system that you want to access, right-click the system for which you want to request access, and select **Security** → **Request Access**.

   Alternatively, you can select **Security** → **Configure Access** and then click **Request Access** on the Configure Access page.
3. On the Request Access page, type the user ID and password of a user with administrator privileges on the managed system.
4. Click **Request Access**. Credentials are created and authenticated to the managed system in an attempt to access it.
5. If the access request is successful, the access status for the managed system will change to OK, and the padlock will be removed.

Note: If any CAS or IPC access points exist on the resource, you must use this process to configure credentials for all of the agent access points, which are all access points that have an access type other than console. When the agent access points include CAS or IPC access points, using the request access task to successfully request access to the resource is all that is required to obtain access to all the agent access points.

Credentials and mappings are created for the agent access points, but you cannot view or manage them. If no CAS or IPC access points exist on the resource, you have the option of using the configure access task to request access to the secured resource.

3.9 Managing Agent Manager credentials

The Agent Manager is responsible for authentication and authorization services between the management server and Common Agents and manages security certificates from both parties using the credentials supplied during IBM Systems Director Server installation. For more information about CAS see 1.5, “Common Agent Services” on page 35.

Note: IBM Systems Director uses only one Agent Manager at a time. The Agent Manager in use is the active Agent Manager. You can add other Agent Managers in the Agent Manager Configuration page, but only the active Agent Manager is used for communication with Common Agents.

Setting the Agent Manager incorrectly prevents IBM Systems Director Server from communicating with Common Agents.

3.9.1 Viewing the Agent Manager information

You can view the configuration of an Agent Manager in a Web browser. You can also use this procedure to verify that an Agent Manager is running. To view the configuration of an Agent Manager:

1. Open the following address in your browser, where *host_name* is the address of the Agent Manager host:

   `http://<host_name>:9513/AgentMgr/Info`

   For example:

   `http://ws2k3isdv03.hatteras.lab:9513/AgentMgr/Info`

   Note: The public HTTP port of the Agent Manager embedded with IBM Systems Director Server is 9513. If you are using an Agent Manager with a different public HTTP port, substitute that port number.

2. If the Agent Manager is running, the Agent Manager Web page opens, as shown in Figure 3-31.

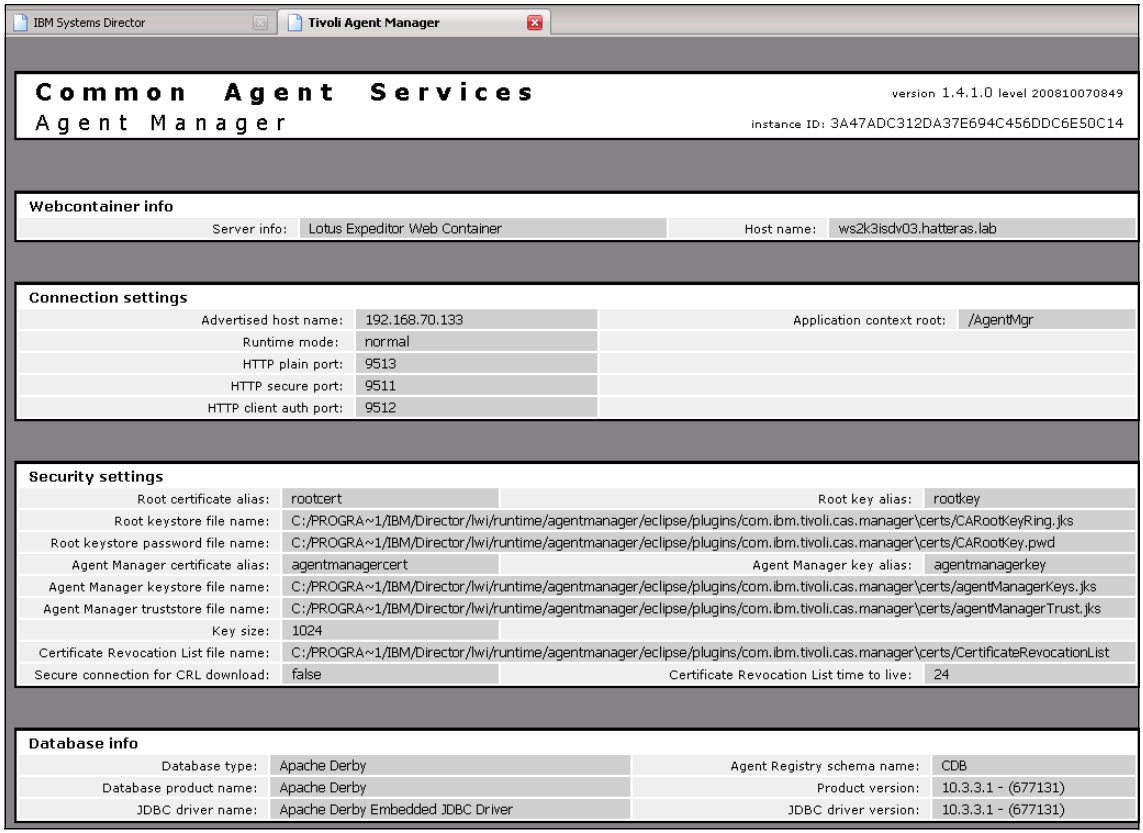


Figure 3-31 IBM Systems Director embedded Agent Manager Information

The Web page information about the Agent Manager includes the following items:

- Version
- Instance ID
- Server name
- Ports used by the Agent Manager
- Aliases for the root certificate, root key, Agent Manager certificate, and Agent Manager key
- The paths and file names for the root keystore file, the root keystore password file, the Agent Manager keystore file, the Agent Manager truststore file, and the certificate revocation list file

- Key size
- Whether a secure connection is used for certificate revocation list download
- Certificate revocation list time to live
- The database type and version used by Agent Manager

3.9.2 Modifying Agent Manager credentials

It is possible to reconfigure several aspects of the Agent Manager via the command line or by modifying specific properties files on the management server. This section includes details on how to modify attributes of the embedded Agent Manager after installation of IBM Systems Director Server, including the following:

- Changing the user ID/password for Resource Manager registration with the Agent Manager (See “Changing Resource Manager credentials” on page 153 for further information.)
- Changing the password for Common Agent registration with the Agent Manager (See “Changing Common Agent registration credentials” on page 154 for further information.)
- Changing the IP address or host name of the Agent Manager
- Changing the Agent Manager with which a Common Agent registers

Changing Resource Manager credentials

To change the password for the Resource Manager in IBM Systems Director, you must use the **AuthchangePasswd** command from a command line. This command can be found in the following directory:

- For Windows:

  ```
  <install_root>\lwi\runtime\agentmanager\toolkit\bin\AuthChangePasswd
  .bat
  ```

- For AIX and Linux:

  ```
  <install_root>/lwi/runtime/agentmanager/toolkit/bin/AuthChangePasswd
  .sh
  ```

The usage of the command is as follows:

```
AuthChangePasswd -toolkitPassword <password> -user <user> -oldPassword
<password> -newPassword <password>
```

Where:

- -toolkitPassword <*password*>: This parameter is used to unlock local toolkit keystore and truststore files. It is set during the toolkit registration process by the registration tool. By default this is set to the same value as the Agent Manager Resource Manager registration password.
- -user <*user*>: User name in the authorization schema.
- -oldPassword <*password*>: Old password.
- -newPassword <*password*>: New password.

Changing Common Agent registration credentials

In some cases you might want to change the agent registration password. The agent registration password serves two purposes:

- Validating the registration of Common Agents
- Locking the agentTrust.jks truststore file

To change the agent registration password, first update the Agent Manager and then redistribute the `agentTrust.jks` truststore file to unregistered Common Agents and to IBM Systems Director Server and any other resource managers that remotely install Common Agents. Use the following procedure:

1. Log on to the Agent Manager server with the credentials that were used to install IBM Systems Director.
2. Run the EncryptAMProps script. Type one of the following commands:
   - For an embedded Agent Manager on Windows:

     ```
     cd <install_root>\lwi\runtime\agentmanager\bin
     EncryptAMProps.bat <new_password>
     ```

   - For an embedded Agent Manager on AIX or Linux:

     ```
     cd <install_root>/lwi/runtime/agentmanager/bin
     ./EncryptAMProps.sh <new_password>
     ```

     Where

     - <*new_password*> is the new agent registration password.
     - <*install_root*> is the root directory of your IBM Systems Director Server installation.

       This script updates the value of the Registration.Agent.Access.Password property in the AgentManager.properties file.

3. Start the IBM Key Management utility. Type one of the following commands:
   - For an embedded Agent Manager on Windows:

     `<install_root>\jre\bin\ikeyman.exe`
   - For an embedded Agent Manager on AIX or Linux:

     `<install_root>/jre/bin/ikeyman.sh`

   Where *<install_root>* is the root directory of your IBM Systems Director Server installation.
4. Open the agentTrust.jks truststore file.
   a. In the IBM Key Management window, click **Key Database File** → **Open**.
   b. In the Open window, set the key database type to JKS, specify the file name and location of the `agentTrust.jks truststore` file, and click **OK**. The `agentTrust.jks truststore` file is located in the following directory:

      `<install_root>\lwi\runtime\agentmanager\eclipse\plugins\com.ibm.tivoli.cas.manager\certs\`

      Where *<install_root>* is the root directory of your IBM Systems Director Server installation.

      If the `agentTrust.jks truststore` file is missing or corrupted, you can copy the `agentTrust.jks` file from a Common Agent or Resource Manager. However, because the password for the file changes when the Common Agent or resource manager registers, you must use the password that unlocks the file on that system to open the truststore file in step 4c.
   c. In the Password Prompt window, type the current agent registration password and then click **OK**. The IBM Key Management window now shows the `agentTrust.jks` file, which contains the signer certificate named rootcert.
5. In the IBM Key Management window, click **Key Database File** → **Change Password**.
6. In the Change Password window, enter and confirm the new password that you specified in step 2 on page 154, and then click **OK**. The `agentTrust.jks` truststore file is encrypted with the new password.
7. Click **Key Database File** → **Exit** to close the IBM Key Management window.
8. Redistribute the `agentTrust.jks truststore` file to any Common Agent or Resource Manager that has not yet registered. If you created a copy of the agent installation files or created an installed image for rapidly deploying Common Agents, copy the new `agentTrust.jks truststore` file to that location.

Note: You do not need to redistribute the `truststore` file to Common Agents and Resource Managers that have successfully registered.

9. On any Common Agent where you redeployed the `truststore` file in step 8 on page 155, update the agent registration password that is stored in an encrypted format in the `endpoint.properties` file.

   Note: You do not need to change the `endpoint.properties` file on Common Agents that have successfully registered.

   To update the saved password, type one of the following commands:

   – For an embedded Agent Manager on Windows:

   ```
   cd <install_root>\lwi\runtime\agentmanager\bin\
   EncryptPW.bat <agent_registration_password>
   ```

   – For an embedded Agent Manager on AIX or Linux:

   ```
   cd <install_root>/lwi/runtime/agentmanager/bin/
   ./EncryptPW.sh <agent_registration_password>
   ```

   Where:

   – <*agent_registration_password*> is the new agent registration password.

   – <*install_root*> is the root directory of your IBM Systems Director Server installation.

10. If necessary, redistribute the `agentTrust.jks truststore` file to any IBM Systems Director Server instances and any other resource managers that have not yet registered. Typically, you will not have resource managers that are installed but not registered.

11. Change the saved agent registration password for any Resource Manager that uses it to deploy Common Agents.

12. Restart the Agent Manager to start using the new properties file and password.

The agent registration password is now changed throughout your deployment.

3.9.3 Adding a new Agent Manager

At some point in the future it may be required to change which Agent Manager the Common Agents register with. However, the new Agent Manager must be configured and available before removing the current Agent Manager.

You also must ensure that you have the following information:

- Host name or IP address of the Agent Manager that you will use
- Resource Manager user name and password (that is, the IBM Systems Director user that will be used to register IBM Systems Director Server with Agent Manager)
- Agent registration password that is used to register Common Agents with Agent Manager
- Public communications port used by Agent Manager

For the above information requirements refer to 3.9.1, “Viewing the Agent Manager information” on page 151.

IBM Systems Director Common Agents uses only one Agent Manager at a time. The Agent Manager in use is the active Agent Manager. You can add other Agent Managers in the Agent Manager Configuration page, but only the active Agent Manager is used for communication with Common Agents.

To add a new Agent Manager:

1. Click **Settings** → **Agent Manager Configuration**. This opens the Agent Manager Configuration page, as shown in Figure 3-32.

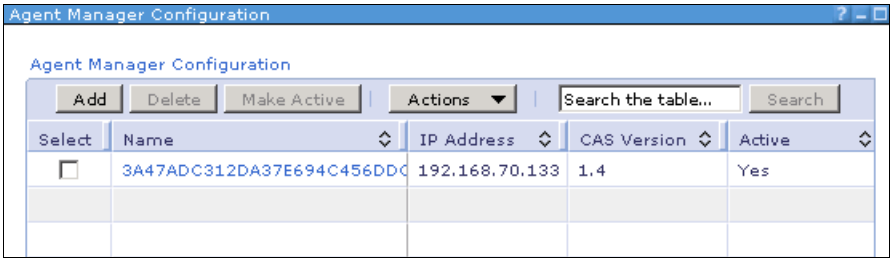


Figure 3-32 Agent Manager Configuration page

2. In the Agent Manager Configuration page, click **Add**.

3. In the Add a New Agent Manager window shown in Figure 3-33, type the requested information for the Agent Manager that you are adding and then click **OK**.

Figure 3-33 Add new Agent Manager window

The settings required are:

- Agent Manager host name or IP address: The host name or IP address of the Agent Manager that you are adding.
- Resource Manager Registration user name: The user name that is used to register IBM Systems Director Server with the Agent Manager.
- Resource Manager Registration password: The password that is used to register IBM Systems Director Server with the Agent Manager.
- Agent Registration password: The password that is used to register Common Agents with the Agent Manager.
- Catalogue service port: The port that is used for non-secure, or public, communications. Note that the agent recovery service listens for registration failures on this port number in addition to port 80.

– Make the new Agent Manager active: If selected, this check box sets the new Agent Manager as the active Agent Manager for IBM Systems Director Server.

Important: Changing the active Agent Manager in IBM Systems Director migrates all of the Common Agents that are registered with the previously active Agent Manager to the new active Agent Manager. This has two implications:

- Depending on the number of Common Agents that are registered with the previously active Agent Manager, the migration process could take some time, during which some Common Agents might not be available for management by IBM Systems Director.
- After the Common Agents are migrated to the new active Agent Manager, they will no longer be able to be managed by any management applications (including other installations of IBM Systems Director) that use the Agent Manager from which they were migrated.

  In order to manage the migrated Common Agents with other management applications, the management applications must be configured to use the new active Agent Manager.

4. Once the Agent Manager has been added successfully you will receive a message, as shown in Figure 3-34.

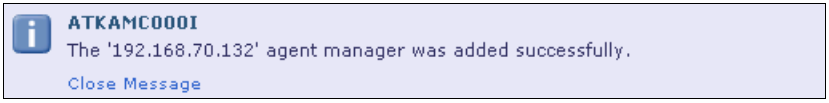


Figure 3-34 Agent Manager added successfully

5. Click **Close Message** to remove from the view. The New Agent Manager will now appear listed in the table, as shown in Figure 3-35.

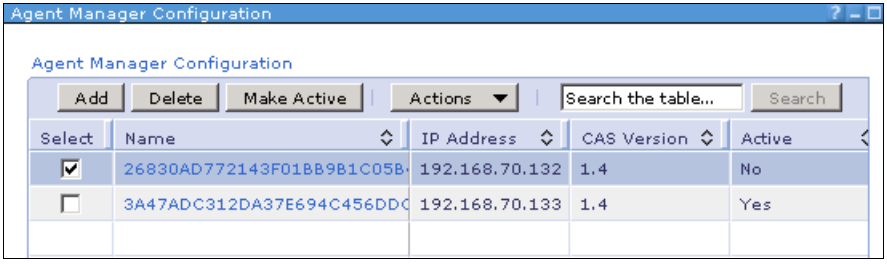


Figure 3-35 New agent successfully added

6. If you did not already activate the Agent Manager you can do so now by selecting the Agent Manager and clicking **Make Active**. However, first ensure the you understand the implications of this action, as discussed in step 3 on page 158.
7. Common Agents now begin migrating from the previous Agent Manager to the new Agent Manager.

Deleting an Agent Manager

You can remove an Agent Manager from the Agent Manager Configuration page. However, you cannot delete the active Agent Manager. If you must delete the active Agent Manager, you must first make a different Agent Manager active. For instructions on adding a new Agent Manager refer to 3.9.3, “Adding a new Agent Manager” on page 156.

To delete an Agent Manager from the Agent Manager Configuration page:

1. Click **Settings** → **Agent Manager Configuration**.
2. In the Agent Manager Configuration page, select the Agent Manager that you want to delete, and then click **Delete**, as shown in Figure 3-36. The Delete Selected Agent Managers window prompts you for confirmation.

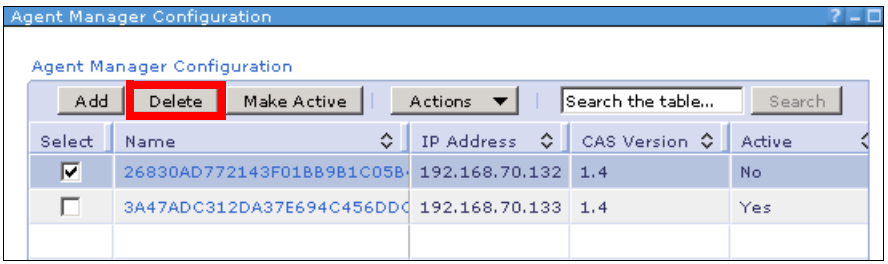


Figure 3-36 Delete Agent Manager

3. Click **OK** in the Delete Selected Agent Managers window, as shown in Figure 3-37.

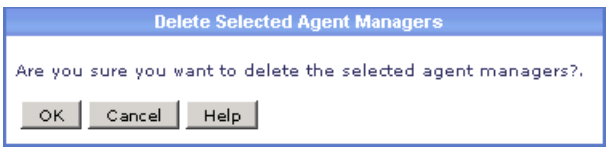


Figure 3-37 Confirm deletion of selected Agent Manager

4. The Agent Manager is now removed from the table in the Agent Manager configuration page, and IBM Systems Director Server will no longer use the Agent Manager to communicate with Common Agents.

Note: Deleting an Agent Manager from the Agent Manager Configuration page does not uninstall the Agent Manager or delete any Agent Manager data.

4

Installation and configuration

In this chapter we discuss the installation of IBM Systems Director 6.1 Server, Common Agent, and Platform Agent and provide recommendations for the initial configuration of these Systems Director components.

For a list of specific requirements for the wide range of hardware products, operating systems, and database applications that are supported by IBM Systems Director, we recommend reading the *Planning, Installation, and Configuration Guides* for your platforms, available from:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

Rather than duplicate information contained in the product publications, this chapter focuses on the installation and configuration details that we consider particularly important or confusing, as well as those topics that are not covered elsewhere in sufficient detail. We cover the following areas:

4.1 Management server installation

Before beginning installation of IBM Systems Director Server, make sure that you have prepared your environment and that you understand the main security considerations that you must apply. You should be familiar with the information contained in Chapter 2, “Planning” on page 55, and Chapter 3, “Security” on page 85, before you install the management server. In addition, you must ensure that the following steps are taken before beginning installation of IBM Systems Director Server:

- Before installing IBM Systems Director Server on a system that has IBM Storage Configuration Manager installed, you must first uninstall IBM Storage Configuration Manager. After installing IBM Systems Director Server, you can re-install IBM Storage Configuration Manager.
- If you plan to install and use a database for IBM Systems Director other than the default Apache Derby database, either make sure that you have installed and configured the database application that you will use with Systems Director before installing IBM Systems Director Server or be prepared to reset the IBM Systems Director Server configuration using the **smreset** command. For more information see in 4.2, “Selecting an external database” on page 184.
- Ensure that there is a mechanism to keep the system clocks on the management server and managed systems synchronized.

Installation of IBM Systems Director Server installs IBM Systems Director Server, Common Agent, and Platform Agent. Therefore, it is not necessary to separately install Common Agent or Platform Agent on the management server after installing IBM Systems Director Server. This is just as it was for Director 5.

Common Agent Services

New in IBM Systems Director 6.1 is the ability to leverage the Common Agent Services (CAS) architecture, which provides a shared infrastructure for managing systems. This infrastructure is also used by Tivoli Provisioning Manager products.

The primary function of CAS for our purposes is to provide a common certificate and registration authority for authentication and authorization using X.509 digital certificates and the Secure Sockets Layer (SSL) protocol. It is the Agent Manager that provides this functionality in an IBM Systems Director environment. For an overview of CAS, see 1.5, “Common Agent Services” on page 35.

IBM Systems Director Server can use its own embedded Agent Manager or it can rely on an external Agent Manager to provide this function. In most Systems

Director implementations, this external Agent Manager is simply embedded in another IBM Systems Director Server.

IBM Systems Director Server can also register with a *stand-alone* Agent Manager. That is, you can install the Agent Manager on a system that is not running IBM Systems Director Server. In fact, if a Tivoli Provisioning Manager product is used, a stand-alone Agent Manager is required.

For the purposes of installing the management server, the important aspect of CAS is to decide whether you will install the embedded Agent Manager. You must have at least one Agent Manager with which IBM Systems Director Server can register at the time of installation. Therefore, if an Agent Manager does not already exist, you must include the embedded Agent Manager in the first management server that you install.

Topics in this section are:

Specifying the database: When installing the management server on Windows, you can either specify the database to use during installation or you can change your selection installation. However, for Linux and AIX, the only option is to specify the database after the installation of the management server. This is discussed in 4.2, “Selecting an external database” on page 184.

4.1.1 Installing the management server on Windows

This section discusses manual installation of IBM Systems Director Server via the Windows installation wizard. If you choose to install the management server on a supported version of AIX or Linux, simply apply the points discussed here to the command-line installation methods used for those operating systems. There are switches available in the `dirserv.rsp response` file that handle all the installation settings that we cover.

If Microsoft Windows Installer (MSI) Version 3.0 or later is not installed on the system, it is installed during IBM Systems Director Server installation. If this upgrade is necessary, the system prompts you to restart following the installation of IBM Systems Director Server without specifying that MSI was installed. Unless you install using the response file and set the RebootIfRequired parameter to N, you are prompted to restart whether or not the IBM Systems Director Server installation is completed successfully.

We cover only the steps in the installation process that are particularly important, since we assume that you can figure out for yourself whether to accept the license agreement, where to install the code, and so on.

Once you have made these decisions, you must choose whether you want to perform a basic installation or a custom installation, as shown in Figure 4-1.

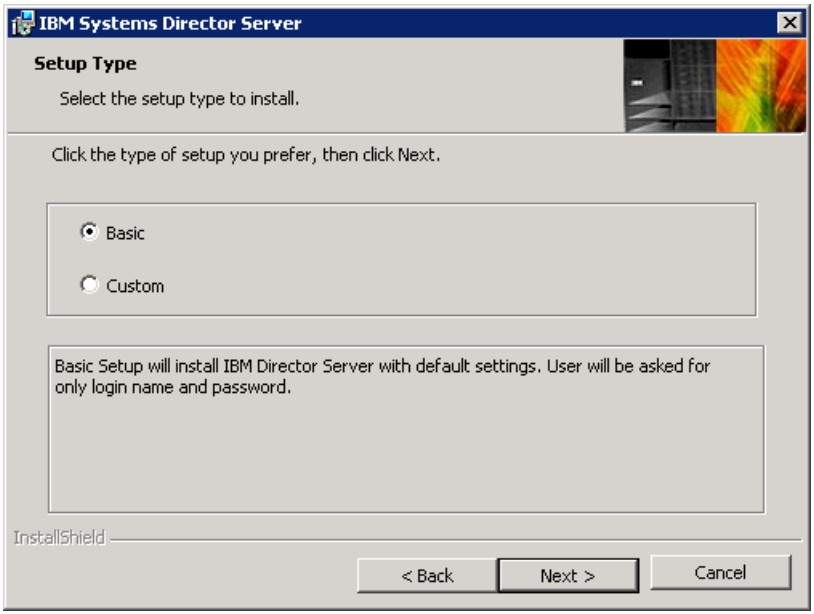


Figure 4-1 IBM Systems Director installer panel

If you perform a basic installation, IBM Systems Director Server is installed with the default configuration. This includes an embedded Agent Manager and the Apache Derby database. In addition, the credentials used for registering with the embedded Agent Manager will be the same as those used for the IBM Systems Director service account. For more details on this and whether to install an embedded Agent Manager, see 1.5, “Common Agent Services” on page 35. We cover the basic installation in the next section.

If you perform a custom installation, you have access to all installation options available, including whether to install an embedded Agent Manager or register with an existing Agent Manager, and which database will be used for IBM Systems Director. We cover the custom installation in “Custom installation” on page 168.

Basic installation

With basic installation, you are presented with the minimum number of setup windows, and IBM Systems Director Server is installed using default settings. The only window that requires any input is the one pictured in Figure 4-2.

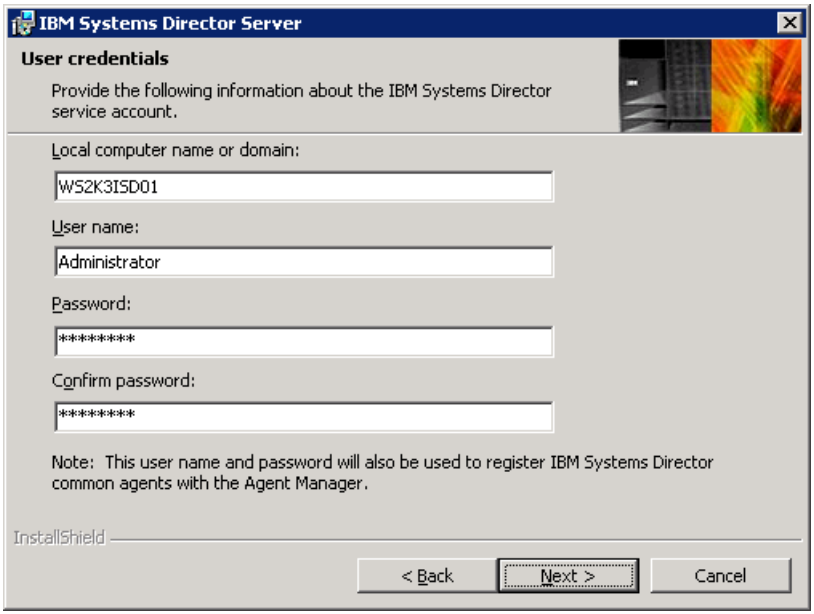


Figure 4-2 Basic installation User credentials panel (see note below)

Note: The User credentials window says `Provide the following information about the IBM Systems Director service account.` This is incorrect, since IBM Systems Director now uses the local system account rather than a user account to run its services. The credentials entered on this window are used for other purposes, as detailed below.

On the User credentials window, enter the requested information as follows:

- Local computer name or domain

  If the system is not a member of a Windows domain, enter the host name of the management server. If the system is a member of a Windows domain, enter the name of that domain.

- User name

  Enter an account name that has local administrator rights on the system. This account will be added to the smadmin local group created during installation. This is the *only* account that will have access to IBM Systems Director Web

console once installation is complete. For more about this, see 3.5.2, “Users and user groups in Systems Director” on page 99. In addition, this account will be used for registration of the Resource Manager with the embedded Agent Manager that gets installed with IBM Systems Director Server. For more about this see 1.5, “Common Agent Services” on page 35.

- Password

  Enter the password for the account entered in the previous field. This password will also be used by Common Agents to register with the embedded Agent Manager. Note that only a password is required for Common Agent to register with an Agent Manager. The user name is not used for this purpose. If you want to specify different passwords for Common Agent and Resource Manager registration with the Agent Manager, you must use the custom installation method.

  Note: The note on this window is incorrect. Although the user name and password entered here are used by the Resource Manager to register with the embedded Agent Manager, Common Agents do not use a user name for registration. They use only the password supplied on this window.

Custom installation

With custom installation, you are presented with all the setup windows and can change the IBM Systems Director default values, such as which database application to use, as necessary. Particularly important windows during a custom installation are discussed here.

User credentials

Enter the requested information exactly as described for the basic installation above. However, notice that the window shown in Figure 4-3 is slightly different from the window seen during basic installation (Figure 4-2 on page 167). This is because the credentials that you enter on this page are *not* used for registration with an Agent Manager.

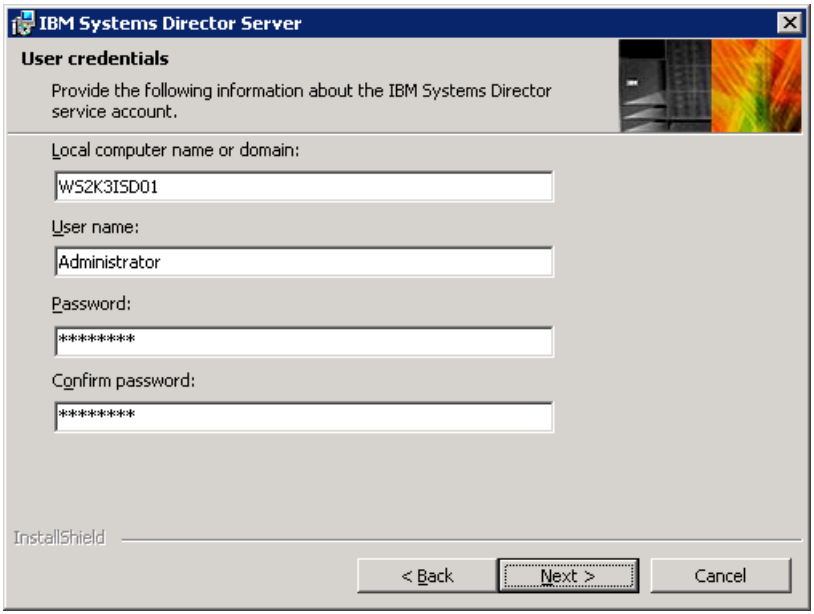


Figure 4-3 Custom installation User credentials panel

Once appropriate credentials are entered on this window, you must choose whether to have IBM Systems Director Server register with the embedded (local) Agent Manager or an existing (external) Agent Manager, as shown in Figure 4-4.

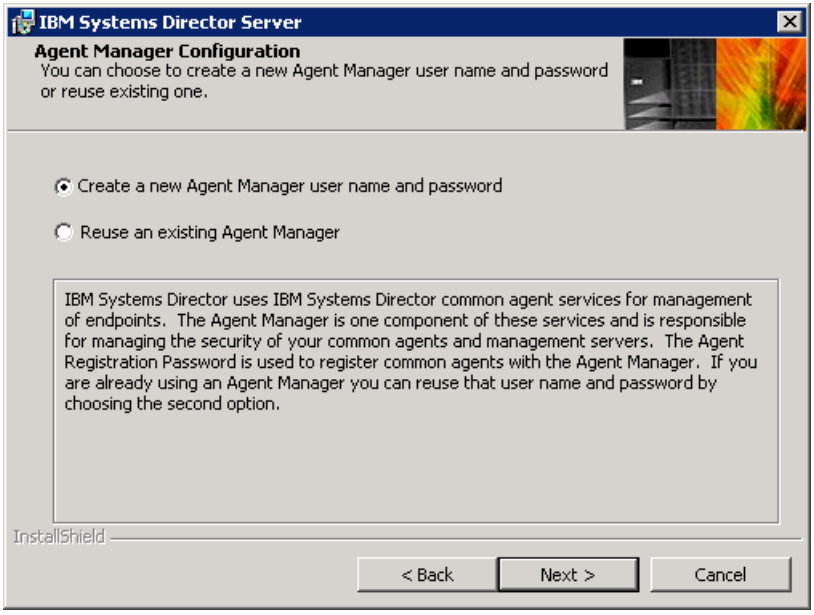


Figure 4-4 Select Create a new Agent Manager user name and password

Note: Regardless of whether you choose to register with the embedded Agent Manager or an existing Agent Manager, an embedded Agent Manager is always installed on the management server. This allows for reconfiguration of the active Agent Manager later (see 4.3, “Switching to a different Agent Manager after installation” on page 197).

Registering with the embedded Agent Manager

If you want the management server to register with the embedded Agent Manager, choose the **Create a new Agent Manager user name and password** option (Figure 4-4 on page 170) and click **Next**. You are then prompted as shown in Figure 4-5.

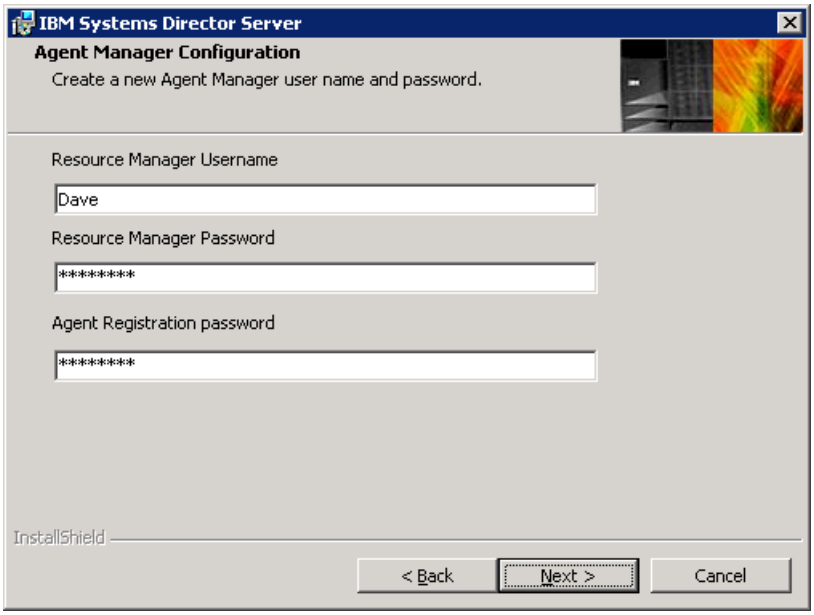


Figure 4-5 Embedded Agent Manager registration credentials

Resource Manager is CAS terminology for the IBM Systems Director Server. The Resource Manager needs both a user name and a password to register with the Agent Manager. However, Common Agents need only a password to register with the Agent Manager.

The Agent Registration password is given to each Common Agent, along with the IP address or host name of the Agent Manager, at the point when access is granted. The Common Agent then uses these details to register with the Agent Manager.

Tip: The two passwords can be the same, and usually they are the same, when you want to treat all the manage objects as equal, but you may want to have different passwords to avoid compromising the Resource Manager password. This is because the Resource Manager password is only used by the non-Director Common Agent components (Agentless, Platform Agent, and so on), whereas the Agent Registration password is used in all IBM Systems Director Common Agents.

Enter the credentials that the embedded Agent Manager installed in this instance of IBM Systems Director Server will use to register all Resource Managers and Common Agents in the future.

Important: Careful consideration should be given to the credentials entered on this window, since it is not trivial to change them after installation. For information about how to change registration credentials after management server installation, see 3.9, “Managing Agent Manager credentials” on page 150.

Registering with an existing Agent Manager

If you want the management server to register with an existing Agent Manager, choose the **Reuse an existing Agent Manager** option in Figure 4-4 on page 170. You will see Figure 4-6.

Note: When you select the option **Reuse an existing Agent Manager**, an embedded Agent Manager is still installed, but it is not used.

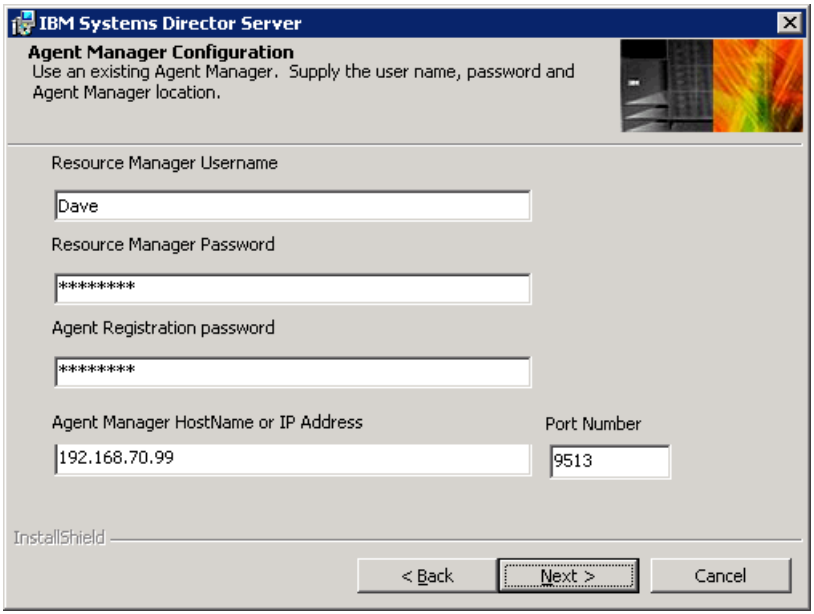


Figure 4-6 Existing Agent Manager registration credentials

Enter the credentials that the management server should use to register with the designated Agent Manager. Note that *Resource Manager Username* is an identifier that is used to communicate with the Agent Manager. It is not a user ID on the operating system or LDAP server. Also, enter the password that should be used by the local Common Agent to register with the designated Agent Manager. This password, along with the host name or IP address of the Agent Manager, will also be provided to each Common Agent that is later discovered and accessed by this management server.

In addition to the registration credentials, you must specify the host name or IP address of the designated Agent Manager, as well as the port that should be used to communicate with the Agent Manager.

To see how to change the Agent Manager, Resource Manager, and Common Agent registration credentials, refer to 3.9.2, “Modifying Agent Manager credentials” on page 153.

Configuring the database

After you set the user credentials and configure the Agent Manager, the next step in the custom installation for Windows is the selection of the database.

In this section we describe the process of defining Microsoft SQL Server 2005 Express Edition as the database for IBM Systems Director Server during installation of the management server on Windows. To use any of the other supported databases, see the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_install_config_database_application.html

To configure IBM Systems Director to use an external database:

1. When the panel shown in Figure 4-7 appears, select the database that you wish to use and click **Next**. We selected MS® SQL for SQL Server.

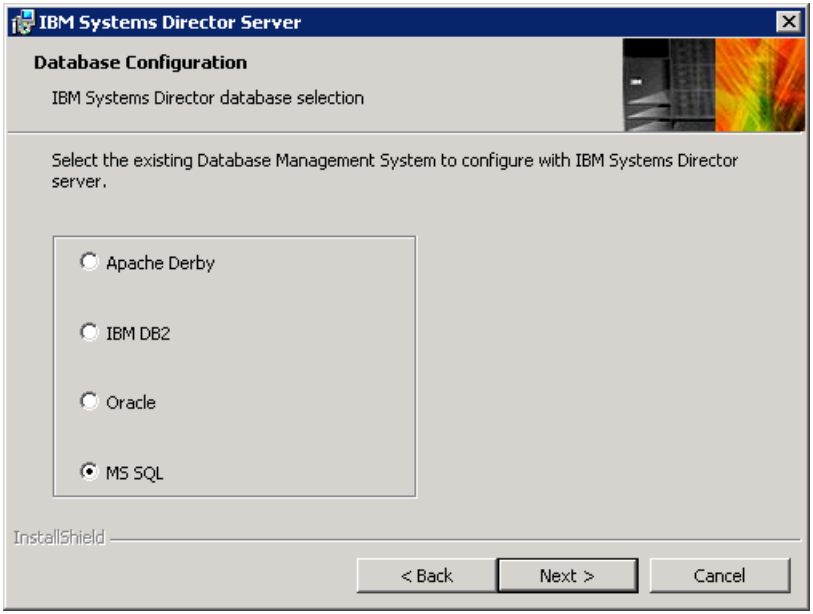


Figure 4-7 MS SQL is selected in IBM Systems Director install

2. In the Database Configuration window shown in Figure 4-8, fill-in the following fields and click **Next**.
   - User name: A valid Microsoft SQL Server user ID. This ID must have database owner (DBO) access to the IBM Systems Director database.
   - Password: The password for the Microsoft SQL Server user ID.
   - Choose **Local** if the database will reside on the IBM Systems Director Server, otherwise choose **Remote**.
   - Administrator name: A valid user ID for the Microsoft SQL Server with administrative privileges.
   - Password: The password for the Microsoft SQL Server administrator account.

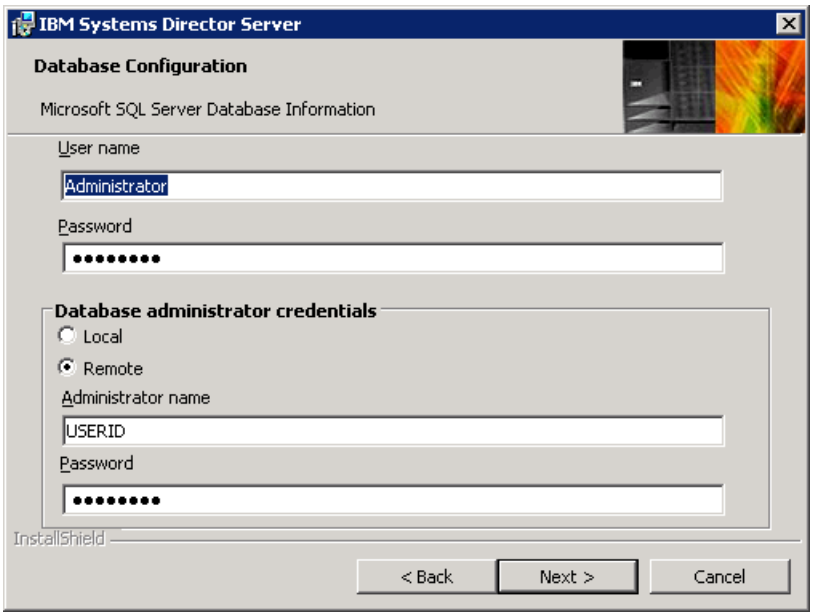


Figure 4-8 Microsoft SQL Server Database information

3. Provide connectivity information for the IBM Systems Director database, as shown in Figure 4-9. Fill-in the following fields and click **Next**.
   - Server hostname: The host name or IP address of the Microsoft SQL Server.
   - Port number: The TCP/IP port that the database server is listening on.
   - Database name: The name of the database (for Microsoft SQL Server. If the database does not exist it will be created.). This is a native behavior for Microsoft SQL Express server. Other databases may have different behaviors. Refer to the database links at the beginning of 4.2, “Selecting an external database” on page 184, for specific procedures.

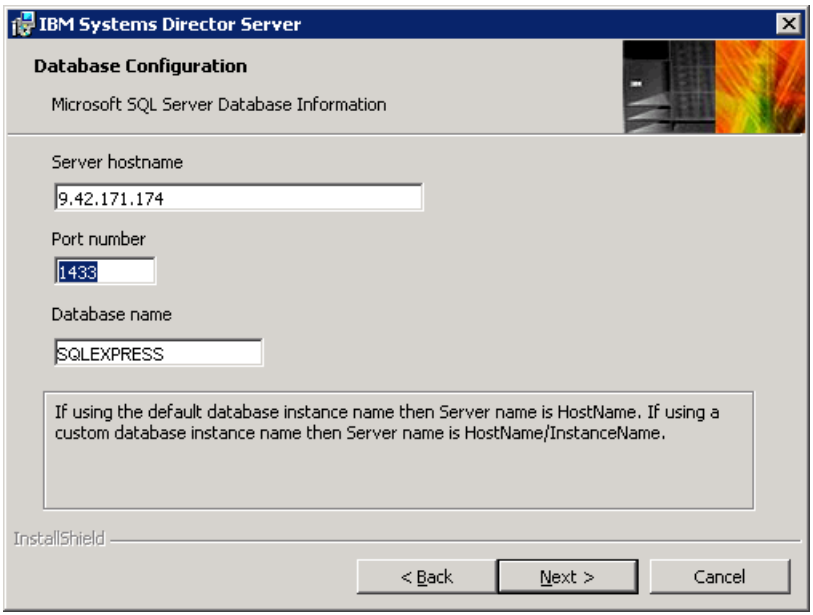


Figure 4-9 Microsoft SQL Server Database Information

4. Specify the location of the files needed to communicate with the database server (for example, the Microsoft SQL Server client or a JDBC™ driver), as shown in Figure 4-10.

Tip: There is no Browse button. You must manually enter (or paste) the full path where the files are but do not include a file name and watch that you are not including a space at the end of the path.

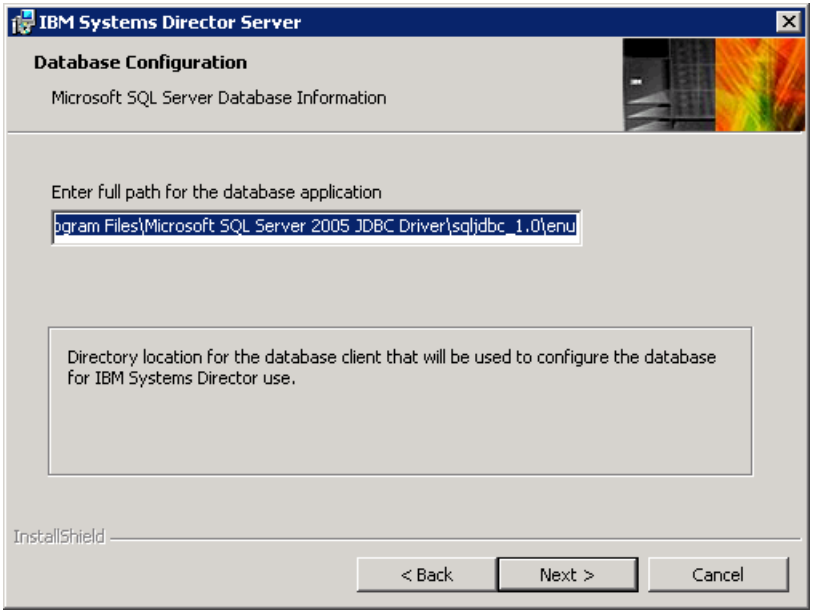


Figure 4-10 Directory location for database client to be used to configure database for IBM Systems Director use

IBM Systems Director 6.1 will recognize automatically if the required files are in that path. Otherwise, it will inform you that they are missing.

5. Once all the database configuration fields are entered, click **Next** to continue with the rest of the IBM Systems Director Server installation.

Installation complete

Figure 4-11 shows the Add or Remove Programs control panel on a Windows system that has IBM Systems Director Server 6.1 installed. Notice that the name for Platform Agent displays as `IBM Director Core Services` and that the icon displays as the Director 5 icon. This is expected, since Platform Agent 6.1 is exactly the same code as IBM Director Core Services 5.20.3. For consistency with all other Systems Director publications, we refer to this code as Platform Agent throughout this book.

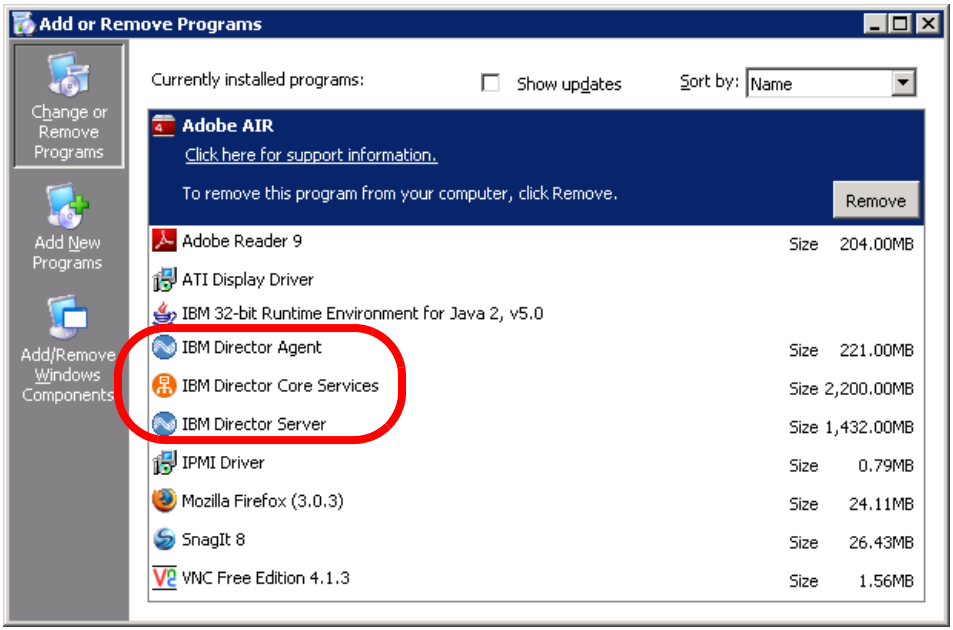


Figure 4-11 Add or Remove Programs control panel on Windows system with IBM Systems Director 6.1 Server installed

It is important that you apply any updates that are released for IBM Systems Director 6.1. To automatically update your management server refer to 4.5, “Applying patches to the management server” on page 201, and 10.9, “Updating IBM Systems Director” on page 494.

4.1.2 Installing a management server on Linux and AIX

In this section and subsequent sections we show how to install your non-Windows management server using a response file. The instructions here are for Linux-based systems. Installation of the IBM Systems Director 6.1 and Common Agent under AIX and Linux Power Systems is virtually identical to the Linux installation.

If you want to install the management server software manually, refer to the links below for the specific operating system (OS) instructions listed in the IBM System Information Center.

Before installing IBM Systems Director 6.1 Server, make sure that the requirements that are applicable to your system have been met. You can see detailed information in the “Preparing the management server” link:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.install_6.1/fqm0_t_installing_ibm_director_server.html

The following links describe the specifics of the installation process for the various supported operating systems.

Note: IBM Systems Director 6.1 Server is not supported on IBM i.

- Installing IBM Systems Director Server on AIX

  http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_installing_ibm_director_server_on_aix.html
- Installing IBM Systems Director Server on Linux on Power Systems

  http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_installing_ibm_director_server_on_linuxonpower.html
- Installing IBM Systems Director Server on Linux and x86-based systems

  http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_installing_ibm_director_server_on_linux_for_xseries.html
- Installing IBM Systems Director Server on Linux for System z

  http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_installing_ibm_director_server_on_linux_for_zseries.html

To customize the IBM Systems Director installation (for example, to select ports other than the default), copy the response file (`dirserv.rsp`) to a local directory and modify the installation settings in your local copy. We cover this in the next section.

In Linux installs, the response file does not let you specify a database to use. This can be performed after installation, as described in 4.2, “Selecting an external database” on page 184. It is also described in the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_config_database_application_cfgdbcmd.html

Tip: Only Windows has the option of connecting the database during installation. All IBM Systems Director Server installations on Linux and AIX must be connected to a newly configured database after the installation.

4.1.3 Modifying the dirserv.rsp response file

You can modify the copy of the `dirserv.rsp response` file using a text editor to modify the installation settings. This file is fully commented. You can modify the following items in the server response file:

- Where the installation log file will be saved:

  ```
  #LogFile=/var/log/dirinst.log
  ```

- Enable debug logging by setting the parameter to 1 (default is 0):

  ```
  DebugInstall=0
  ```

- TCP/IP port numbers for the Web console, both secure and insecure. The defaults are:

  ```
  PortNumber=8421
  SecurePortNumber=8422
  ```

- Specify the Tivoli Provisioning Manager (TPM) host name and IP address. You normally would not change these parameters. These parameters are used to configure the local database. TPM is installed as a component of the server. The default is localhost, but if you want to declare it in case you do not use localhost you can write the actual IP and the actual host name of the system:

  ```
  TPMHostname=localhost
  TPMIPAddress=127.0.0.1
  ```

  Note: It is not possible to change the database from the response file using the TPM parameters. With these parameters you only have the option to use the actual IP and domain name server (DNS) host name of your actual system running the IBM Systems Director server or use the host name variable and the loopback IP if it is allowed. You cannot change to any other system in the network. This is only for the local system.

- The nonstop service is a watchdog service and works to keep the server continuously running on a system. It is disabled by default but, if enabled, will restart the server's Java process if it crashes or if it is killed. There are no disadvantages to enabling this feature (for example, you will not lose any logs) except for the use of resources to keep this service running in the background.

  ```
  EnableNonStop=0
  ```

- The host name (or IP address) and password of the Agent Manager if a remote one is used. These are disabled (commented out) by default.

  ```
  #AMHostname=remotehost
  #AMPassword=think4me
  ```

  These two parameters are used to register the local Common Agent to a *remote* Agent Manager during the local Common Agent installation. Use these parameters when you have IBM Systems Director Server installed on a remote system and you want to register the Common Agent of this system there.

  Do not, however, use these parameters to point to a *local* Agent Manager. Otherwise, the installation of the Common Agent services portion of the server installation will fail. If you are using a local Agent Manager, simply leave these parameters disabled (commented out).

- The default network ports that the Common Agent Services uses are:
  - AgentPort=9510 (Common Agent listener port)
  - AgentNonStopPort1=9514 (Common Agent nonstop services port 1)
  - AgentNonStopPort2=9515 (Common Agent nonstop services port 2)
  - AgentClientPort=20000 (Agent Manager listener port)

  You must ensure that the installation is set to use ports that are not already in use. If these ports are already in use when you install the agent, the installation fails. A situation where these ports will be already in use is if you have a different version of the CAS agent installed, for example, as part of the Tivoli Provisioning Manager agent.

To install IBM Systems Director Server using the settings in the response file enter the following command:

```
<install source>/dirinstall.server -r <path/modified_response_file.rsp>
```

Where <*install source*> is the local directory to which you copied the response file, and <*path/response_file.rsp*> is the path and name of the response file.

After this, the response file will be used to set up the IBM Systems Director initial installation, but you must need finish it running the Agent Manager configurator, configAgtMgr.sh, as shown in Example 4-1.

Example 4-1 Output reminding you to run the Agent Manager configurator

```
Installation of selected components is successful.
See the help documents for instructions on configuring a different
database.

You must configure the Agent Manager prior to starting the server.
To configure the Agent Manager, run
 /opt/ibm/director/bin/configAgtMgr.sh
To start the server manually, run
 /opt/ibm/director/bin/smstart
XNL3096:~/Desktop/DirectorServer #
```

We describe the **configAgtMgr.sh** command in the next section.

4.1.4 Configure the use of the Agent Manager

Whether you have customized the installation or not, you must configure the use of the Agent Manager before starting IBM Systems Director Server.

1. Configure the Agent Manager by running the following command:

   ```
   /opt/ibm/director/bin/configAgtMgr.sh
   ```

   Example 4-2 shows the use of the command.

   Example 4-2 Output of the configAgtMgr.sh command

   ```
   Enter the Resource Manager user ID that you would like to set for your
   Agent Manager:
   root
   Enter the Resource Manager password to set for your Agent Manager:

   Verify the Resource Manager password to set for your Agent Manager:

   Enter the Agent Registration password to set for your Agent Manager:

   Verify the Agent Registration password to set for your Agent Manager:

   Would you like to use an existing Agent Manager (yes or no)?
   no
   ```

2. As prompted in Example 4-2 on page 182, enter the Resource Manager user ID that you would like to set for your Agent Manager.

   The resource manager user ID is an identifier that is used by IBM Systems Director or other resource managers to register with the Agent Manager. It is not a user ID on the operating system or an LDAP server.

3. Enter the Resource Manager password to set for your Agent Manager.
4. Verify the Resource Manager password to set for your Agent Manager.
5. Enter the agent registration password to set for your Agent Manager.

   Note: The agent registration password is used by Common Agent systems to register with the Agent Manager. See 3.9, “Managing Agent Manager credentials” on page 150.

6. Verify the agent registration password to set for your Agent Manager.
7. Specify whether you want to use an existing Agent Manager (yes or no).

   If you answer yes, the user ID and passwords that you previously entered will be used to register with the existing Agent Manager. Continue to step 8.

   If you answer no, the script completes and the configuration will be applied. You do not need to specify your local IP, because it is automatically configured. Continue to 4.1.5, “Start the server” on page 184, or configure the database as described in 4.2, “Selecting an external database” on page 184.

8. Enter the IP address for the existing Agent Manager.

   The required data is the IP address of the existing remote Agent Manager. (A host name can be also used.) If we are not configuring a local Agent Manager, we point the resource manager of this local system to the remote Agent Manager.

9. Enter the port number for the existing Agent Manager.

   Provide the port number of the existing Agent Manager. The port number must be a valid number between 0 and 65535.

After you have provided all the requested information, the Agent Manager configuration script runs and displays a series of status messages. When it finishes the Agent Manager set up and Resource Manager credentials are set.

If you want to change to a different database now is time to follow the instructions before starting the server. Go to 4.2, “Selecting an external database” on page 184.

4.1.5 Start the server

Start IBM Systems Director processes on the management servers by running the **smstart** command:

```
/opt/ibm/director/bin/smstart
```

You can check the status of the management server by running:

```
/opt/ibm/director/bin/smstatus
```

This reports the status of the server. Alternatively, you can run the **smstatus** command with the -r parameter so that it will continue to report changes in status until you manually terminate the command:

```
/opt/ibm/director/bin/smstatus -r
```

When the **smstatus** command reports `Active`, the server is started and ready to use.

4.2 Selecting an external database

IBM Systems Director stores inventory data in a database. IBM Systems Director provides Apache Derby as a default database engine. You can either use the included Apache Derby or configure one of the other following supported database applications:

- IBM DB2 Universal Database
- Microsoft SQL Server 2005
- Microsoft SQL Server 2005 Express Edition
- Oracle Database

The timing as to when you can specify the database to use depends on the operating system that you are installing the management server on:

- Windows: You can specify the database to use either during installation or you can change the database after the installation. We cover selecting the database during installation in “Configuring the database” on page 174.
- Linux and AIX: You must specify the database after the installation of the management server.

This section describes the process of selecting a database after the installation of the management server is complete. This task is performed using the **cfgdbcmd** command, along with the `cfgdbcmd.rsp response` file.

Note: If you change the database after running the management server, you must reset the management server using the **smreset** command, as described in “Reset the server” on page 189. We recommend properly configuring the database before working with the newly installed server.

This section contains the following topics:

4.2.1 Prerequisites

The links to the Information Center describe the prerequisites for each supported database:

- IBM DB2 Universal Database

  http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_preparing_ibm_db2.html

- Microsoft SQL Server 2005

  http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_preparing_ms_sql_server.html

- Microsoft SQL Server 2005 Express Edition

  http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_preparing_ms_sql_server_express_2005.html

- Oracle Database

  http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_preparing_oracle_server.html

Unless you want to use the default embedded database for your system, you must prepare the database application for use with IBM Systems Director and configure both systems to work together.

The steps required to prepare the database depends on the database application chosen. Preparation will likely include some of the following tasks:

- Downloading and installing the applicable database administrator client
- Downloading and installing the applicable Java Database Connectivity (JDBC) drivers
- Creating the database that IBM Systems Director will use
- Creating a user ID with sufficient access to the server and database

- Configuring and starting a TCP/IP listener
- Setting the authentication mode

Note: You can install IBM Systems Director before preparing the database, but you will only be able to use the default Apache Derby database until you configure IBM Systems Director Server to use a different database.

4.2.2 Using SQL Server 2005 Express Edition

In this section we provide an example for using this process to change the management database from the default Apache Derby database to Microsoft SQL Server 2005 Express Edition for the same Windows management server.

Prepare the database

Make sure that all requirements for use of SQL Server 2005 Express Edition are met and that it has been prepared for use by IBM Systems Director. Specific instructions for this can be found in the IBM Systems Director Information Center at:

`http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.install_6.1/fqm0_t_install_config_database_application.html`

You will need a few important details in order to ensure successful database configuration:

- If the database is installed on a different system from IBM Systems Director Server, you must install the SQL Server Native Client and SQL Server 2005 Command Line Query Utility on the management server.
- The JDBC drivers must be installed on the IBM Systems Director Server.
- Integrated security cannot be used for IBM Systems Director. You must use SQL security (that is, mixed mode authentication).
- Stop the IBM Systems Director Server services with the following command:

  `/opt/ibm/director/bin/smstop`

The next step is to edit the `cfgdbcmd.rsp response` file, then run the **`cfgdbcmd`** command to configure and initialize the database connection. We discuss these in the next section.

Use the cfgdbcmd command

Complete the following steps to use the **cfgdbcmd** command and the cfgdbcmd.rsp file to configure your database:

1. Open the cfgdbcmd.rsp file with any text editor. The cfgdbcmd.rsp file resides in the <*install_root*>\proddata directory, where <*install_root*> is the root directory of your IBM Systems Director installation.
2. In the cfgdbcmd.rsp file, ensure that the configuration information for Microsoft SQL Server is not commented out. To do this, remove the semi-colon (;) at the beginning of all fields in the SQLServer section. Make sure that the other possible database configuration options are commented out so that they remain ignored. Alternatively, you can delete all lines in the file except those in the SQLServer section (after creating a backup copy of the original file).
3. Use information from your database administrator to fill in the fields needed for the SQL Server. A portion of our modified cfgdbcmd.rsp file can be seen in Example 4-3.

Attention: Make sure that you do not use any quotation marks (“) in the response file, as these cause errors.

Example 4-3 A portion of cfgdbcmd.rsp file set to configure Microsoft SQL Server

```
;====================================================================
; SQLServer
;====================================================================
DbmsApplication = SQLServer
DbmsTcpIpListenerPort = 1433
DbmsServerName = w2k3sql01
DbmsDatabaseName = sysdirdb
DbmsUserId = sysdiradmin
DbmsPassword = itso4you
DbmsDatabaseAppHome = C:\Program Files\Microsoft SQL Server
;====================================================================
```

4. Save and close the cfgdbcmd.rsp file.
5. Before running the **cfgdbcmd** command, you must encrypt the database password using the **cfgserver** script provided. To encrypt the SQL Server password, open a command prompt on the management server and issue the following commands (where <*install_root*> is the root directory of your IBM Systems Director Server installation):

```
cd <install_root>\bin
cfgserver.bat -db
```

6. Provide the information requested by the script. This script prompts for the user ID and password for the SQL Server and writes the encrypted password to the response file in the DbmsPassword field. Example 4-4 shows this process on our management server.

Example 4-4 Database password encryption script in action

```
C:\Program Files\IBM\Director\bin>cfgserver.bat -db
Enter Database username : sysdiradmin
Enter Database password :
Re-Enter Database password :
[Configuration-Key]: y9ODudWbUviklxzsp5KUReAl9LDWbgtY
[Database-Password]: YNKtCJxOqYhcWN4wKT3pwQ==
[Update] [File]: C:\Program Files\IBM\Director\/proddata/cfgdbcmd.rsp
[Update] [Element]: DbmsUserId [Value]: sysdiradmin
[Update] [Element]: DbmsPassword [Value]: YNKtCJxOqYhcWN4wKT3pwQ==
```

Example 4-5 shows our `cfgdbcmd.rsp` file after password encryption. Compare the DbmsPassword entry with the one in Example 4-3 on page 187.

Example 4-5 Same portion of the cfgdbcmd.rsp file after password encryption

```
;===================================================================
; SQLServer
;===================================================================
DbmsApplication = SQLServer
DbmsTcpIpListenerPort = 1433
DbmsServerName = w2k3sql01\sysdirdb
DbmsDatabaseName = sysdirdb
DbmsUserId = sysdiradmin
DbmsPassword = YNKtCJxOqYhcWN4wKT3pwQ==
DbmsDatabaseAppHome = C:\Program Files\Microsoft SQL Server
;===================================================================
```

7. After the encryption script is complete, run the **`cfgdbcmd`** tool. The **`cfgdbcmd`** tool uses the `response` file to configure your IBM Systems Director Server to use the Microsoft SQL Server 2005 Express Edition database.

   To run the tool and configure our SQL Server database, we entered (all on one line):

   ```
   cfgdbcmd.cmd -dbLocal false -rspfile
   "C:\Program Files\IBM\Director\proddata\cfgdbcmd.rsp"
   ```

   Note: The -dbLocal false parameter is only required if the database server is not local to the IBM Systems Director Server.

Reset the server

After the database configuration tool completes, reset the management server with the following command. This resets IBM Systems Director Server, returning it to its installation default values.

```
install_root\bin\smreset
```

Important: The **smreset** command changes the configuration of IBM Systems Director Server and cannot be undone. This command reinitializes the databases and clears all persistent data. It deletes both local data on the file system where IBM Systems Director Server is installed as well as deletes and rebuilds all database tables that are used by IBM Systems Director Server. The deleted data incudes:

- Discovered resource data
- Inventory data
- Event data, including logs, filters, actions, and plans
- Monitoring data
- Updates data
- Status data
- Configuration templates
- Security configurations
- All other data associated with running and configuring IBM Systems Director Server after installation

Start the server

Start IBM Systems Director Server with the following command for Windows:

```
net start DirServer
```

Or stop the IBM Systems Director from Services in Windows, as shown in Figure 4-12.

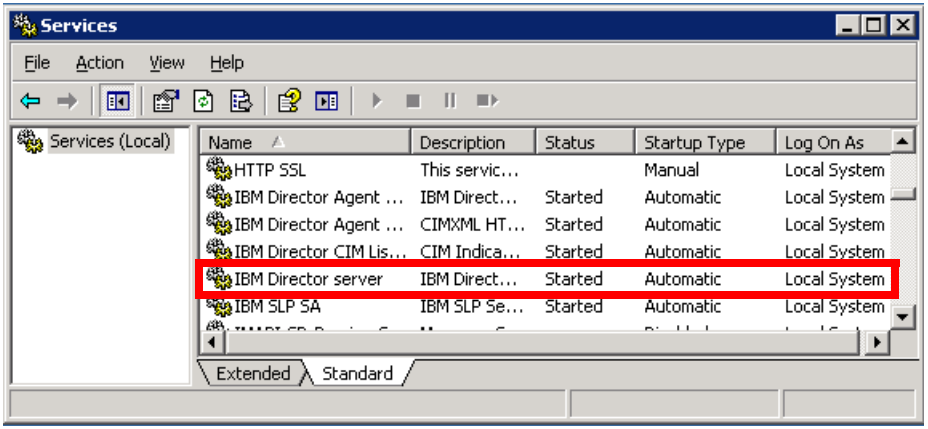


Figure 4-12 IBM Systems Director 6.1 management server Windows service

For Linux-based systems the command to stop it is:

```
/opt/ibm/director/bin/smstart
```

After this configuration is complete, IBM Systems Director Server is properly connected to Microsoft SQL Server 2005 Express Edition. You can now begin system discovery and management server configuration.

4.2.3 Using DB2 on an AIX system

In this section we provide an example of configuring DB2 to be the database on IBM Systems Director Server running on AIX. IBM Systems Director Server provides an embeded database (Apache Derby) that is used to store inventory data for the discovered systems in the environment. In this section we describe how to configure IBM DB2 Universal Database for using with IBM Systems Director Server running on an AIX system.

There are three database installation types, depending on the application selected and the operating system of the management server. The database management system (DBMS) might be embedded, local, or remote.

When using IBM DB2, the database can be either local or remote:

- Local DBMS: The DBMS is installed on the management server on which IBM Systems Director Server is installed.
- Remote DBMS: The DBMS is installed on a different server from the management server, and accessed remotely by IBM Systems Director Server.

The DB2 versions that this section is based on are:

- Express Version 9
- Version 9.1 with Fix Pack 4 or later
- Version 9.5 with Fix Pack 1 or later

Additional database support information can be found in the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.plan_6.1/fqm0_r_supported_database_applications.html

Preparing DB2

Before you configure IBM Systems Director to use DB2, you must first prepare the database:

1. Install the database server on either the management server or a different server.

   Note: If you want to run the database on a remote server, you must install the full administration client with IBM Systems Director Server. The administration client automatically installs the needed DB2 tools and JDBC drivers.

2. Set the EXTSHM environment variable.

   If the DB2 server and IBM Systems Director Server are both installed on the machine running AIX (that is, using a local instance of DB2), set the EXTSHM environment variable to ON to increase the number of shared memory segments to which a single process can be attached. EXTSHM must be exported both in the shell where the IBM Systems Director server is going to be started and also in the shell where **db2start** is run.

To configure the EXTSHM environment variable for multiple JDBC connections:

a. Before starting the DB2 server, run the following commands (in the shell where **db2start** is going to be run):

```
export EXTSHM=ON
db2set DB2ENVLIST=EXTSHM
db2set -all
```

b. Open db2profile in an editor and add the following lines:

```
EXTSHM=ON
export EXTSHM
```

c. Once you have installed IBM Systems Director and before starting it, run the following command:

```
export EXTSHM=ON
```

You must have the EXTSHM=ON in every shell that we have opened to manipulate the database or IBM Systems Director. If you are using the same shell that you used in step a, then you do not need to issue this command again.

Note: Always confirm the EXTSHM setting before starting IBM Systems Director Server or running any command-line tools such as cfgdbcmd, smreset, smsave, or smrestore. If EXTSHM is not set to ON, run the **export EXTSHM=ON** command again.

3. Start the database server.
4. Create the database that you plan to use for IBM Systems Director.
5. Create a unique user ID and password on the database server for the runtime database connection. Ensure that this user ID is not the instance owner of the database server. The IBM Systems Director **cfgdbcmd** database configuration tool grants the user the correct privileges to manage the database, as we described in “Use the cfgdbcmd command” on page 187.

Note: If you plan to use **smsave** or **smrestore** with IBM Systems Director Server and the database, you must:

1. Enable password file authentication for the database system administrator user ID that is used for backup/restore.
2. Ensure that the database system administrator user ID that is used for backup/restore has write permission to the backup directory so that the database server can write the database backup image to the backup directory.

IBM Systems Director does not save the IBM DB2 Universal Database administrator account user ID and password.

3. Ensure that the following environment variables are correctly set and are persistent after logoff or reboot:
   - PATH

     Add the bin directory under the DB2 installation root directory to the system variable PATH so that IBM Systems Director tools can access db2cmd:

     `<db2_install_root>/bin`

   - LD_LIBRARY_PATH (Linux) or LIBPATH (AIX)

     For 32-bit machine types, set this variable to <db2_install_root>/lib or <db2_install_root>/lib32 (lib is a link to lib32).

     Notes: If your machine type is 64-bit, the DB2 installation will link <db2_install_root>/lib to a 64-bit driver, which is incorrect. You must use <db2_install_root>/lib32 for 64-bit machine types.

     On AIX, if you want IBM Systems Director Server to automatically start at boot time, you must also set LIBPATH in /etc/environment.

   - DB2_HOME (AIX)

     Set this variable to <db2_install_root>.

   Tip: You can automate the task of setting the environment variables on UNIX. Depending on which UNIX platform you are on, values for the environment variables are set in either db2profile (for bash or korn shell) or db2cshrc (for C shell). You can place a call to these files in your .profile (bash or korn shell) or .login (C shell) file so that every time you log in those variables are set.

4. Complete the following steps to set DB2_WORKLOAD to TPM on IBM DB2 Universal Database Server. TPM is a predefined setting that turns on DB2_SKIPINSERTED, DB2_SKIPDELETED, and DB2_EVALUNCOMMITTED. Setting DB2_WORKLOAD to TPM improves concurrency through instance-level configuration settings.

You must run the following commands in CLI command mode, not interactive mode.

a. Ensure that the CLI environment is initialized by running the following command:

   - On Linux or AIX: **db2profile**
   - On Windows: **db2cmd**

   Registry keys and values are not case-sensitive.

b. Set DB2_WORKLOAD to TPM:

```
db2set DB2_WORKLOAD=TPM
```

c. Stop the database instance:

```
db2stop force
```

d. Restart the database instance:

```
db2start
```

5. Ensure that the DB2 administration server is initialized by running the following command:

```
DB2ADMIN START
```

6. Complete the following steps to enable automatic reorg in DB2.

   a. In the DB2 Control Center, right-click the database instance that you want to configure for automatic reorganization and select **Configure Automatic Maintenance**. The Configure Automatic Maintenance wizard is displayed. Click **Next**.

   b. Select **Change automation settings**. Click **Next**. The Specify when automatic maintenance activities can run page is displayed.

   c. Next to the On-line maintenance window, click **Change**.

   d. Specify a start time of 00:00 and duration of 24.

   e. Click **OK**. Click **Next**. Click **Next** again. The Select maintenance activity to configure page is displayed.

   f. In the Automate column, select **Reorg and RUNSTATS**. Click **Finish**.

Connecting the management server to the DB2 database

Now that DB2 has been configured, configure IBM Systems Director Server to connect to the database.

Follow the instructions in 4.2, “Selecting an external database” on page 184. You need the following information to go into the `cfgdbcmd.rsp response` file:

- Host name of the server on which the database is installed (DbmsServerName in the response file).
- Name of the database that you created (DbmsDatabaseName).
- Whether the database is local or remote to IBM Systems Director Server.
- Fully qualified directory where DB2 is installed (the sqllib directory). You can confirm this from a DB2 command window using DB2SET DB2PATH (DbmsDatabaseAppHome).
- TCP/IP listener port ID for the database. You can get this from the DB2 command **`db2 get dbm config`** and look for the value of with SVCENAME (DbmsTcpIpListenerPort).
- User ID and password of the database user account that you created (DbmsUserId and DbmsPassword).

For more information see Table 1 in the following Information Center page:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.install_6.1/fqm0_t_preparing_ibm_db2.html

In our lab, the response file will look like Example 4-6.

Example 4-6 cfgdbcmd.rsp file after password encryption

```
(0) root @ aix6srv: : /opt/ibm/director/proddata
# cat cfgdbcmd.rsp
DbmsApplication = DB2
DbmsTcpIpListenerPort = 50001
DbmsServerName = lwi17.austin.ibm.com
DbmsDatabaseName = IBMDIR03
DbmsUserId = db2usr03
DbmsDatabaseAppHome = /home/db2admc3/sqllib
DbmsPassword = CromCGF/tcM=
(0) root @ aix6srv: : /opt/ibm/director/proddata
```

In this previous example you can see that we are using a remote DB2 database server specified in the `DbmsServerName` where we previously set the DB2.

Now you can use the **`cfgdbcmd`** command as described in 4.2, “Selecting an external database” on page 184. Since our database is remote, we used:

```
./cfgdbcmd.sh -rspfile /responseFilePath/cfgdbcmd.rsp -dbAdmin admin
-dbAdminPW passwOrd -dbLocal false
```

You can omit the dbAdmin and the dbAdminPW parameters in the command if they are already specified in the response file.

For more information about the **cfgdbcmd** command, see:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.cli_6.1/fqm0_r_cli_cfgdbcmd.html

Note: The IBM DB2 Universal Database Information Center has current information about security in IBM DB2 Universal Database. The IBM DB2 Universal Database Information Center is at:

http://publib.boulder.ibm.com/infocenter/db2help/index.jsp

Reset the server

After the database configuration tool completes, if you had previously run IBM Systems Director Server, you must reset the management server with the following command. This resets IBM Systems Director Server, returning it to its installation default values.

```
/opt/ibm/director/bin/smreset
```

Important: The **smreset** command changes the configuration of IBM Systems Director Server and cannot be undone. This command reinitializes the databases and clears all persistent data. It deletes both local data on the file system where IBM Systems Director Server is installed as well as deletes and rebuilds all database tables that are used by IBM Systems Director Server. The deleted data incudes:

- Discovered resource data
- Inventory data
- Event data, including logs, filters, actions, and plans
- Monitoring data
- Updates data
- Status data
- Configuration templates
- Security configurations
- All other data associated with running and configuring IBM Systems Director Server after installation

Start IBM Systems Director Server

Start IBM Systems Director Server with the following command:

```
/opt/ibm/director/bin/smstart
```

After this configuration is complete, IBM Systems Director Server is properly connected to IBM DB2 Universal Database. You can now begin system discovery and management server configuration.

4.3 Switching to a different Agent Manager after installation

You can configure how IBM Systems Director interacts with the Common Agent Services architecture to secure your Common Agent managed systems and to improve scalability and performance. For more information about CAS see 1.5, “Common Agent Services” on page 35.

IBM Systems Director Server fills the role of a Resource Manager in the CAS architecture. Although a Resource Manager can know about multiple Agent Managers, it can *register* with only one. The process of changing Agent Managers involves adding a new Agent Manager and then making the new Agent Manager active.

Important: Setting the Agent Manager incorrectly prevents IBM Systems Director Server from communicating with all IBM Systems Director Common Agents.

To change the Agent Manager with which the management server is registered:

1. Open the Settings task in the navigation area of the Web console (Figure 4-13) and click **Agent Manager Configuration**.

Figure 4-13 Settings task expanded in navigation area of Web console

The Agent Manager Configuration window opens, showing a list of all currently known Agent Managers. For most installations this includes only one entry, as seen in Figure 4-14.

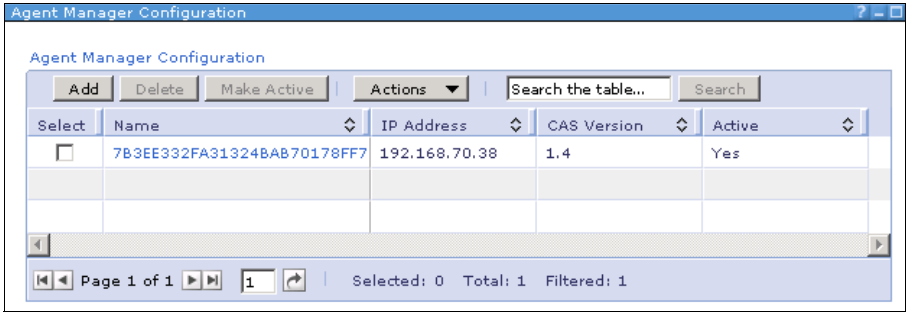


Figure 4-14 Agent Manager Configuration panel

2. Click the **Add** button to open the Add a New Agent Manager window shown in Figure 4-15.

Figure 4-15 Add a New Agent Manager window

3. Enter the following information in this window:
   - The host name or IP address of the Agent Manager to be added (likely another IBM Systems Director Server in your environment).
   - The user name that IBM Systems Director Server will use to register with the new Agent Manager.
   - The password that IBM Systems Director Server will use to register with the new Agent Manager.
   - The password that Common Agents will use to register with the new Agent Manager. For a brief discussion of whether these two passwords should be the same or different see the important note on page 172.
   - Leave the Catalogue service port at its default value of 9513.
   - If you wish to use this new Agent Manager now, deactivate the Agent Manager that is currently in use and begin migrating all existing Common Agents to the new Agent Manager, then click **Make the new Agent Manager active**. Each Common Agent that is registered with the previous

Agent Manager will be contacted and given instructions on how to reach the new Agent Manager.

If you wish to leave the activation process until later, leave this field unchecked. You can make the new Agent Manager active at a later stage using the Make Active button in Figure 4-14 on page 198.

4. Click **OK** to complete the process of adding a new Agent Manager.

Important: Changing the active Agent Manager migrates all Common Agents that are registered with the previously active Agent Manager to the new active Agent Manager. This has two implications:

- Depending on the number of Common Agents that are registered with the previously active Agent Manager, the migration process could take some time, during which some Common Agents might not be available for management.
- After the Common Agents are migrated to the new active Agent Manager, they will no longer be able to be managed by any management applications (including other installations of IBM Systems Director Server) that use the Agent Manager from which they were migrated. In order to manage the migrated Common Agents with other management servers, those management servers must also be configured to use the new active Agent Manager.

4.4 Migrating Common Agents to a new management server

If you install a new management server with the intent of replacing your existing management server, and each has a local Agent Manager, you will probably want to migrate all Common Agents from the old Agent Manager to the new Agent Manager.

To migrate Common Agents to a new management server:

1. Install IBM Systems Director Server on the new management server.
2. On the new management server, configure Director Server to use the (remote) Agent Manager of the old management server.

   You will need to do a custom install (Windows) or use a modified response file (Linux, AIX, or Windows). Doing this means that the new management server will pick up all Common Agents defined in the old Agent Manager.

3. On the new management server, reconfigure the selection of the Agent Manager by specifying the new Agent Manager, as described in 4.3, “Switching to a different Agent Manager after installation” on page 197.

   The act of changing the Agent Manager from the old one to the new one will copy over all Common Agent credentials. Make sure to select the **Make the new Agent Manager active** option. The Common Agents that were managed using the old Agent Manager will be migrated to use the new Agent Manager.

4. After migration is complete, perform a discovery on the new management server.

For any further details and information about the Agent Managers configuration options refer to the IBM Systems Information Center at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.agent_6.1/fqm0_t_managing_agents.html

4.5 Applying patches to the management server

It is a good practice install all the updates and patches that IBM makes available to clients.

The following section provides the step-by-step process to update your management server through the automatic update manager process, but if you have any further questions about the Update Manager capabilities refer to Chapter 10, “Update Manager” on page 449.

To update your management server:

1. Log on to the IBM Systems Director server Web console.
2. Ensure that the management server itself is both discovered and unlocked in the Web console. It normally is as part of the installation process. The management server is the system that the IBM Systems Director Server is installed on (that is, the localhost). This should be automatically discovered and unlocked.

   a. Click the **Navigate Resources** link in the top-left corner.

b. Click the **All Systems** group. You should see something like Figure 4-16.

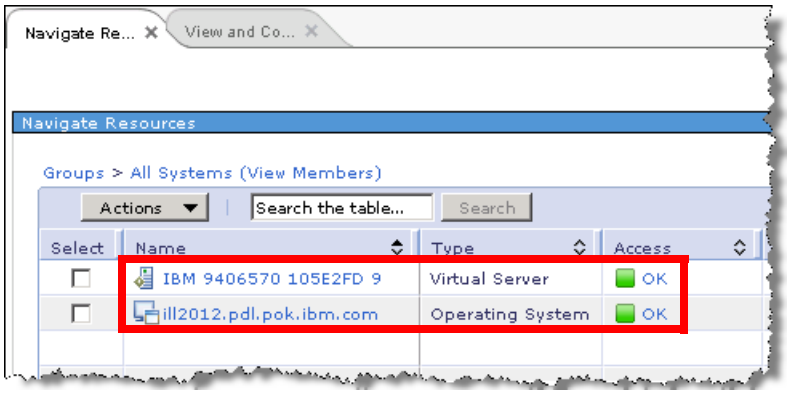


Figure 4-16 Operating System and Server MEPs exist

c. Verify that an operating system and server resource exist for the management server (see the Type column).

- If neither exist, discover the management server via **Inventory** → **System Discovery**.
- If the operating system exists and is locked, click the **No access** link in the Access column and provide credentials to unlock the management server. Once that is successful, the server resource should appear in the all systems group.

3. Collect inventory on the management server (use either the operating system or server resource).

a. Right-click the system in the resource navigator and select **Inventory** → **View and Collect Inventory**.

b. Once on the View and Collect Inventory page, the system should already be selected, so click the **Collect Inventory** button.

c. Click **OK** on the pop-up and monitor the task to completion. The collect inventory job must be started as seen in Figure 4-17.

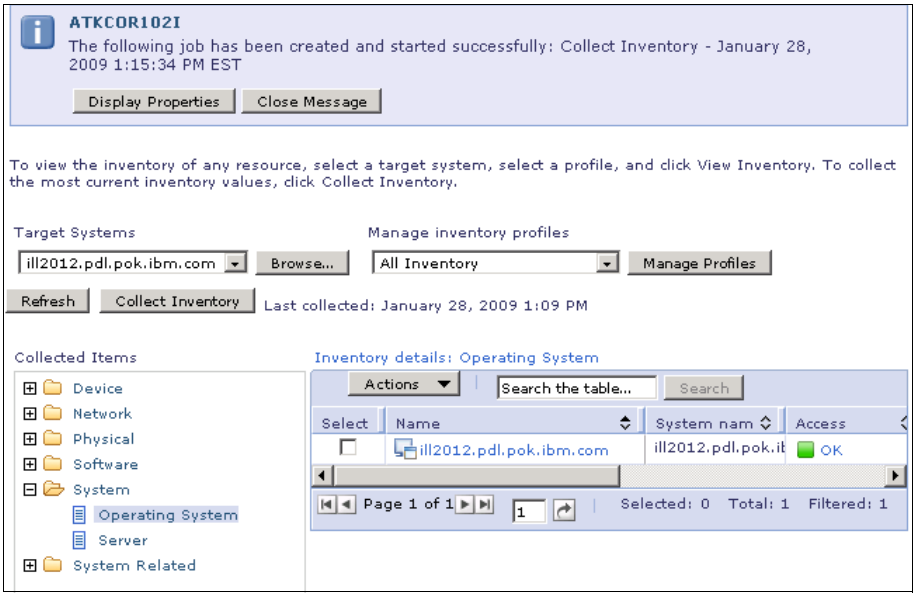


Figure 4-17 Collect Inventory job has been created for the management server

4. From the welcome page, click the **View Updates** link in the top-right corner. See Figure 4-18.

Figure 4-18 View updates link in the Welcome page

5. Click the **Check for Updates** button. This brings up a criteria chooser, which should be populated already (Figure 4-19).

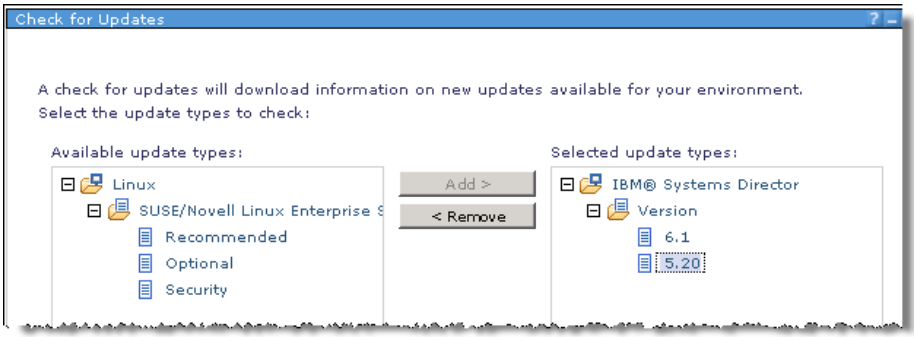


Figure 4-19 After check for updates we see the updates selection

Note: If you are only applying Director 6.1 update/patch content, then you should only select **IBM Systems Director → Version → 6.1** in the check for updates criteria chooser. In other words, that is all that should be in the right-side of the chooser.

6. Click **OK** and **OK** again to check for updates. Monitor the task to completion. It may take a while to have all the results. Figure 4-20 shows the progress.

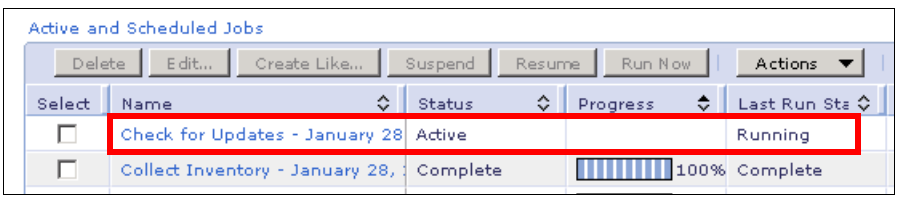


Figure 4-20 Check for updates task completion in progress

Note: Compliance will be automatically run after the check for updates completes and new updates are found. However, the compliance task is run in the background, so it cannot be monitored from the Active and Scheduled Jobs page. To monitor the update compliance task to completion, click the management server in the resource navigator, select the **Applied Activities** tab, and monitor the compliance task to completion (Figure 4-21 on page 205).

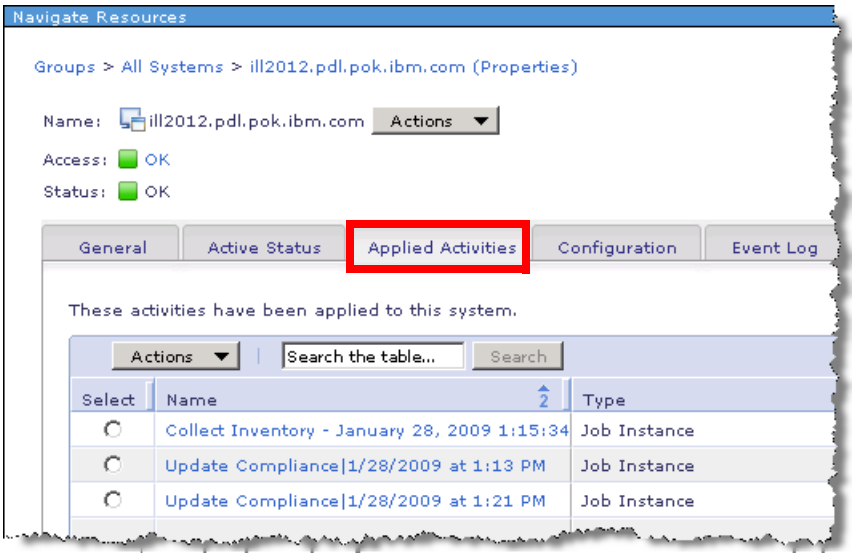


Figure 4-21 Monitoring the Update Compliance task completion

Note: If you experience time-out issues while checking for updates, try authenticating to the firewall and then check for updates again. If your management server is behind a VPN firewall you may need to also set proxy connection settings using **Release Management** → **Updates** → **Settings**. Enter proxy information in the Connection tab.

7. Back on the View Updates page (from step 5 on page 204), you should see the newly acquired updates that are needed by the management server, as seen in Figure 4-22. Select the updates that you want to install and click the **Install** button. This launches the Install Wizard.

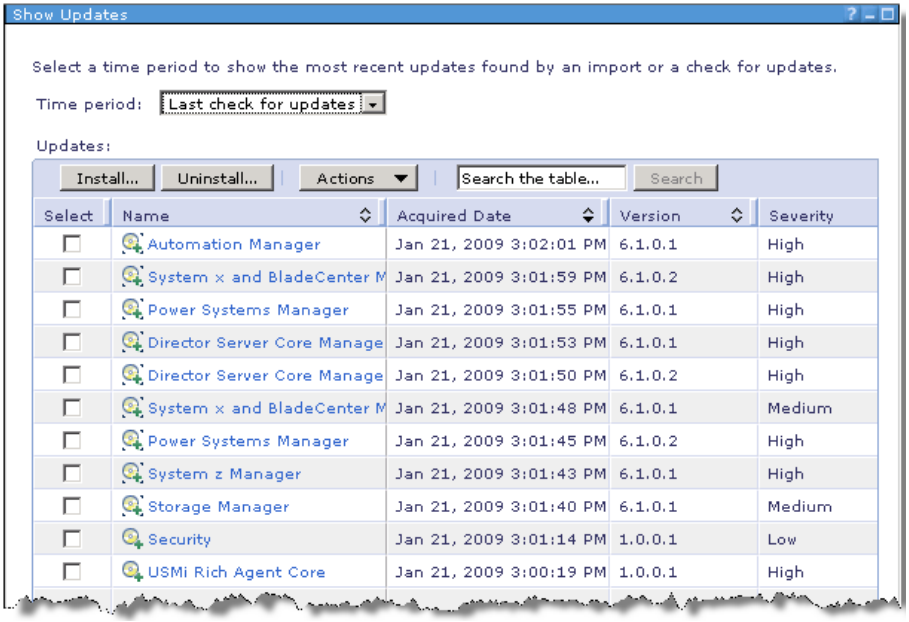


Figure 4-22 Show Updates lists the required patches and the install button

8. Click **Next** on the Welcome panel and answer the wizard as usual in the Update Manager updating process. Refer to 10.9, “Updating IBM Systems Director” on page 494, for further details.
9. Select the management server (operating system or server resource) and add to the right side of the chooser. Click **Next**.
10. Leave the default options and click **Next**.
11. Leave the default restarts and click **Next**.
12. Review your selections on the Summary panel and click **Finish** to begin the install task. Click **OK** on the pop-up scheduler dialog and monitor the task to completion.

Note: Inventory will be automatically collected on the target systems after the install task completes. This is done on a background task so it will not show up in the Active and Scheduled Jobs page. Once the inventory task completes, compliance will be automatically validated again on the target systems and all updates/patches. You can monitor these tasks in the same way described in step 6 on page 204.

13. If the install task fails, check the logs. If the install task is successful, view the installed updates by going to **Release Management** → **Updates** and clicking the **Show installed updates** link, as seen in Figure 4-23.

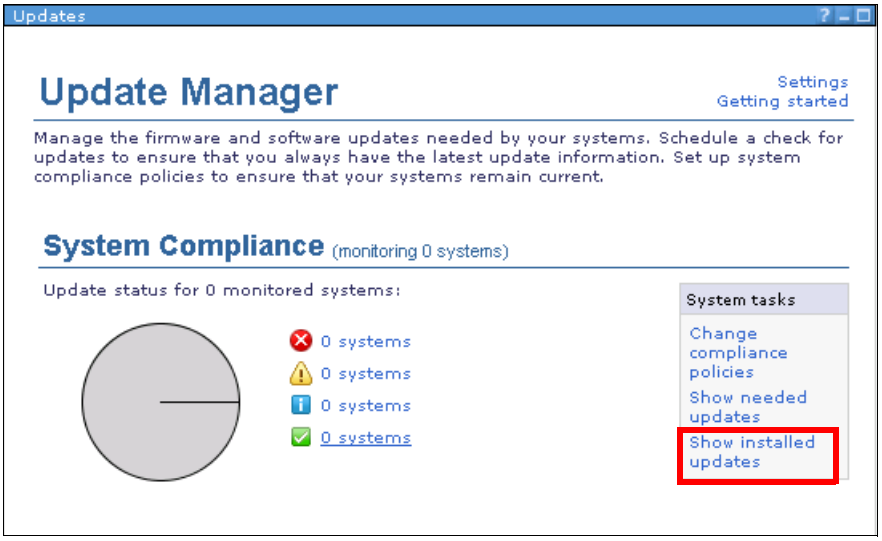


Figure 4-23 Updates already installed

14. Select the management server (click the **Browse** button to find the management server if it is not already selected) and click the **Show Installed Updates** button to see the updates installed on the management server, as shown in Figure 4-24.

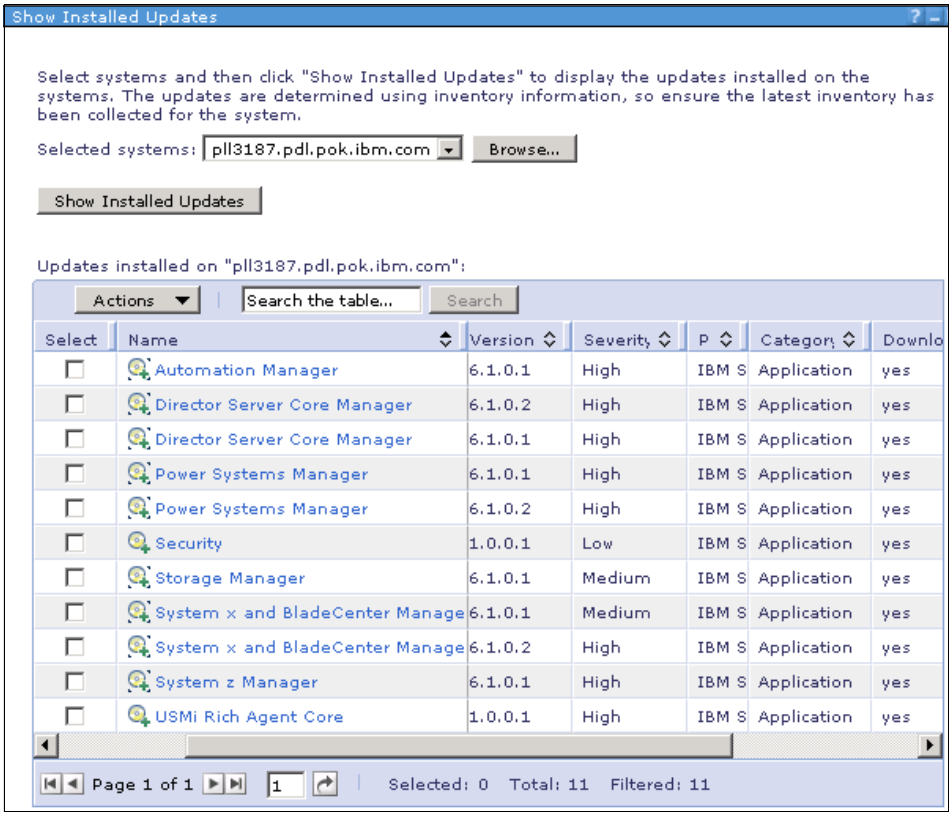


Figure 4-24 Showing the installed IBM Systems Director 6.1 updates

15. At this point, the plug-ins within the updated features are not *active* in the framework. You must log off the Director console and *restart* the management server run time to enable the patched plug-ins to test the issues that they are meant to fix.

Patches rollback (uninstallation)

You can also roll back the installation of updates from the Show Installed Updates page (Figure 4-25).

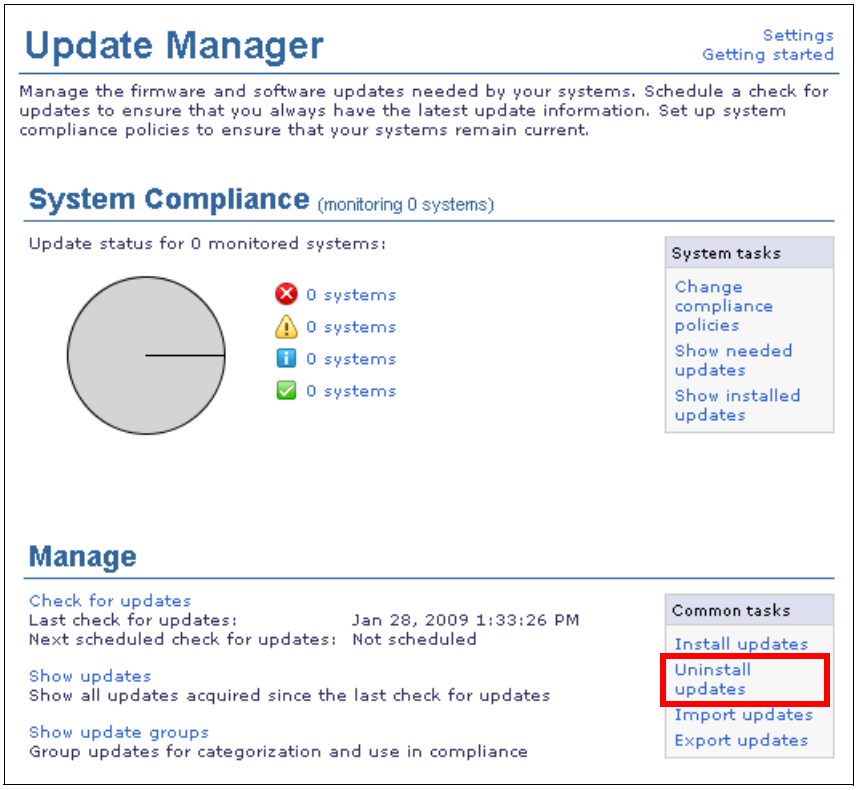


Figure 4-25 Uninstall updates common task

Note: The Director Services Core Manager is not uninstallable.

To uninstall an update:

1. Select **Uninstall updates**.
2. Once on the Uninstall Wizard, click **Next** on the Welcome panel.
3. Select the management server and add it to the right side of the context chooser (same as the install wizard). Click **Next**.
4. Leave the defaults on the Options page and click **Next**.

5. On the Manual uninstall panel, select the **View** link to view manual uninstall instructions, as seen in Figure 4-26.

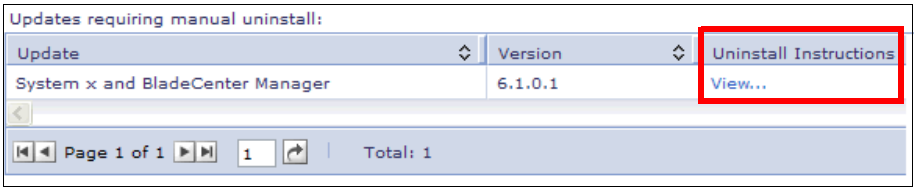


Figure 4-26 Uninstall instructions View link

6. Follow the manual uninstall instructions to roll back the manager patch. This attempts to uninstall the member features and manager feature in the reverse order in which they were updated via the install task. The previous versions of the features should be enabled once the rollback is complete.
7. Once the rollback is successful, restart the management server, log on to the Director console, collect inventory on the management server, and verify that the updates are no longer installed by viewing the Show Installed Updates page for the management server.

4.6 Installing Common Agent

There are a number of ways that you might choose to install agents on your managed systems. IBM Systems Director supports the following methods for agent installation:

- IBM Systems Director Release Management
- Manual installation
- Unattended installation

We discuss each of these installation methods. As in other areas of this book, we focus on important points, issues not covered elsewhere, and tips and tricks to make each method of agent installation as effective and efficient as possible.

Topics in this section are:

- 4.6.1, “Pushing agents from the management server” on page 211
- 4.6.2, “Manual agent installation on Windows” on page 221
- 4.6.3, “Installing Common Agent on Linux and AIX” on page 224
- 4.6.5, “Managing IBM Power Systems” on page 231
- 4.6.6, “Managing Power Systems running IBM i” on page 232
- 4.6.4, “Unattended Common Agent installation” on page 225

Important: The IBM Systems Director on x86 DVD no longer includes OpenSSH for Windows. If an agentless managed system does not have a Secure Shell (SSH) package installed, IBM Systems Director Server cannot communicate securely with the managed system. To secure communication, install OpenSSH on the managed system. Download OpenSSH for Windows from the following site and update the managed system with SSH:

http://www.sourceforge.net/projects/sshwindows/

To install systems with service processors, make sure that you have the supporting device drivers and mapping layers, if they are not already installed. See the “Preparing to manage service processors with IBM Systems Director” Information Center topic for information about these drivers and mapping layers:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_preparing_to_manage_service_processors.html

4.6.1 Pushing agents from the management server

IBM Systems Director is installed with a number of agent packages that can be deployed to managed systems using the Agent Installation Wizard.

The Agent Installation Wizard is launched from the IBM Systems Director 6.1 Web console and guides you through the process of deploying agent software to remote systems. The wizard guides you through agent selection and system target selection and is an effective way of performing a remote installation of the agent code.

Importing agent packages

IBM Systems Director 6.1 can import agent packages that have been downloaded from the Web or provided on media. These agent packages then can be distributed to managed systems using the Agent Installation Wizard.

Tip: The install DVD and the Systems Director download page have the full IBM Systems Director 6.1 management server including the Common Agent and the Platform Agent in the package ready to be pushed to the managed resources.

The agent packages that IBM Systems Director uses are Tivoli Provisioning Manager automation packages with a file extension of .tcdriver.

Use the following procedure to import one or more agent packages for distribution using the Agent Installation Wizard:

1. Copy the tcdriver package files to a directory on the management server. In our example, we use c:\CommonAgent.
2. In the IBM Systems Director navigation area, click **Release Management** → **Agents**. The available agent package groups are listed, as shown in Figure 4-27.

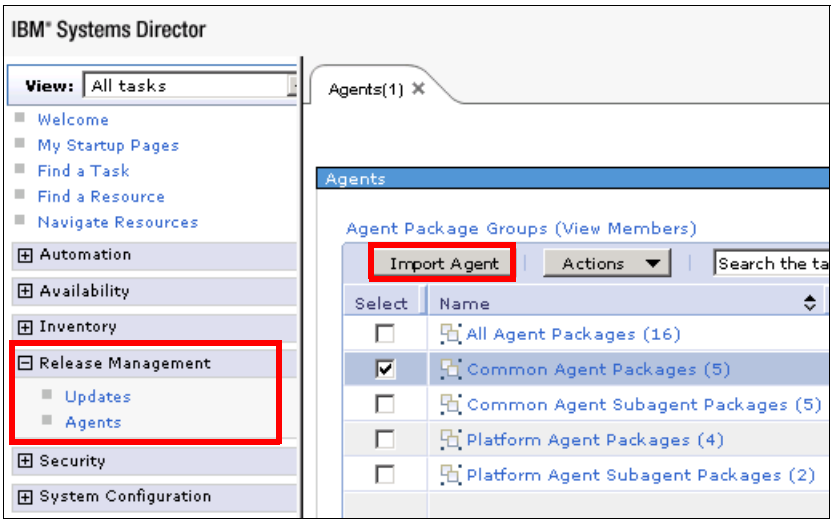


Figure 4-27 Available agent packages

3. Click **Import Agent**. The Import Agent window opens, as seen in Figure 4-28. As you can see, you can import and push as much as Common Agents as Platform Agents, but you must have the correct tcdrivers for the specific platform, as mentioned in 4.7, “Installing Platform Agent” on page 233.

Tip: Platform Agent packages to be pushed through the Agent Installation Wizard are:

- Dir5_20_3_Platform_Agent_Linux_Power.tcdriver
- Dir5_20_3_Platform_Agent_Linux_Power.tcdriver
- Dir5_20_31_Platform_Agent_Windows.tcdriver

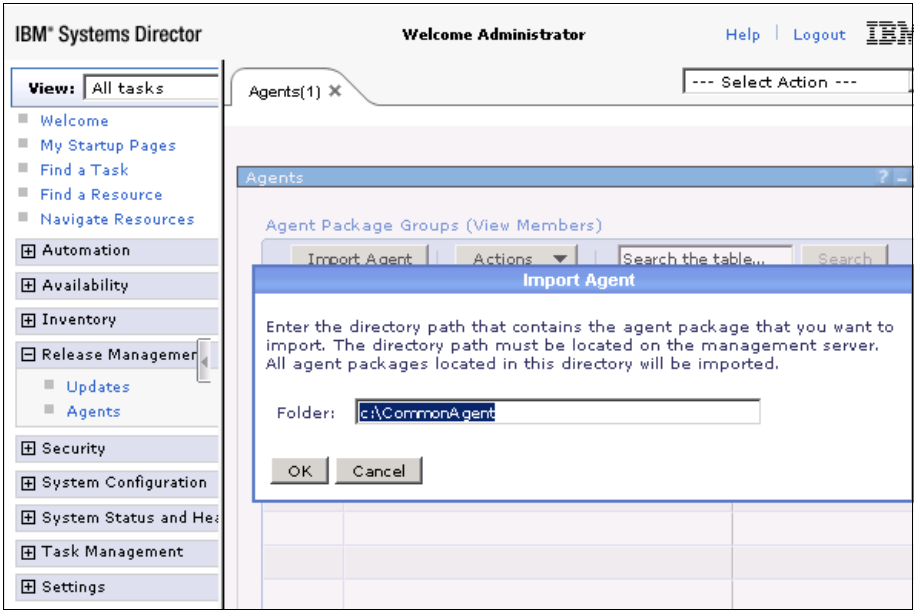


Figure 4-28 Specify the directory path that contains the agent tcdriver packages

4. Type the path in the management server where you copied the package files in step 1 on page 212, and then click **OK**.

All of the agent packages that are found in the specified path are imported, and a confirmation message appears indicating that the packages were successfully imported, as shown in Figure 4-29.

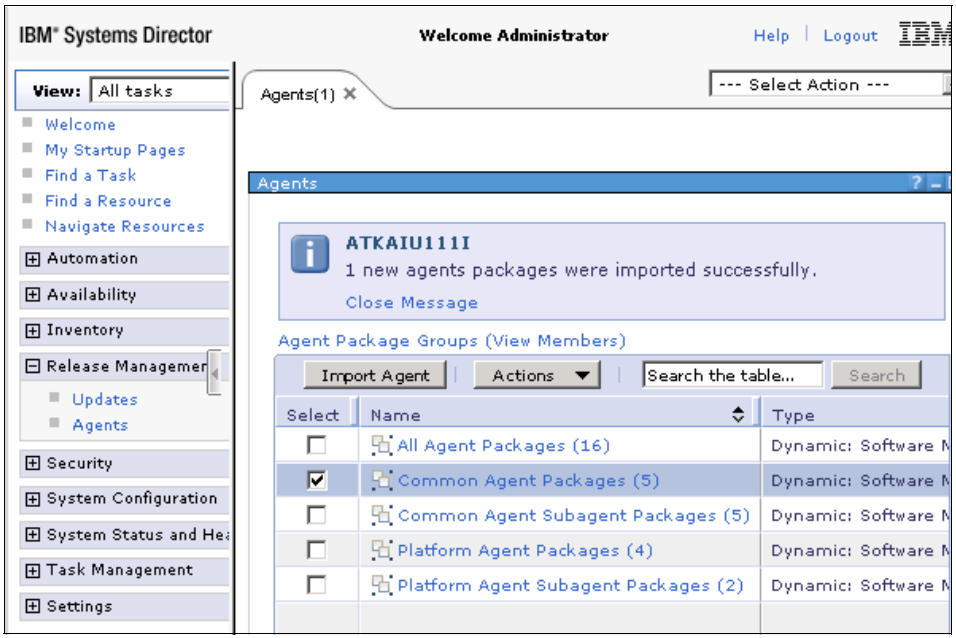


Figure 4-29 Agent package successfully imported

Tip: The imported packages will not appear in the agent package groups list, but as soon as the message `1 new agents packages were imported successfully` is shown, you will be ready to install it from the release management function.

After the agent packages are successfully imported and appear in the agent package groups, you can install the packages using the Agent Installation Wizard.

Installing agents using the Agent Installation Wizard

The imported packages are located in the dynamic group *Agent Package Groups* and can be accessed by clicking **Release Management** → **Agents** in the navigation area. Use the Agent Installation Wizard to select one of these agent packages to install and one or more systems on which to install the agent package. Then the wizard creates an agent installation job that can be run now or scheduled.

Note about VMware systems: You might need to configure certain VMware systems before you can install agents on them using the Agent Installation Wizard. Managed systems running VMware ESX require the following configuration to ensure that agents can be installed using the Agent Installation Wizard:

1. On the VMware managed system, open the `/etc/ssh/sshd_config` file in a text editor.
2. Locate the following line:

   ```
   Ciphers aes256-cbc,aes128-cbc
   ```

3. Change the line to:

   ```
   Ciphers aes256-cbc,aes128-cbc,3des-cbc
   ```

4. Save and close the `/etc/ssh/sshd_config` file.
5. Stop and restart the ssh daemon. Type the following command:

   ```
   service sshd restart
   ```

1. Start the Agent Installation Wizard. You can start the wizard in one of two ways:
   - Right-click an agent package or a managed system and select **Release Management** → **Install Agent**.
   - From the IBM Systems Director 6.1 Welcome page (Figure 4-30), click **Install agents on systems**.

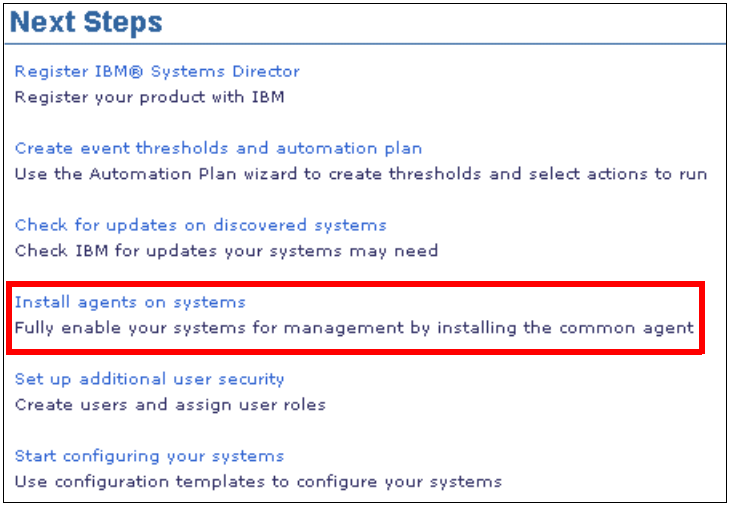


Figure 4-30 Install agents on systems from the welcome page

2. When the Agent Installation Wizard Welcome page appears, click **Next**.
3. At the Agent Installation Wizard Agents page, select the agent package that you want to install in the available list and click **Add**. The selected agent package is displayed in the selected list, as shown in the Figure 4-31. Click **Next**.

Tip: Depending on how you started the Agent Installation Wizard, one or more agent packages might already be displayed in the selected list.

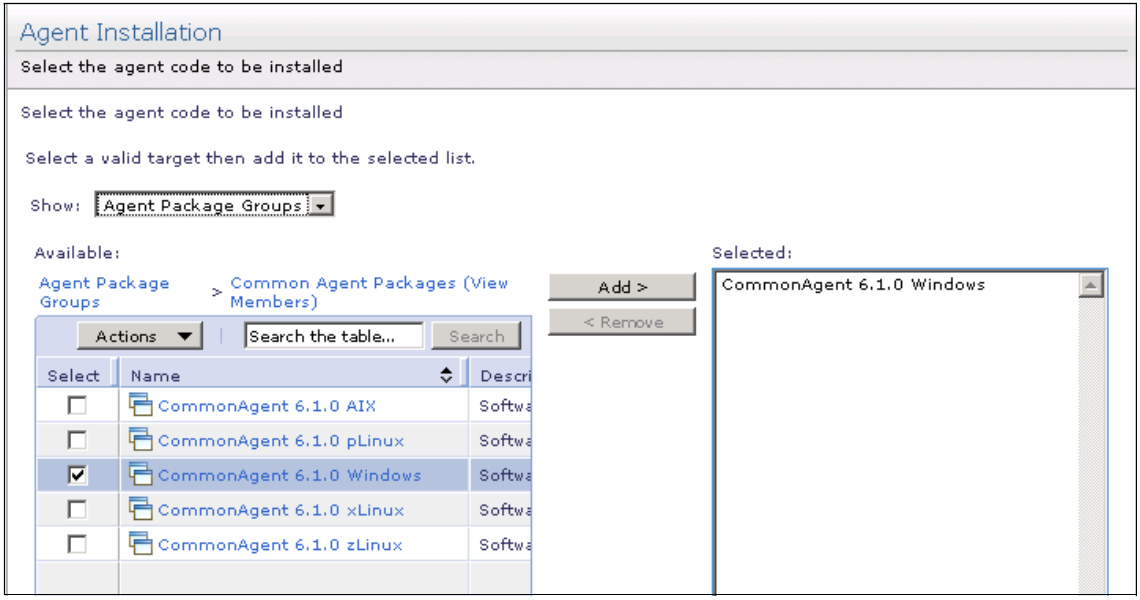


Figure 4-31 Agent package to be installed

Note: The Agent Installation Wizard can install only one agent package at a time. If more than one agent package is displayed in the selected list, you will not be able to advance to the systems page.

4. In the Agent Installation Wizard Systems page, select the managed systems on which you want to install the agent package in the available list and click **Add**. The selected systems are displayed in the selected list (Figure 4-32).

> **Tip:** Depending on how you started the Agent Installation Wizard, one or more systems might already be displayed in the selected list.

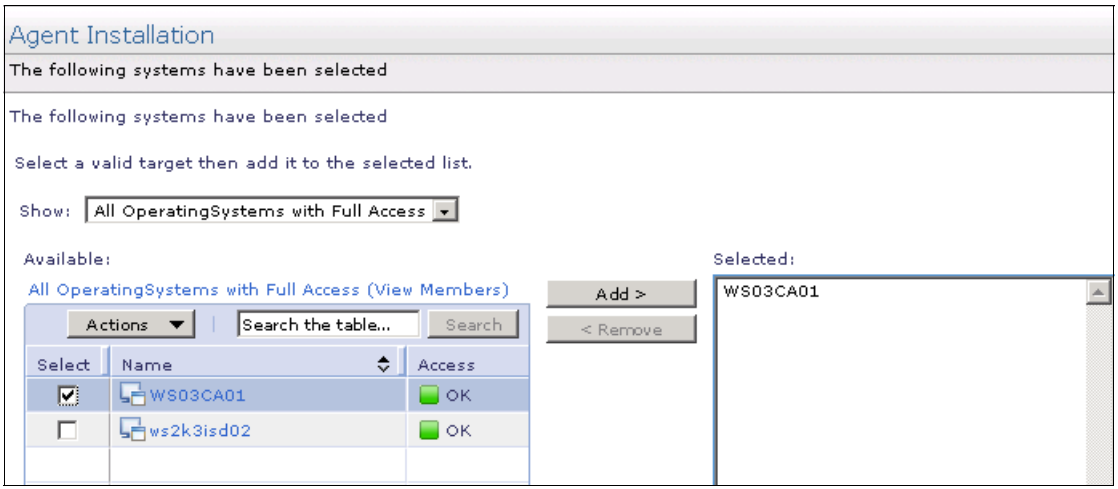


Figure 4-32 System to be installed

5. Click **Next**. Depending on the agent package being installed, some selected systems might not be valid targets for installation. The wizard checks the selected systems for the following criteria to ensure that the systems are valid targets for installing the selected agent package before allowing you to continue:
   - Operating system family
   - Operating system version
   - Operating system distribution
   - Operating system name
   - Server architecture

6. In the Agent Installation Wizard Summary page, shown in Figure 4-33, review the selected agents and selected systems lists to ensure that they are correct. If the selections are not correct, click **Back** and make the necessary changes. If the selections are correct, click **Finish**.

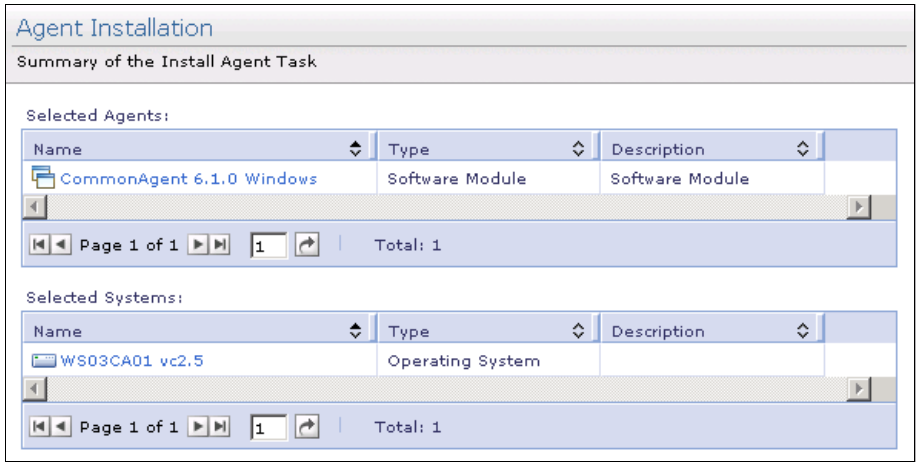


Figure 4-33 Summary of the install agent task, package and system selected

7. The Run - Install Agent window appears. Click the **Schedule** tab. On this page, you can choose to run the job immediately or schedule the job to run at a later time, as shown in Figure 4-34.

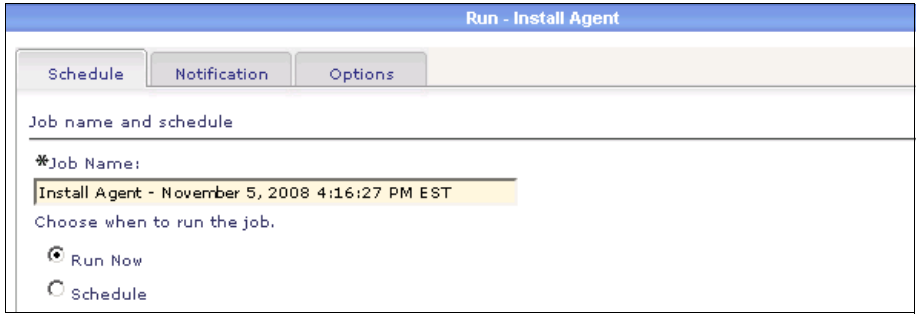


Figure 4-34 Install Agent IBM Systems Director job

8. Click **OK** to save the job.

   If the job is created successfully, a message is displayed on the page from which you started the scheduler, as seen in Figure 4-35. If the job creation fails, a message is displayed in the Run window so that you can correct the job.

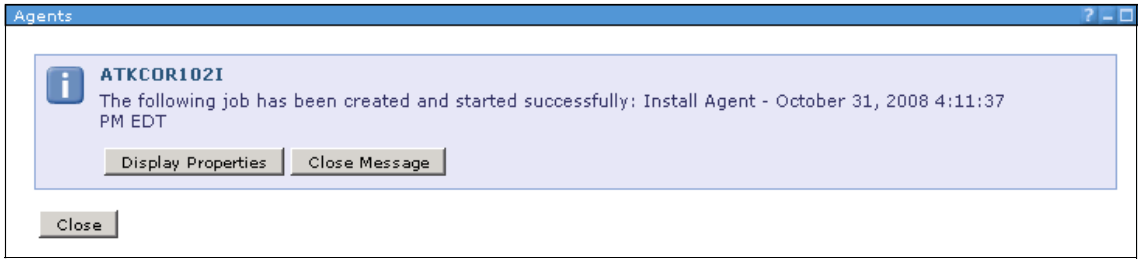


Figure 4-35 Install Agent job is created

The job created by the Agent Installation Wizard transfers the agent self-extracting script and the agent response file into the %TEMP% directory on the target system. After the files are copied, the installation file sets are extracted into a %TEMP%\extract_XXXXXX directory and installed. The files are then removed after a successful installation. You must ensure that there is sufficient space on the target system to copy the self-extracting script and extract the file sets. Refer to the space requirements, as specified in the IBM Systems Infocenter under the “Hardware requirements for systems running Common Agent or Platform Agent” section:

`http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.plan_6.1/fqm0_r_hardware_requirements.html`

9. You can view the status of the agent installation job by clicking **Task Management** → **Active and Scheduled Jobs**, as shown in Figure 4-36.

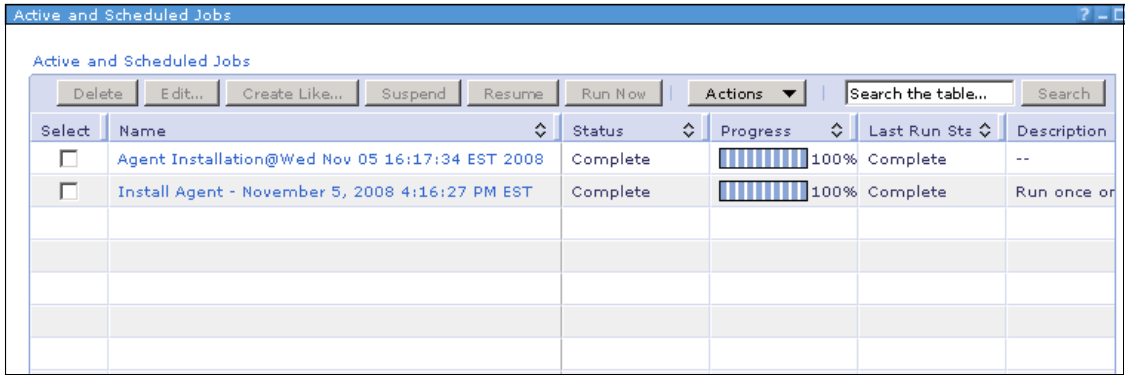


Figure 4-36 Status of active and scheduled jobs: Showing successful installation

As you can see in Figure 4-37, the Common Agent is now installed on the host selected.

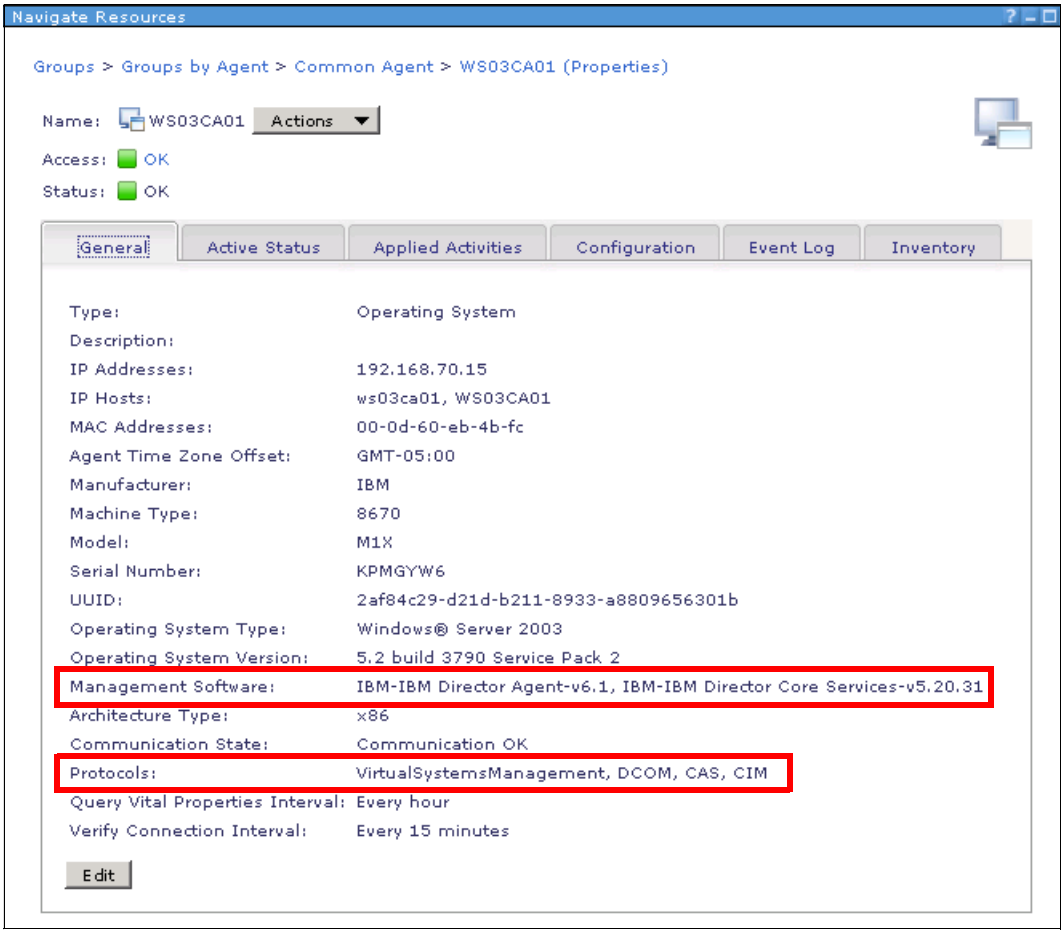


Figure 4-37 Common Agent installed in Virtual Center 2.5: DCOM, CAS, and CIM are protocols managing machine

The Common Agent is now installed in a Virtual Center 2.5. DCOM, CAS, and CIM are the protocols managing the machine, and it now has IBM Director Agent Version 6.1 and IBM Director Core Services Version 5.20.31 installed.

In this way, now you can see that this is the standard release management installation procedure for Common Agent, Platform Agent, and sub agents in IBM Systems Director 6.1.

4.6.2 Manual agent installation on Windows

The manual installation process on Windows is a standard application install. The only window in the installation wizard that requires input is the Registering Common Agent Services (CAS) window shown in Figure 4-38. This window provides the ability to preregister Common Agent with an existing Agent Manager. This is analogous to the AddKnownServerAddress function that could be specified in the response file and invoked from an unattended installation of the Director 5 Agent.

Using this option allows Common Agent to find and register with an existing Agent Manager (for example, the one embedded in the management server). As a result, all management servers that are registered with the same Agent Manager will automatically discovery and gain access to the Common Agent being installed.

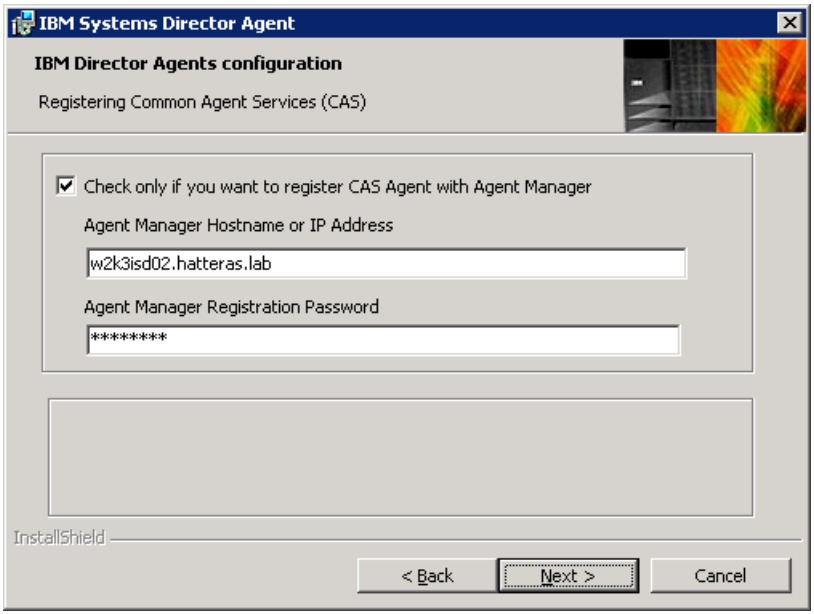


Figure 4-38 Registering Common Agent Services (CAS) panel

If you want to take advantage of this feature, select the **Check only if you want to register CAS Agent with Agent Manager** option and enter the following information:

- Agent Manager Hostname or IP Address: The host name or IP address of the existing Agent Manager
- Agent Manager Registration Password: The password used by all Common Agents to register with the specified Agent Manager

Note: IPv6-only Agent Managers are not supported.

When the installation is completed, the resource will be set up as a manageable resource. If you chose to register the Common Agent with an existing Agent Manager during installation, it will be discovered and accessible without further intervention, as seen in Figure 4-39.

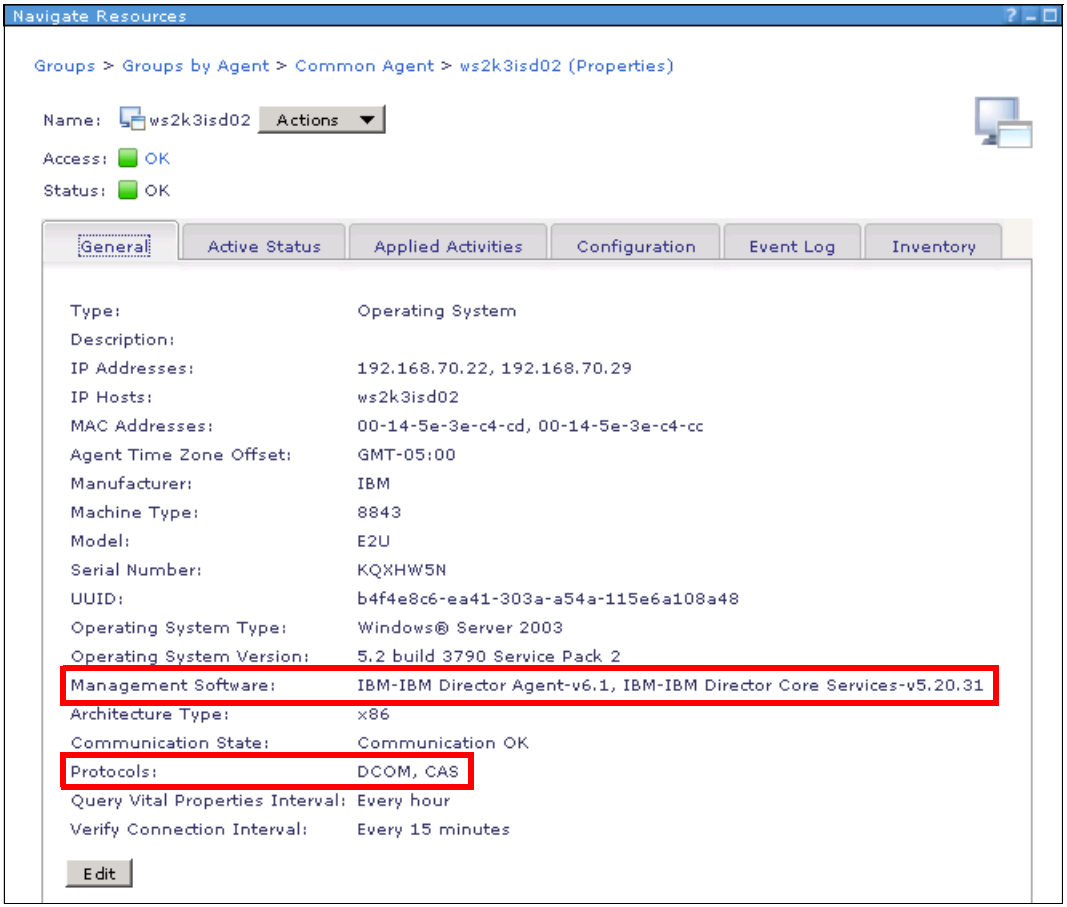


Figure 4-39 Common Agent installed and ready to be managed

In the highlighted fields in Figure 4-39, you can see that the management software is IBM Director Agent 6.1 and the IBM Director Core Services 5.20.31, meaning that the Common Agent is already installed.

The second highlight in Figure 4-39 shows that DCOM and CAS protocols are in use. The fact that they are listed here indicates that the Common Agent was installed successfully.

4.6.3 Installing Common Agent on Linux and AIX

To install IBM Systems Director Common Agent using the default settings in Linux on System x, and Linux or AIX on System p, use the following packages:

- Installation packages for AIX
  - SysDir6_1_Common_Agent_AIX.tar.gz (for script installation)
  - SysDir6_1_Server_Agent_Installp_AIX.tar.gz (for installp or NIM installation)
  - SysDir6_1_Common_Agent_AIX.tcdriver (agent package for Agent Installation Wizard installation)

Note: You can perform a standard installation, install using installp or Network Installation Management (NIM), or you can use a response file to customize the installation for your organization.

- Installation packages for Power Linux
  - SysDir6_1_Common_Agent_Linux_Power.tar.gz
  - SysDir6_1_Common_Agent_Linux_Power.tcdriver (agent package for Agent Installation Wizard installation)
- Installation packages for Linux on System x or x86
  - SysDir6_1_Common_Agent_Linux_x86.tar.gz
  - SysDir6_1_Common_Agent_Linux_x86.tcdriver (agent package for Agent Installation Wizard installation)

Log in as the root user and run the following command:

`dir6.1_commonagent_<`*`LinuxPackage`*`>.sh`

Where <*LinuxPackage*> represents any of the particular packages supported by the platform and the operating system. The script runs and installs all the Common Agent products, as shown in Example 4-7.

Example 4-7 Installing the Common Agent for Linux and AIX

```
[root@xnv9167]# ./dir6.1_commonagent_linux.sh
./dir6.1_commonagent_linux.sh self-extracting installation
program... Please wait...

(The installation process continues until it finish in this way:)

Installation of selected components is successful.
Attempting to install Common Agent Services.
```

```
Preparing...
########################################### [100%]
   1:ISDCommonAgent
########################################### [100%]
Attempting to install features.
Restarting the agent runtime.
Feature installation complete.
Configuring VMware firewall
Restarting the agent runtime.
Installation of IBM Systems Director Agent completed successfully.
[root@xnv9167]#
```

You use the same script to perform scripted installs, as described in 4.6.4, “Unattended Common Agent installation” on page 225.

4.6.4 Unattended Common Agent installation

It is possible to use a response file to perform an unattended installation of Common Agent. The response file is used to set the switches used to configure several options during installation.

Notes: The response file for a Windows install is different from that of a Linux install.

There is no Common Agent for IBM i. You must use the Platform Agent instead.

Linux and AIX

If you download the Common Agent from the IBM Systems Director 6.1 Web download page it is in a compressed tar.gz file. Simply unpack these files before starting your customization. The Common Agent that is delivered on the DVD (or in the DVD ISO image) is in a self-extracting shell script for Linux and AIX.

To extract the contents of the installation package, type the following command:

```
tar -xvf install_package
```

Where *install_package* is the file name of the downloaded installation package. To see a list of the different kinds of packages for AIX and Linux refer to 4.6.3, “Installing Common Agent on Linux and AIX” on page 224.

Tip: To extract the file sets but not install Common Agent, enter the following command:

```
agent/xlinux/dir6.1_commonagent_linux.sh -x extract_directory
```

Where *extract_directory* is the local directory into which you want to extract the installation files.

To install IBM Systems Director Common Agent, use the following command:

```
<install source>/dir6.1_commonagent_linux.sh -r <path>/<response_file.rsp>
```

Where <*path*> is the local directory to which you copied the response file, and <*response_file.rsp*> is the name of the response file.

Note: You must specify the path to the response file. If you do not the installer may not be able to find the file. If the installer cannot find the response file you will see the error in the `/var/log/dirinst.log` file.

You can customize the Linux installation, as we did in 4.1.3, “Modifying the dirserv.rsp response file” on page 180. However, for the Common Agent, the response file to modify is `diragent.rsp`.

The parameters that you can modify are as follows. These first two are for Linux and AIX installs only (they are not available for Windows installs).

- This is where the log installation file will be saved. The default is `/var/log/dirinst.log`.

  ```
  LogFile=/var/log/dirinst.log
  ```

- Whether to enable debug logging. The default is disabled.

  ```
  DebugInstall=0
  ```

You can also modify these parameters, which are common in all the Common Agents across the platforms:

- Whether to use an Agent Manager and how to register with it. By default, the agent is not registered with an Agent Manager. To register one, you must supply both the host name (or IP address) and Agent Manager password.
  - AMHostname: The host name or IP address for the Agent Manager
  - AMPassword: The password for the Agent Manager
- What network ports the Common Agent Services will use. The defaults are:
  - AgentPort=9510: Agent Listener Port
  - AgentNonStopPort1=9514: Nonstop services port 1
  - AgentNonStopPort2=9515: Nonstop services port 2

See 4.1.3, “Modifying the dirserv.rsp response file” on page 180, for a description of these parameters.

The following additional information may also be useful:

- Installing Director Server and Common Agent for AIX using installp
- Installing Director Common Agent for AIX using NIM
- List of filesets installed with Director Server and Common Agent on AIX

These and others are available from the IBM Redbooks Wiki:

http://www-01.ibm.com/redbooks/community/display/director/Installation+(Director+6.1+Power)

Windows

Prior to performing an attended installation of the Common Agent, you must unpack the agent install code.

If you download the Common Agent from the IBM Systems Director 6.1 Web download page it is in a compressed file ZIP file. Simply unpack these files before starting your customization.

The Common Agent that is delivered on the DVD (or in the DVD ISO image) is in a self-extracting EXE. To unpack the Windows EXE file, do the following:

1. Run the self-extracting EXE and stop at the welcome page.
2. Open the folder where the EXE unpacked itself to. This will be a folder in the%TEMP% directory. You must scan through this directory to find the correct folder.
3. Copy that folder to another location and use it as your source directory.
4. Cancel the install process.

Start the IBM Systems Director Common Agent install by running the following command:

```
IBMSystemsDirectorAgentSetup installationtype rsp="responsefile" option
```

Note: If Microsoft Software Installer (MSI) V3.0 or later is not installed on the system, it is installed during Common Agent installation. If this occurs, a system restart will be required following the installation of Common Agent.

Use the following options to begin an unattended or silent installation. Additional details can be found at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_performing_an_unattended_installation_of_ibm_director_level2_agent_on_windows32bit.html

The installationtype parameter can be one of the following:

- unattended

  Displays progress messages but does not prompt for any input. Uses the `diragent.rsp response` file located in the installation source directory.

- silent

  A silent installation that does not display any messages. Uses the `diragent.rsp response` file located in the installation source directory.

Other parameters are:

- rsp="filename"

  Used with unattended or silent parameters. Specifies the name and location of the response file.

  Note: You must specify the full path to the response file. If you do not the installer may not be able to find the file. If the installer cannot find the response file you will see the error in the `%SystemRoot%\dirinst.log` file.

- waitforme

  Used with unattended or silent parameters. Ensures that the ISDAgentSetup.exe process will not end until the installation of IBM Director Agent is complete.

Note: When using the unattended option without the waitforme option, there may be a period of time both at the beginning and the end of the installation when no installation window is on the window but the installer is still running. We recommend using the Task Manager and waiting until the IBMSystemsDirectorAgentSetup process finishes before testing the installation.

- log=logfilename

  Specifies the fully qualified name of an alternative log file.

We do not extensively cover all the switches present in the `diragent.rsp` file, but only those that allow Common Agent to register with an existing Agent Manager. This is particularly useful and is analogous to the AddKnownServerAddress function that could be specified in the response file and invoked from an unattended installation of the Director 5 Agent.

Specific settings for Windows that are not common with AIX and Linux in their response files are:

- UseExistingTarget

  Use the same installation location as in the previous version. Specifying Y will use the same directory as the existing IBM Director Agent installation. The TargetDrive and TargetFolder parameters in this response file are ignored if UseExistingTarget is set to Y during an upgrade.

  ```
  UseExistingTarget = Y
  ```

- TargetDrive

  Specifies the drive letter for the installation directory. If no value is specified, the hard disk drive that is running Windows is used by default.

  ```
  TargetDrive = C
  ```

- TargetFolder

  Specifies the installation directory on the target disk. If no value is specified, the *<d>*`:\Program Files\IBM\Director` directory is used by default, where *<d>* is the drive letter for the installation directory. If targetFolder starts with Program Files it is replaced with the environment variable %PROGRAMFILES%, which includes the drive letter. In this case, the TargetDrive value is ignored. To use a TargetDrive value, TargetFolder must not start with program files.

  ```
  TargetFolder = Program Files\IBM\Director
  ```

- Existing Common Agent Services

  These two parameters are used to instruct IBM Systems Director Common Agent to use the existing Common Agent Services:

  ```
  UseExistingCAS = Y
  ExistingCASDir = E:\Program Files\tivoli\ep
  ```

Example 4-8 shows the portion of the `diragent.rsp response` file that pertains to Common Agent Services). For more information about CAS, see 1.5, “Common Agent Services” on page 35.

Example 4-8 A portion of diragent.rsp used for unattended installation of Common Agent

```
;============================================================================
;UseExistingCAS = Y
;ExistingCASDir = E:\Program Files\tivoli\ep
;
;
; The following parameters are used to register common agent services
; with an Agent Manager. These parameters are optional, but if
; one is specified, then both need to be specified
;
; AMHostname  = The hostname or IP address for the Agent Manager
; AMPassword  = The password for the Agent Manager
;
;
AMHostname=ws2k3isd02.hatteras.lab
AMPassword=itso4you
;
;
;============================================================================
```

To have Common Agent automatically register with an existing Agent Manager, make sure to uncomment (remove the semi-colon (;) at the beginning of the lines) the statements for AMHostname and AMPassword and enter the proper information on those lines as follows:

- **AMHostname**

  The host name or IP address for the Agent Manager where all the Common Agents are being registered.

- **AMPassword**

  The password for registering with the Agent Manager used in the IBM Systems Director installation process or defined in the standalone Agent Manager.

Example 4-8 on page 230 shows a portion of the `diragent.rsp` file customized for our environment.

Important: The Platform Agent installation response file does not contain information to be registered in the Agent Manager, because it does not use Common Agent Services.

4.6.5 Managing IBM Power Systems

IBM Systems Director 6.1 provides specific tasks that can help you manage Power Systems and platform managers such as the Hardware Management Console (HMC) and the Integrated Virtualization Manager (IVM). Specific information about how to set up these Platform Agents to work with the management server are documented in 12.2.5, “IBM Power Systems virtualization” on page 559.

IBM Systems Director can also manage the following IBM Power environments that might include POWER5™ and POWER6™ processor-based servers running AIX, IBM i (formerly i5/OS), or Linux:

- Power Systems managed by the Hardware Management Console
- Power Systems managed by the Integrated Virtualization Manager
- A Power Systems server with a single image (a nonpartitioned configuration), which IBM Systems Director installation for AIX and Linux is identical to the xLinux configuration.
- A Power Architecture® BladeCenter server under the control of a BladeCenter management module

For additional information about managing the virtualization and consolidation on Power Systems using IBM Systems Director, see the white paper *Managing IBM Power Servers with IBM Systems Director 6.1,* available at:

`http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=SA&subtype=WH&appname=STGE_PO_PO_USEN&htmlfid=POW03011USEN`

For instructions on how to install the Common Agent on VIOS see:

`http://www-01.ibm.com/redbooks/community/display/director/Installing+Common+Agent+on+VIOS`

4.6.6 Managing Power Systems running IBM i

The following IBM i systems can be managed by IBM Systems Director 6.1:

- IBM i 6.1 (formerly i5/OS, Version 6 Release 1)
- IBM i 5.4 (formerly i5/OS, Version 5 Release 4)

These IBM i systems can be managed by IBM Systems Director 6.1 using the following:

- IBM Director Agent 5.20 for i5/OS
- i5/OS Universal Manageability Enablement 5722-UME, which acts as a Platform Agent
- Agentless support (only discovery, remote session, and a limited subset of the Agent Installation Wizard task)

There is, however, no IBM Systems Director 6.1 Common Agent for IBM i.

IBM Director Agent 5.20 for i5/OS, when managed by IBM Systems Director 6.1, has the following restrictions:

- The Agent Installation Wizard cannot be used to install subagents.
- Configuration Manager: Only operating system configuration plug-ins are supported.
- Update Manager: Only IBM i operating system updates are supported.

Refer to the *IBM Systems Director for IBM i Planning, Installation, and Configuration Guide* at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqp0_bk_install_gde_ibmi.pdf

This guide provides detailed instructions to install and configure each component of IBM Systems Director on systems running IBM i using the Standard installation option.

4.7 Installing Platform Agent

You can install Platform Agent by downloading the installation files from the IBM Systems Director support Web site or by using the CD. You can install Platform Agent in one of three ways:

- Performing a standard installation by using the wizard in a standard interactive mode
- Performing an unattended installation by using a response file, as we described in the Common Agent examples in 4.6, “Installing Common Agent” on page 210
- Pushing the Platform Agent remotely using the Agent Installation Wizard, as we described in 4.6.1, “Pushing agents from the management server” on page 211

Topics in this section are:

- 4.7.1, “Platform Agent on Windows” on page 233
- 4.7.2, “Platform Agent on Linux System x and Power Systems” on page 234

Note: Systems running AIX require Common Agent to be installed. These systems cannot be managed with Platform Agent.

With IBM i, Platform Agent managed system support is provided by the i5/OS 5722-UME product. For further information refer to 4.6.6, “Managing Power Systems running IBM i” on page 232.

4.7.1 Platform Agent on Windows

To use the InstallShield wizard to install Platform Agent on a system that is running Windows, get the following installation files:

- Dir5_20_31_Platform_Agent_Windows.zip
- Dir5_20_31_Platform_Agent_Windows.tcdriver (agent package for Agent Installation Wizard installation)

Run the command **`dir5.20.3_coreservices_windows.exe`**. The installation is a standard MSI installation. Follow the standard prompts until the installation completes.

4.7.2 Platform Agent on Linux System x and Power Systems

To install Platform Agent on a system that is running Linux System x or on Power Systems, download the installation files from the IBM Systems Director support Web site or use the DVD. You can perform a standard installation or you can use a response file to customize the installation for your environment.

The Platform Agent has different kind of packages to be used during the installation process:

- Platform Agent for Linux on Power Systems
  - Dir5_20_3_Platform_Agent_Linux_Power.tar.gz
  - Dir5_20_3_Platform_Agent_Linux_Power.tcdriver (agent package for Agent Installation Wizard installation)
- Platform Agent for Linux on System x
  - Dir5_20_31_Platform_Agent_Linux_x86.tar.gz
  - Dir5_20_31_Platform_Agent_Linux_x86.tcdriver (agent package for Agent Installation Wizard installation)

To unzip and extract the contents of the installation package, type the following command:

```
gzip -cd <package_name> | tar -xvf -
```

Where <*package_name*> is the file name of the download package.

Optionally, modify the `coresvcs.rsp` response file to customize the installation. This file is fully commented.

To install the Platform Agent for Linux on a Power platform, use either of the following commands:

```
agentlinux/cs5.20.3_agent_linppc.sh
agentlinux/cs5.20.3_agent_linppc.sh -r /directory/response.rsp
```

To install the Platform Agent for Linux on System x, use either of the following commands:

```
agentlinux/dir5.20.3_coreservices_linux.sh
agentlinux/dir5.20.3_coreservices_linux.sh -r /directory/response.rsp
```

Use the first variation of the command in either case to accept the defaults during installation. Use the second variation to use the response file for a custom installation.

The Platform Agent is started automatically when installation completes.

4.8 Uninstalling IBM Systems Director components

This section describes how to uninstall IBM Systems Director and its components from your system. Before you begin ensure that you uninstall any IBM Systems Director extensions before using these methods to uninstall IBM Systems Director Server, Common Agent, or Platform Agent. For more information see the uninstallation instructions provided with each extension.

Consider retaining the configuration data when you uninstall IBM Systems Director. This enables you to reinstall or upgrade IBM Systems Director and access the saved configuration data. Should you reinstall, be sure to reinstall IBM Systems Director in the same location.

Note: In the IBM i, Platform Agent managed system support is provided by the i5/OS 5722UME product, which is part of the Universal Manageability Enablement (UME) in the base operating system. HMC and IVM also include this capability, and there is not a Platform Agent uninstalling process for it.

4.8.1 Uninstalling IBM Systems Director on Windows

Uninstall IBM Systems Director 6.1 by using either the Windows Add or Remove Programs feature or a command-line prompt. You can use either of these methods to uninstall IBM Systems Director Server, Common Agent, and Platform Agent.

The command-line tool to uninstall IBM Systems Director is **`isduninst`** and is used as follows:

```
<install_root>\bin\isduninst directorcomponent option
```

Refer to the IBM Systems Director Information Center for details on switches available for this command. The Information Center can be found at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.install_6.1/fqm0_t_uninstalling_ibm_director_using_the_dirunins_command.html

4.8.2 Uninstalling IBM Systems Director on AIX or Linux

Use the **`diruninstall`** command to uninstall IBM Systems Director and its components on AIX, Linux for System p, Linux for System x, or Linux for System z.

Note: You can also uninstall IBM Systems Director on Linux using standard RPM commands or on AIX using the System Management Interface Tool (SMIT).

The **diruninstall** command is located in the *install_root*/bin directory, where *install_root* represents the root directory of your IBM Systems Director installation. By default, this command removes all IBM Systems Director components, but you can modify the script to remove specific components. The following files are not removed in case other applications need them:

- openssl.base (on AIX)
- sysmgt.cimserver.pegasus (on AIX)
- sysmgt.cim.providers (on AIX)
- sysmgt.cim.smisproviders (on AIX)
- tivoli.tivguid (on AIX) and TIVguid-1.3.0-0 (on Linux)
- cas.agent (on AIX)

Complete the following steps to uninstall IBM Systems Director and all of its components:

1. Type the following command and press Enter:

   ```
   install_root/bin/diruninstall
   ```

2. (Linux only) Ensure that the installed RPM packages were removed by executing the following command:

   ```
   rpm -qa --last | less
   ```

Note: The TIVguide package is not automatically removed in case it is needed by another product. If you determine that it is not needed elsewhere, use the following command to remove it manually:

```
rpm -e TIVguid
```

When you uninstall packages on AIX or Linux, the /etc/ibm/director/twgagent/twgagent.uid file is retained to make it possible to restore persistent data. Use the information in the following link to clean up after a failed IBM Systems Director installation or uninstallation:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.tbs_6.1/fqm0_r_tbs_ibm_director_uninstallation_fails.html

Note: When uninstalling Director 5 in order to install an earlier version of IBM Systems Director, ensure that you uninstall all instances of Platform Agent. On managed systems running Microsoft Windows, versions of IBM Systems Director previous to 5.20 cannot detect whether Platform Agent is installed. As a result, the pre-5.20 installation will not provide any indication that an IBM Systems Director 5.20 component is present.

5

Web interface

IBM Systems Director now provides a Web interface as the console. This is different from the previous versions of IBM Director, which used a Java interface. The Web interface enables you to view all your resources and use tasks to manage your environment.

This chapter contains the following information about the IBM Systems Director Web interface:

5.1 Supported Web browsers

The Web interface requires that you use a supported Web browser. The following Web browsers are supported for use with the IBM Systems Director Web interface:

- Firefox versions
  - Firefox 2.0
  - Firefox 3.0

  Note: Firefox 3.0 is the minimum required version on SUSE Linux Enterprise Server 10.

- Microsoft Internet Explorer versions
  - Microsoft Internet Explorer 6.0
  - Microsoft Internet Explorer 7.0

  Note: At time of writing, the plan to support Microsoft Internet Explorer v8.0 was targeted for 1st Quarter 2009. This target date is subject to change without notice.

5.2 Logging into and out of the Web interface

In order to log into the IBM Systems Director Web interface and log out of the Web interface, follow the steps in this section.

5.2.1 Logging into the Web interface

To log into the IBM Systems Director Web interface you must open a Web browser.

1. Open the browser and point the browser to the following URL:

   `http://system_name:port_number/ibm/console`

   Where:

   - *system_name* is the host name (or IP address) of the system on which IBM Systems Director Server is installed.
   - *port_number* is the first (lower) of two consecutive port numbers that you configured the Web server to use during installation. (Default ports for the Web server are 8421 for http and 8422 for https.)

Note: If you prefer to use SSL for security, use the second port (by default port 8422) and use https in the URL:

`https://system_name:port_number/ibm/console`

2. Figure 5-1 appears. Enter the user ID and password corresponding to an authorized IBM Systems Director administrator user ID and password and click **Log in**.

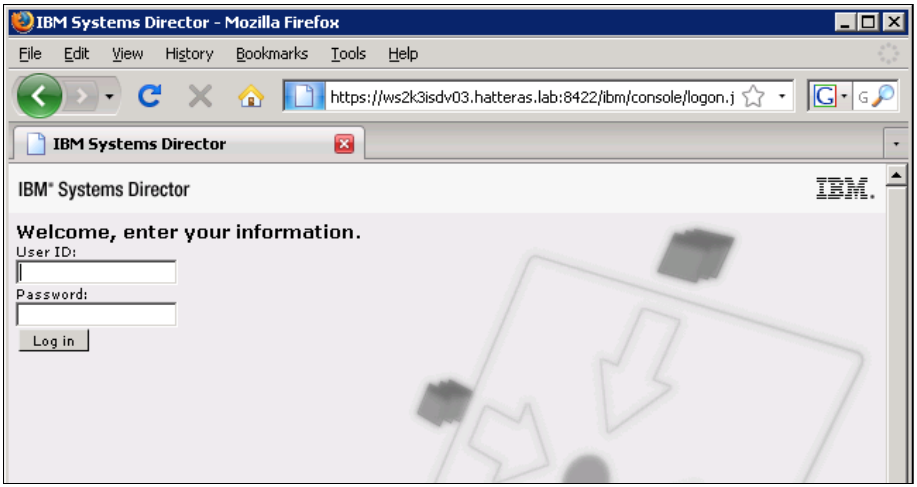


Figure 5-1 Web interface login window

Note: A security alert window might be displayed before logging in. This is due to an incorrect configuration of the Secure Socket Layer (SSL) certificate. For details about configuring SSL between IBM Systems Director and the Web browser, see 3.9, “Managing Agent Manager credentials” on page 150.

3. The first time that you log in you will be presented with the welcome shown in Figure 5-2 on page 242. The IBM Systems Director Welcome page is used to complete first-time setup steps to make sure that IBM Systems Director and its plug-ins are set up and configured to manage your environment. See 5.3, “Layout of the Web interface” on page 243, for a description of the various areas in the Web console.

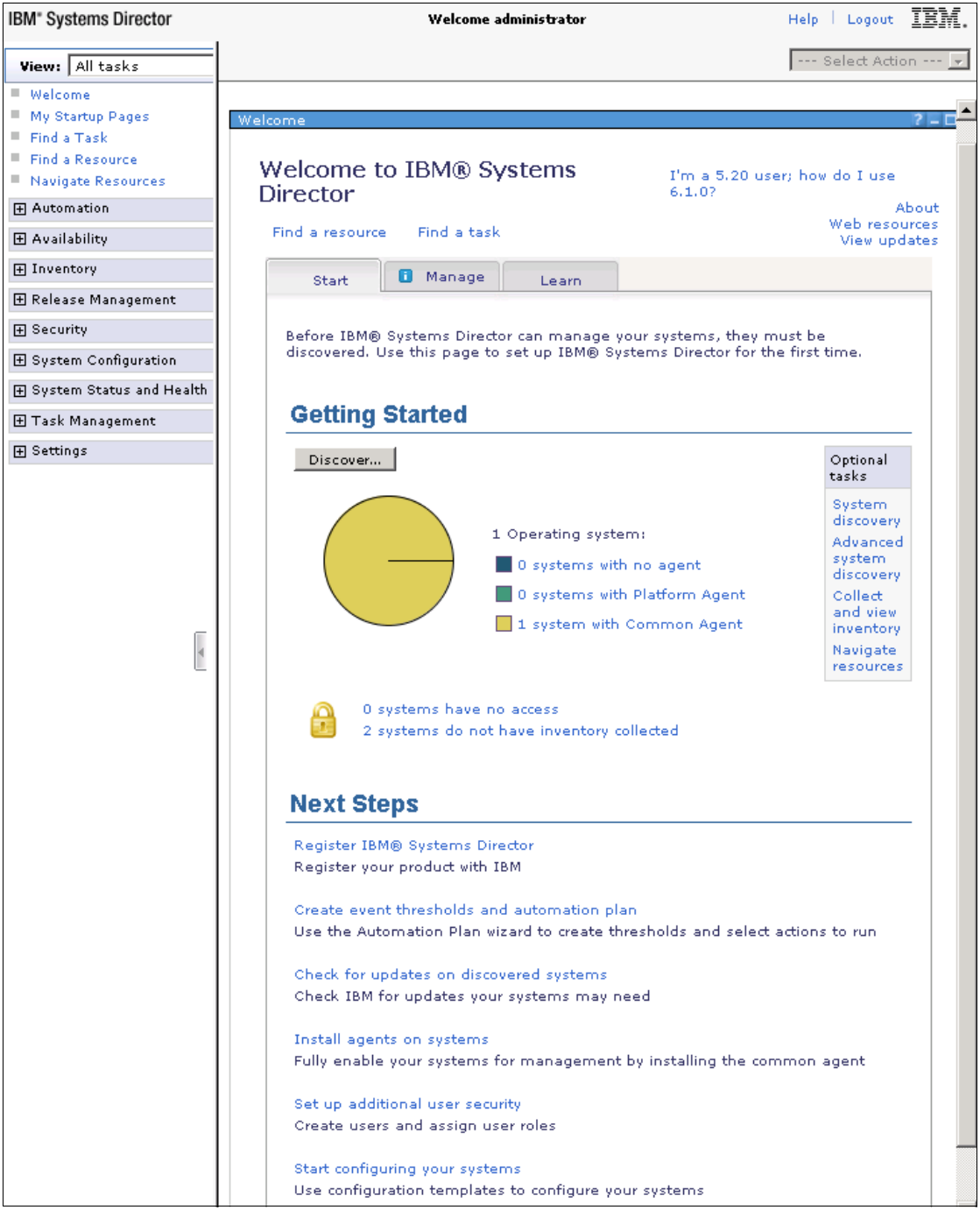


Figure 5-2 IBM Systems Director welcome view at initial login

5.2.2 Logging out of the IBM Systems Director interface

To log out of the IBM Systems Director Web interface locate the link in the top right corner of the Web interface and click **Logout**. See ❻ in Figure 5-3. This logs you out of the IBM Systems Director server Web interface.

Note: If you do not actively use the IBM Systems Director Web interface for 30 minutes, the automatic timeout feature logs you out.

5.3 Layout of the Web interface

The IBM Systems Director Web interface provides tasks and unique views to help you manage your environment. The Web interface is divided into six areas, which are highlighted in Figure 5-3.

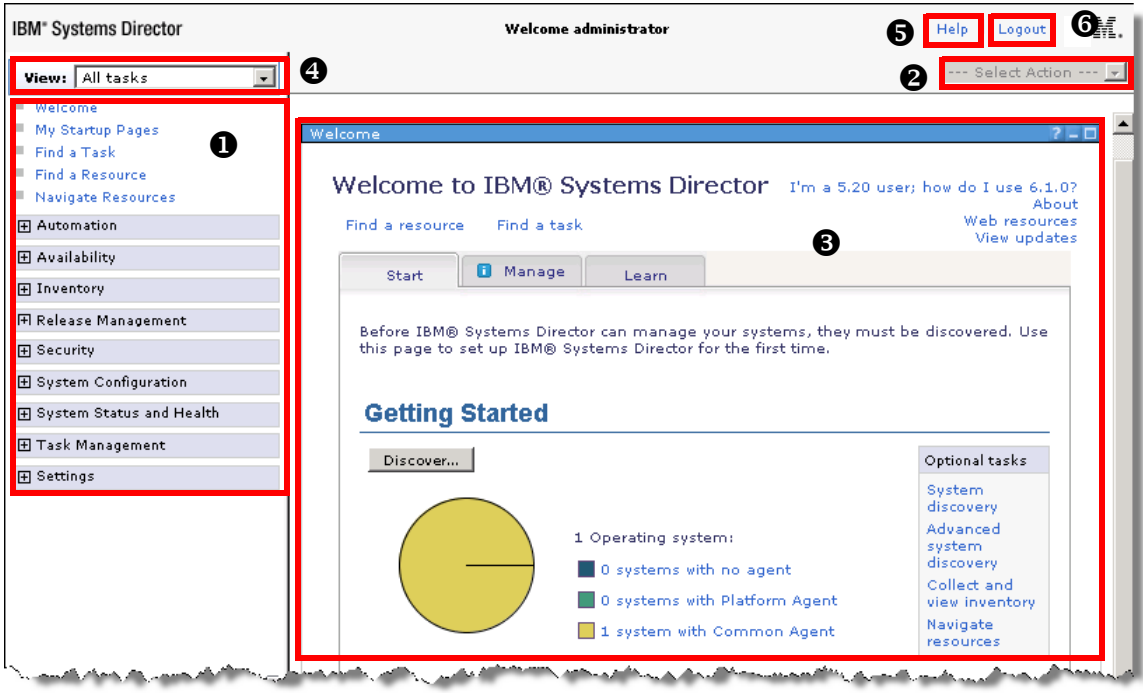


Figure 5-3 Web interface layout

The areas in Figure 5-4 on page 245 are:

❶ Navigation area: The navigation area of IBM Systems Director Web interface provides categories of tasks that can vary depending on your IBM Systems Director installation. The navigation provides links to that you can perform on your resources. Examples of typical tasks are navigate resources, inventory, health summary, automation, and settings.

❷ Select Action pull-down: This list provides the following ways to work with task pages:

- My Startup Pages: Customizes the pages that are started automatically when you log into IBM Systems Director, the page that is displayed first of these automatically started pages, and the default navigation area view. For more information see 5.4.2, “Customizing My Startup Pages” on page 247.
- Manage Open Pages: Provides a way to manage and close one or more open pages.
- Close Page: Closes the page that you are viewing.

❸ Content area: When you open the Web interface, by default you see the Welcome page for IBM Systems Director in the content area. The content area changes depending on the item that you select in the navigation area. You can customize aspects of the content area using the Navigation Preferences.

❹ View list: See 5.4.1, “Customizing the navigation area” on page 245.

❺ Help: Displays the help information for IBM Systems Director.

❻ Logout: Logs you out of the IBM Systems Director Web interface.

5.4 Customizing the Web interface

The IBM Systems Director Web interface provides options and settings that you can use to customize the Web interface to meet your specific needs.

The My Tasks feature provides a way to customize the tasks that are displayed in the navigation area. By saving task pages to My Startup Pages, you can set one or more pages to open automatically when you log into IBM Systems Director, including a setting for the default page that is displayed first among all of the automatically started pages. Also, you can set the view that is displayed in the navigation area. You can also hide the navigation area to increase the size of the contents viewable area.

5.4.1 Customizing the navigation area

The navigation area of the IBM Systems Director Web interface provides categories of tasks that can vary depending on your IBM Systems Director installation. The navigation area provides links to tasks that you can perform on your resources. Examples of typical tasks might include navigate resources, inventory, health summary, automation, and settings. On the tasks menu there are three options, as shown in Figure 5-4.

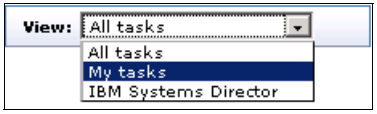


Figure 5-4 Task options for IBM Systems Director

The My tasks feature provides a way to customize the tasks that are displayed in the navigation area. By default this view is empty, as shown in Figure 5-5.

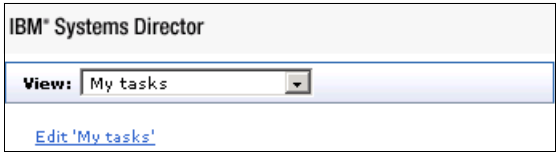


Figure 5-5 Default view for my tasks

To add tasks available to My tasks:

1. Select **My tasks** from the drop-down options, as shown in Figure 5-4.
2. Click link **Edit "My Tasks"**.

The tasks option view is shown in the contents area, as shown in Figure 5-6.

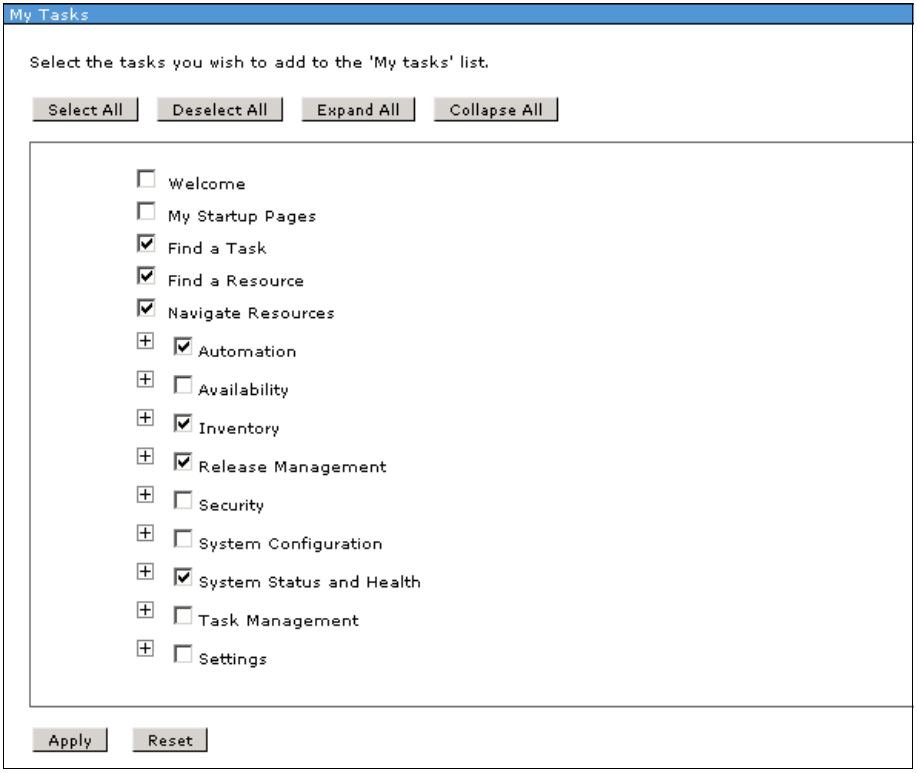


Figure 5-6 Tasks available to choose

3. Select the available tasks required and click **Apply**.

The tasks selected now appear in the tasks list on the left, as seen in Figure 5-7.

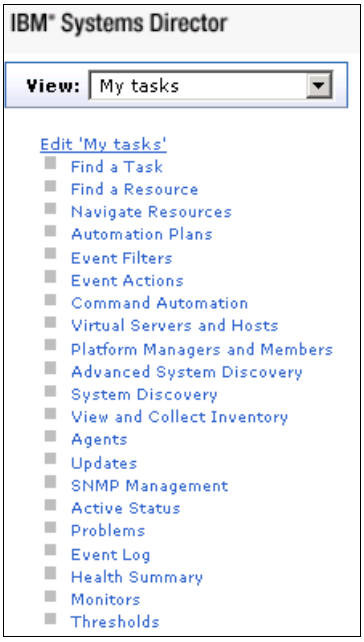


Figure 5-7 My tasks selected

5.4.2 Customizing My Startup Pages

By saving task pages to My Startup Pages, you can set one or more pages to open automatically when you log in to IBM Systems Director, including a setting for the default page that is displayed first among all of the automatically started pages.

Adding pages to My Startup Pages

To customize My Startup Pages:

1. Select the **My Startup Pages** link from the navigation area. The My Startup Pages window opens in the contents area of the Web interface, as seen in Figure 5-8.

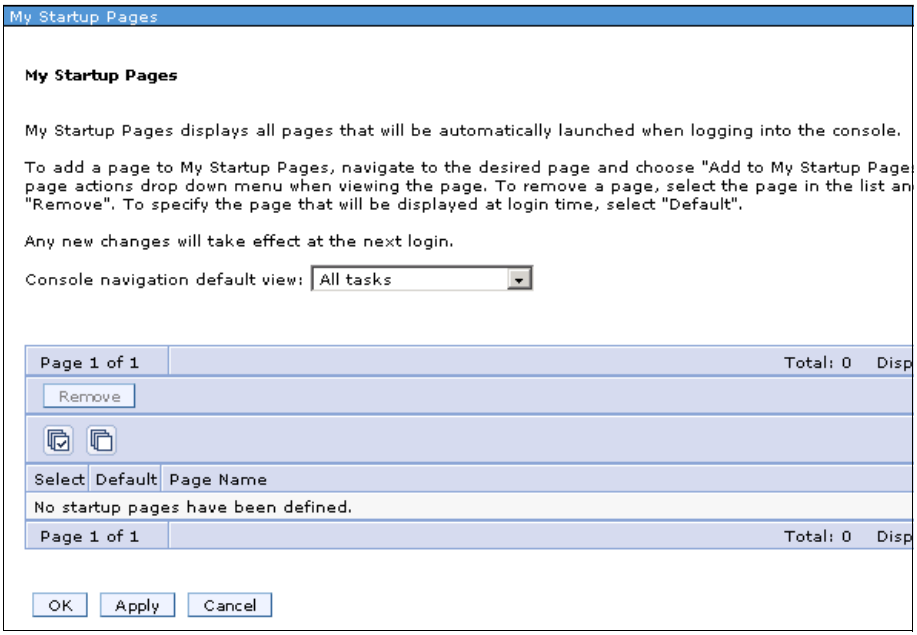


Figure 5-8 My Startup Pages view

2. From this view you can select the default navigation view that you want, which will display by default in the navigation area the next time that you log in. Click **Apply** and then click **OK** to close the My startup Pages view.
3. To add a page to My Startup Pages, navigate to the desired page and select **Add to My Startup Pages**. In our example we want to add Navigate Resources and Health Summary to My startup pages.
   a. To add Navigate resources to My Startup Pages locate and select **Navigate Resources** in the Navigation area. The Navigate Resources view opens in the contents area.

b. From the Select Action List located in the upper-right corner of the Web interface content area, select **Add to My Startup Pages**, as shown in Figure 5-9.

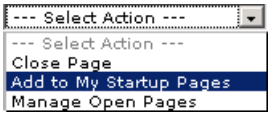


Figure 5-9 Action list: Selecting Add to My Startup Pages

c. You are prompted via the view in Figure 5-10 to confirm your request. Click **OK**.

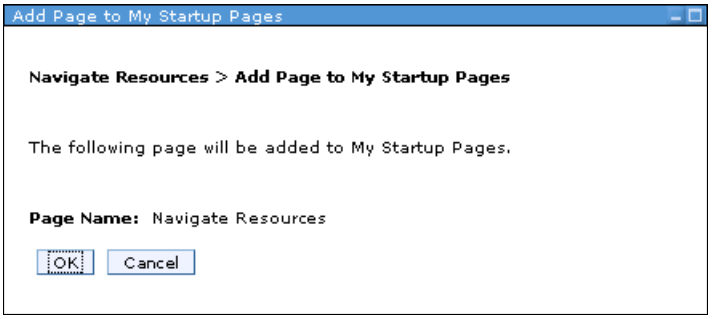


Figure 5-10 Confirming request to add Navigate Resources to My Startup Pages

d. Expand **System Status and Health** from the navigation area and click **Health Summary**. The Health Summary window opens in the contents area.

e. From the Select Action List click **Add to My Startup Pages**, as shown in Figure 5-9.

f. You will be prompted via the view in Figure 5-11 to confirm your request. Click **OK**.

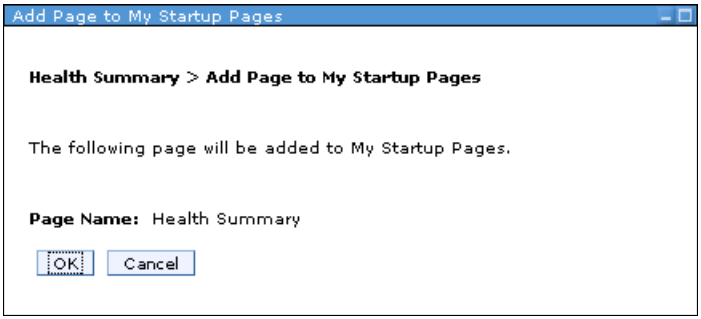


Figure 5-11 Confirming request to add Health Summary to the Startup Pages

g. Click **My Startup pages** in the Navigation area, You now see the pages listed, as shown in Figure 5-12.

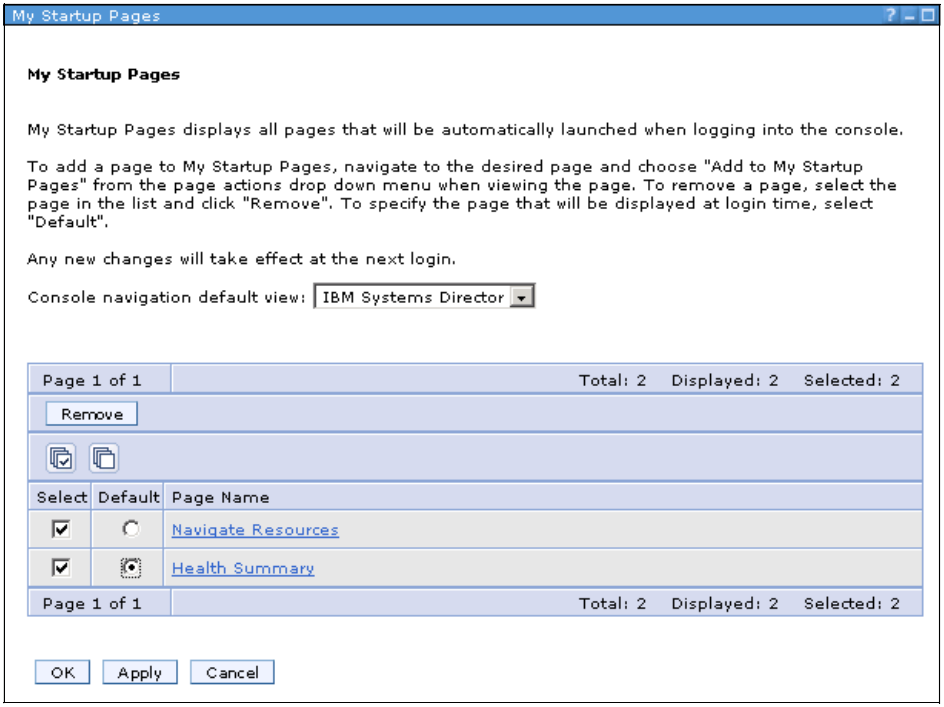


Figure 5-12 Updated My Startup view

h. Make the selection for the default view to be shown at login and click **Apply**.

i. Click **OK** to confirm and close the My Startup pages view.

j. The next time that you log in you will see these two pages open in the contents area, with the default view showing the page that you selected, as shown in Figure 5-13.

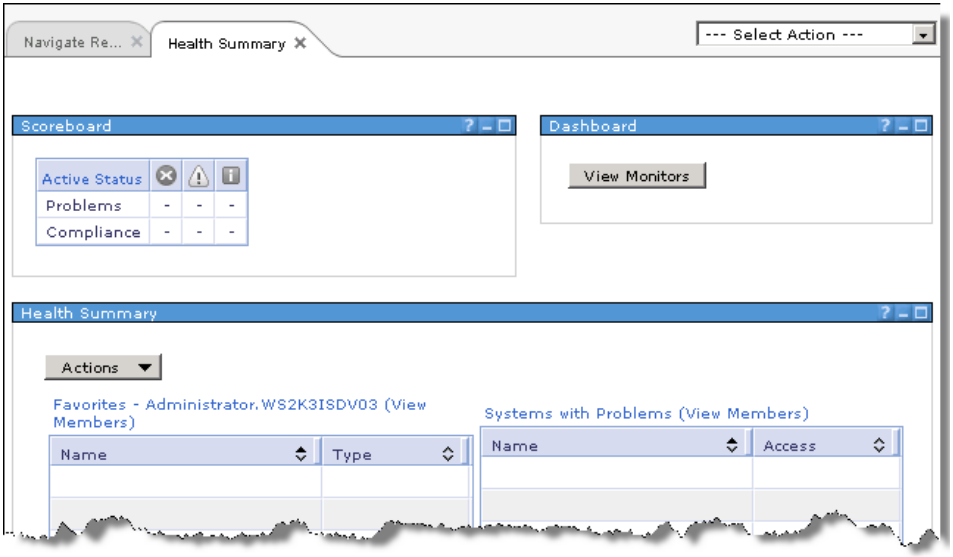


Figure 5-13 My Startup Pages at next logon showing default view

Removing pages from My Startup Pages

To do this:

1. Select the **My Startup Pages** link from the navigation area. The My Startup Page window opens in the contents area of the Web interface, as seen in Figure 5-8 on page 248.
2. To remove a page, select the page in the list and click **Remove**. To modify the default view at any time, specify the page that will be displayed at login and select the **Default** radio button.
3. Click **Apply**.
4. Click **OK** to confirm, which closes the My Startup Pages view.

5.4.3 Hiding the Navigation area

To maximize, increase, or decrease the contents view, there is also the option to hide the navigation view or reduce or increase the size of the Navigation view. To achieve this:

1. Locate the slide bar, as shown in Figure 5-14.

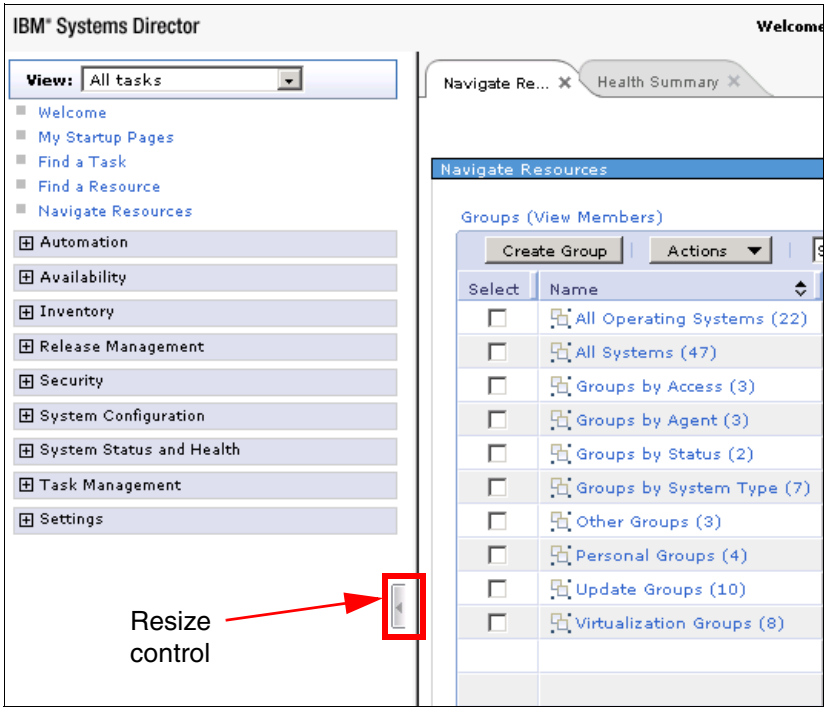


Figure 5-14 Navigation view resize option

2. To increase the Navigation area, drag the  to the right.
3. To decrease the Navigation area, drag the  to the right.
4. To hide the Navigation area, select the arrowhead  .

5.4.4 Managing and closing open pages in the Web interface

The IBM Systems Director Web interface provides several ways to manage and close open pages.

The Web interface provides page controls in the upper-right corner in the Select Action list. Also, when you have more page tabs than can be displayed in the width of the Web interface, an arrow is displayed that you can click to view the additional tabs, as shown in Figure 5-15. The arrow only appears if there are more pages than the interface can show. It disappears if the maximum has not been reached.

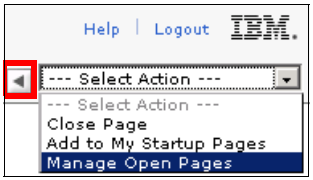


Figure 5-15 Web interface page navigation via arrow and action list

To manage and close open pages:

1. In the IBM Systems Director Web interface, click **Manage Open Pages** from the Select Action list. This opens the Manage Open Pages view, as shown in Figure 5-16.

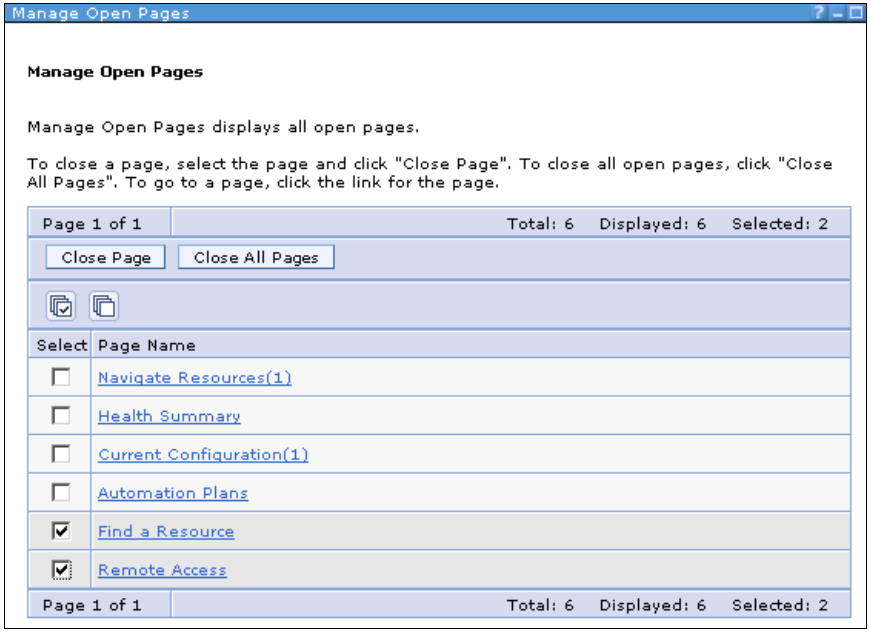


Figure 5-16 Manage Open Pages view

2. On the Manage Open Pages page, you can close all pages by clicking **Close all Pages**, close selected pages by selecting one or more pages and clicking

Close Page, or view a selected page by clicking the page URL link listed under Page Names.

3. To close a page that you are viewing, click **Close Page** from the Select Action list, as shown in Figure 5-17. Or you can also close a page by clicking the **X** on the page tab, as shown in Figure 5-18. The X is visible on all tabs.

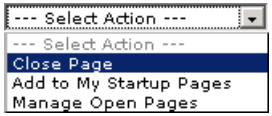


Figure 5-17 Close Page option

Figure 5-18 Close a tab by clicking the X

When applicable on some pages, click **OK** or **Cancel** on the page, which also results in the closure of the page.

5.5 Navigating within the Web interface

This section describes the various ways to navigate the Web interface. We discuss the following methods:

- 5.5.1, “Navigating via the Welcome Page” on page 254
- 5.5.2, “Accessing help from within the Web interface” on page 260
- 5.5.3, “Breadcrumb trail” on page 261
- 5.5.4, “Using IBM Systems Director search options” on page 262

5.5.1 Navigating via the Welcome Page

Use the IBM Systems Director Welcome page to complete:

- First-time setup steps
- Steps to make sure that IBM Systems Director and its plug-ins are set up and configured correctly
- Steps to manage your environment from plug-in summary pages
- Ways to access tutorials to expand your skills with IBM Systems Director

The Welcome page contains the following tabs:

- Start tab
- Manage tab
- Learn tab

Start tab

The Start tab:

- Provides the getting started tasks to perform initial discovery in your systems-management environment
- Requests access to your discovered resources
- Collect inventory from your resources, as shown in Figure 5-19 on page 256

You can use the Next Steps area of the Start page, also shown in Figure 5-19 on page 256, to guide you through which actions to perform after the initial discovery of your environment.

Note: A user must have the AllPermission permission to view this page. Otherwise, it is not displayed.

Figure 5-19 Getting Started content in the Start Page

Manage tab

After the initial discovery is completed, the Manage tab is displayed by default when you view the Welcome page. The Manage tab provides information that you can use to determine whether IBM Systems Director and its plug-ins are installed correctly and ready to use, as shown in Figure 5-20 on page 257.

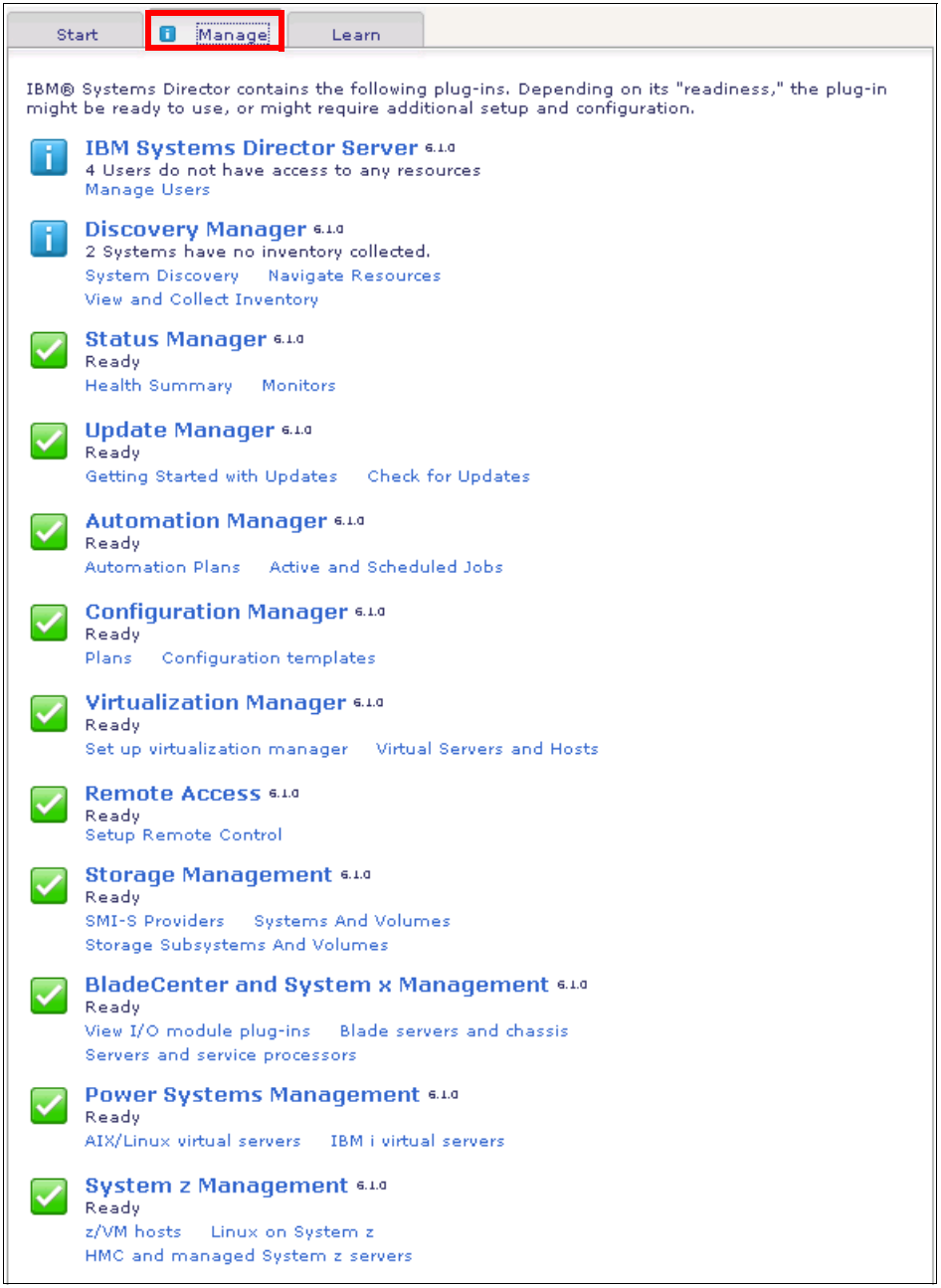


Figure 5-20 The Manage page view

Note: The term *plug-in* refers not only to management function that can be added to IBM Systems Director after initial installation, but also to the multiple *manager* functions that come preinstalled in the base IBM Systems Director product.

The message and icon associated with each plug-in changes based on whether the plug-in is ready to use. The icons detailed beside each Manager help you see whether the manager or plug-in is in one of the following states:

Ready: The manager or plug-in is correctly installed, configured, and ready to use.

Setup Required: The plug-in is not set up correctly or the setup is currently incomplete. A message and additional links are displayed providing information about any required setup, such as additional configuring, enabling of firewall support, identifying applicable types of servers required by that plug-in, or other setup activities that you must perform to complete configuration of the plug-in, as shown in Figure 5-21. In this case, inventory must be collected on discovered systems.

Figure 5-21 Setup-required state showing action required

Once the Collect Inventory task has been run and has completed, click **Refresh** located at the bottom of the Manage page and the icon next to Discovery manager will change to ready, as shown in Figure 5-22.

Figure 5-22 Status now set to ready

Error Connecting: The plug-in has failed to connect to the applicable destination, which might be the management server, a Web site, or another destination.

Collecting Data: The process to determine whether a plug-in is ready to use has started and might take a long time. To determine when the plug-in is ready, click **Refresh** (located at the bottom of the page), and if the plug-in is ready the status icon will change.

The links provided for each plug-in include the plug-in summary page, on which you have quick access to your environment's data and applicable tasks. Under this main link is the status description and smaller URL links to plug-in specific tasks. These can be seen in Figure 5-21 on page 258, Figure 5-22 on page 258, and Figure 5-20 on page 257.

Learn tab

To aid the user further, IBM Systems Director provides a list of available tutorial links via the Learn tab, as shown in Figure 5-23. Each link opens a tutorial section in the IBM Systems Director Information Center located at:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director_6.1/fqm0_main.html

Tip: For more information about each tutorial listed you can hover over each link in turn and a description for that particular tutorial will be displayed. For example, in Figure 5-23, the mouse is hovering above the Monitoring Systems link.

Figure 5-23 Learn tab with mouse hovering over the Monitoring Systems link

5.5.2 Accessing help from within the Web interface

The IBM Systems Director Web interface provides several ways to view help:

- In the IBM Systems Director Web interface, click **Help** in the upper-right hand corner of the Web interface. The IBM Systems Director help system opens in a new Web browser window titled Help, as shown in Figure 5-24. You can search the online help resource for any aspect of IBM Systems Director.

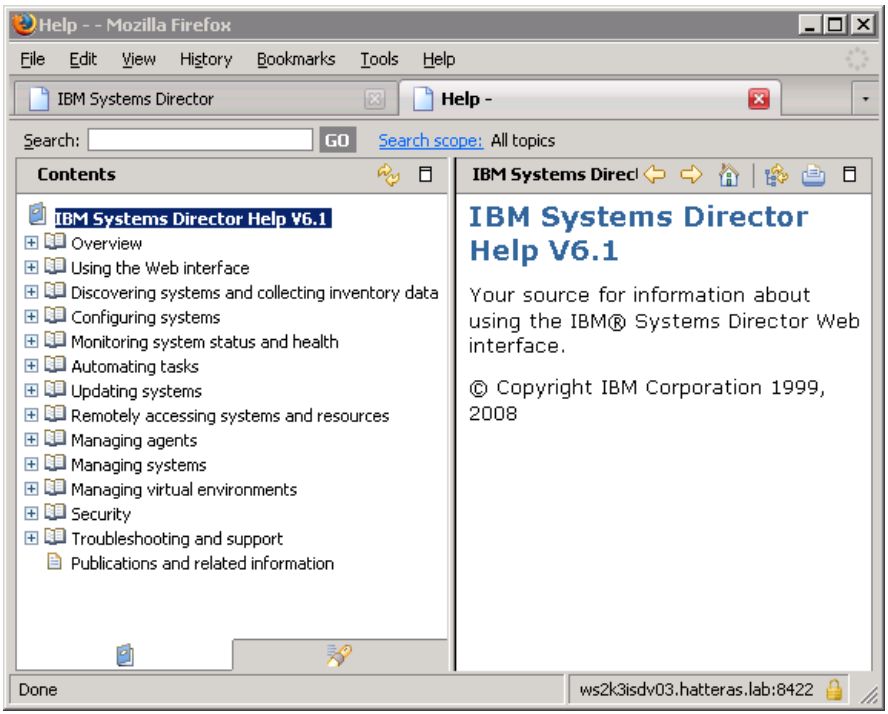


Figure 5-24 Help browser

- To locate help when in a task page, click the question mark (**?**) in the upper-right hand corner of the page, as shown in Figure 5-25.

Figure 5-25 Accessing help within task page

This provides help and information specific to the tasks page that you are currently viewing.

- In a task window or wizard, click **?** in the upper-right hand corner of the window or wizard, as shown in Figure 5-26 on page 261.

Figure 5-26 Accessing help within a task wizard

- When applicable, click the **Help** option on the page.

5.5.3 Breadcrumb trail

As you navigate from one resource to another or drill down from a resource to its subcomponents, a *breadcrumb trail* is displayed at the top of the page as a navigational signpost.

Tip: Breadcrumbs are a navigation technique used within user interfaces. Its purpose is to give users a way to keep track of the pages that they have visited, providing an easy way to return to them.

The breadcrumb trail is extended each time you drill down. If you navigate to a related resource, the breadcrumb trail is updated to the current location. The last link in the path identifies your current location in the resource navigation. As shown in Figure 5-27, we see the breadcrumb trail forming above the table, providing an easy way to get back to the previous location.

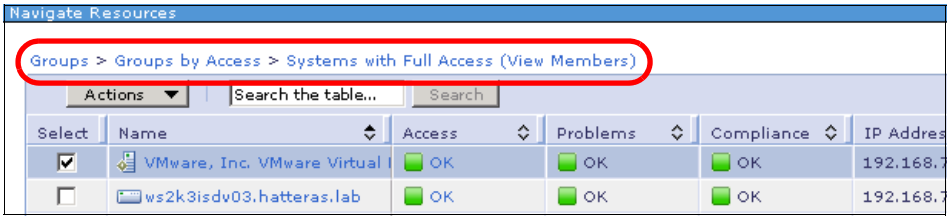


Figure 5-27 Example of the breadcrumb trail

In addition, if you right-click the right-most link in the breadcrumb trail (that is, **Systems with Full Access (View Members)** in Figure 5-27 on page 261), a menu is displayed. This menu provides the same options as the Actions menu at this current location. See Figure 5-28.

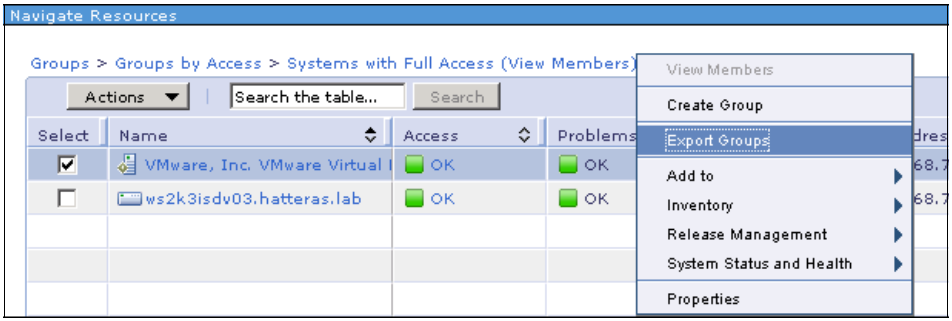


Figure 5-28 Right-clicking last link in breadcrumb trail launches Actions menu

In the following examples we detail specific resources and the pop-up menus that are displayed when you right-click the breadcrumb trail:

- When you view members of a group, the breadcrumb trail displays the menu associated with that group.
- When you view blade servers in a BladeCenter chassis, the breadcrumb trail displays the menu associated with the chassis.
- When you view a resource in a topology map, the breadcrumb trail displays the menu associated with that resource.

5.5.4 Using IBM Systems Director search options

IBM Systems Director provides a wealth of tasks that you can use to manage your systems management environment. You can quickly and easily find particular tasks or resources using the following methods:

- “Searching tables” on page 263
- “Finding a task” on page 263
- “Finding a resource” on page 266

We discuss each in the following sub-sections.

Searching tables

Within any IBM Systems Director Web interface table, you can search for a specific string in the table information. To search any table:

1. From the table view, type a string in the Search field. Any matching strings in the currently displayed table are highlighted, as shown in Figure 5-29.

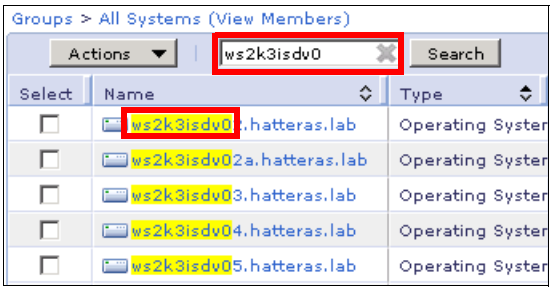


Figure 5-29 Table search for the string ws2k3isdv0

2. Once you have entered the string, click **Search**. All of the pages in the table are searched for the provided string and any rows that contain that string are displayed in a new table, as shown in Figure 5-30.

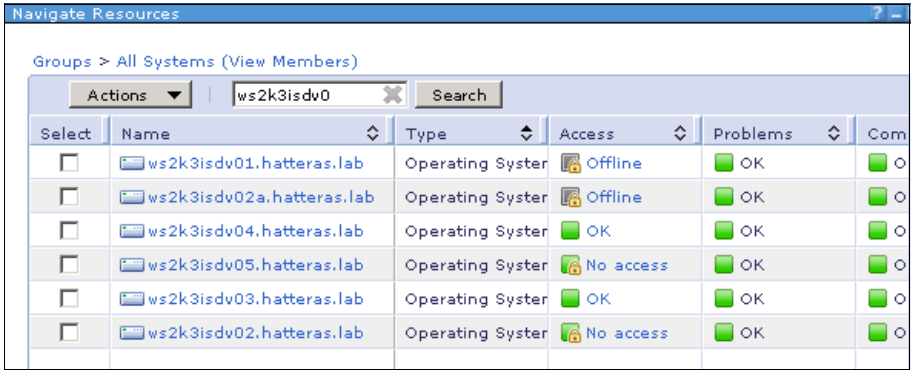


Figure 5-30 Search results for the string "ws2k3isdv0"

Finding a task

To find a task, you must be authorized to use that task. If it is a targeted task, you must also have authorization to access the systems. For more information about task and system authorization, see Chapter 3, "Security" on page 85.

To find tasks quickly in the IBM Systems Director Web interface:

1. In the Navigation area, click **Find a Task**, as shown in Figure 5-31.

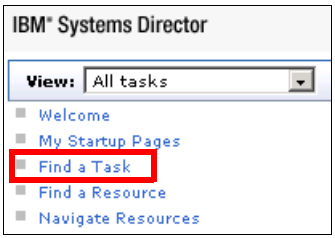


Figure 5-31 Navigation area → Find a Task

Find a Task is also available on the Welcome page, as shown in Figure 5-32.

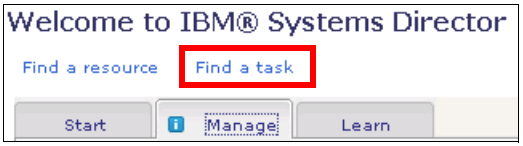


Figure 5-32 Welcome page option for Find a Task

The Find a Task page opens and displays an alphabetical list of all available tasks in your IBM Systems Director installation, as seen in Figure 5-33.

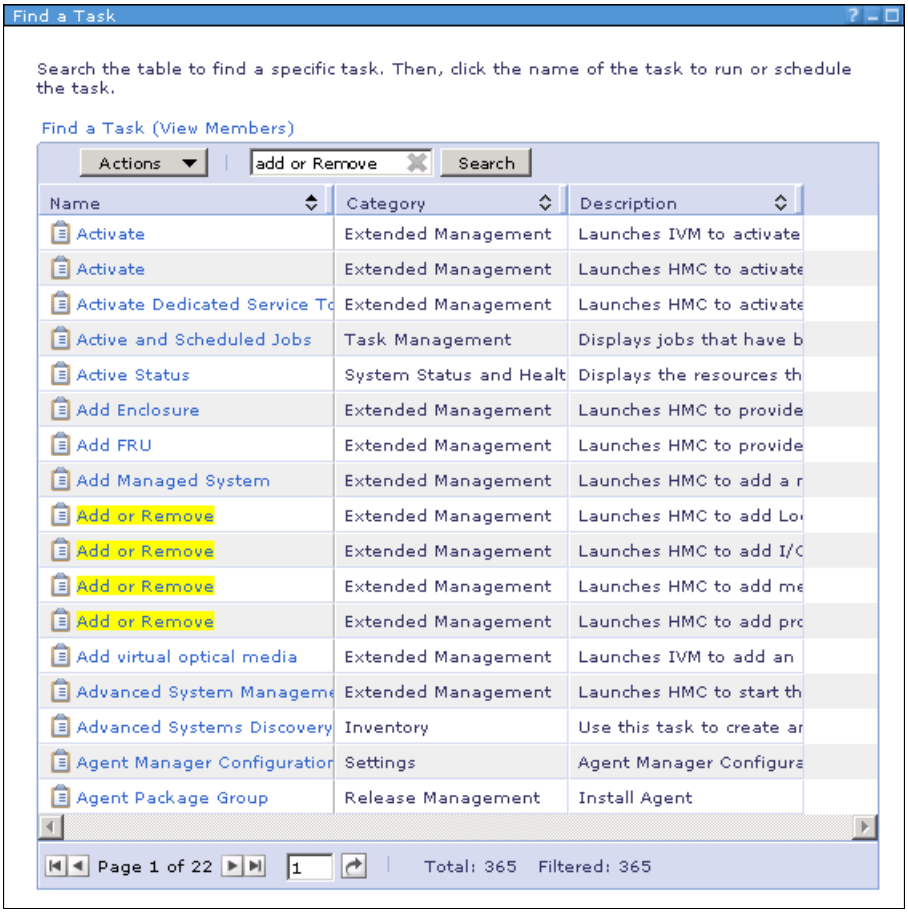


Figure 5-33 Find a Task, alphabetic view, with search string add or Remove

If you do not know the name of the task that you want, go through the Find a Task pages and view the descriptions of the tasks until you recognize the task that you want. If you know all or part of the name of the task that you want to find, type the task name in the Search field. All of the table columns are searched for the string that you enter. Any task that has the entered string in any of its columns is highlighted. This is also shown in Figure 5-33 on page 265. When you click **Search** the tasks are shown in a new table, as shown in Figure 5-34.

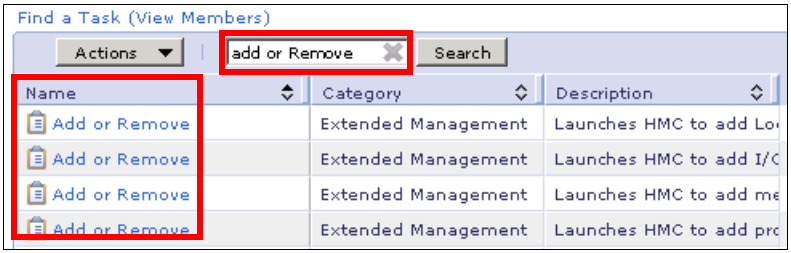


Figure 5-34 Find task results, shown in new table

2. To start any task that is found, click the task. In our example in Figure 5-34 you would select any of the tasks **Add or Remove**. Note that although four seemingly identical tasks are listed, the Description field for each makes it clear that these are four tasks that perform four entirely different functions.
3. If the task requires a resource on which to work, the task requests the resource. If the task does not require a resource, then the task opens immediately.

Finding a resource

A systems management environment can include thousands of resources. You can quickly and easily find a particular resource using the Find a Resource option. To locate resources quickly:

1. In the Navigation area, click **Find a Resource**, as shown in Figure 5-35.

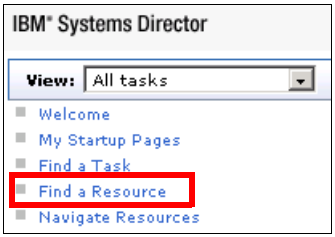


Figure 5-35 Navigation area → Find a Resource

Find a Resource is also available on the Welcome page, as shown in Figure 5-36.

Figure 5-36 Welcome page option for Find a Resource

2. In the Find a Resource field, type the name of a system and click **Find**. The first 10 results of the search are displayed below the field, as shown in Figure 5-37.

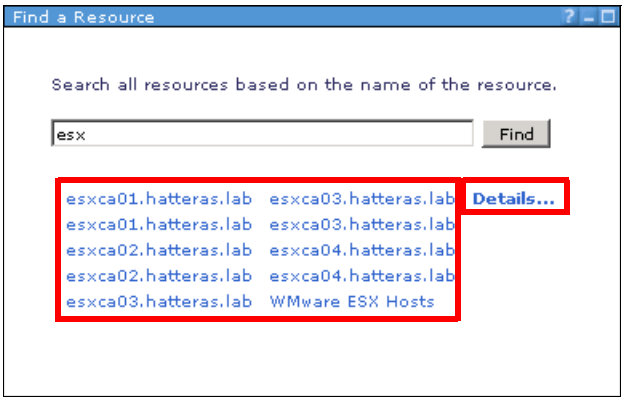


Figure 5-37 Results for Find a Resource with name esx

3. From this results view you can access the resource via different methods:
   – The Details option: To show a tabular view of the resources found click **Details** and you will see the list of resources displayed in a table, as shown in Figure 5-38.

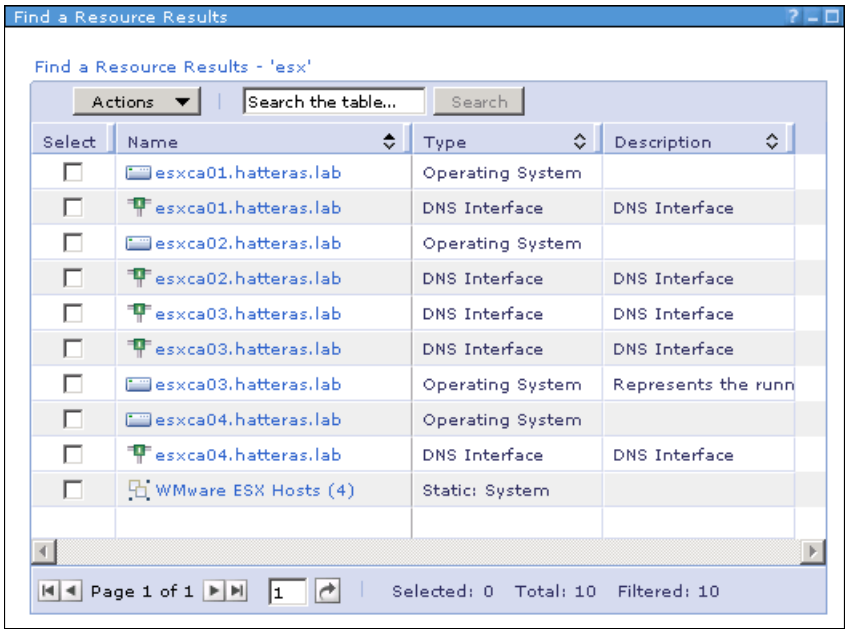


Figure 5-38 Clicking Details shows resources found in table format

– Clicking one of the resources found: You can also select one of the specific resources listed, as shown in Figure 5-37 on page 267. For example, in Figure 5-37 on page 267 we clicked the link **esxca01.hatteras.lab**, which opened the resources view shown in Figure 5-39. From this view you can look deeper into the information for the specific resource, in our case esxca01.hatteras.lab.

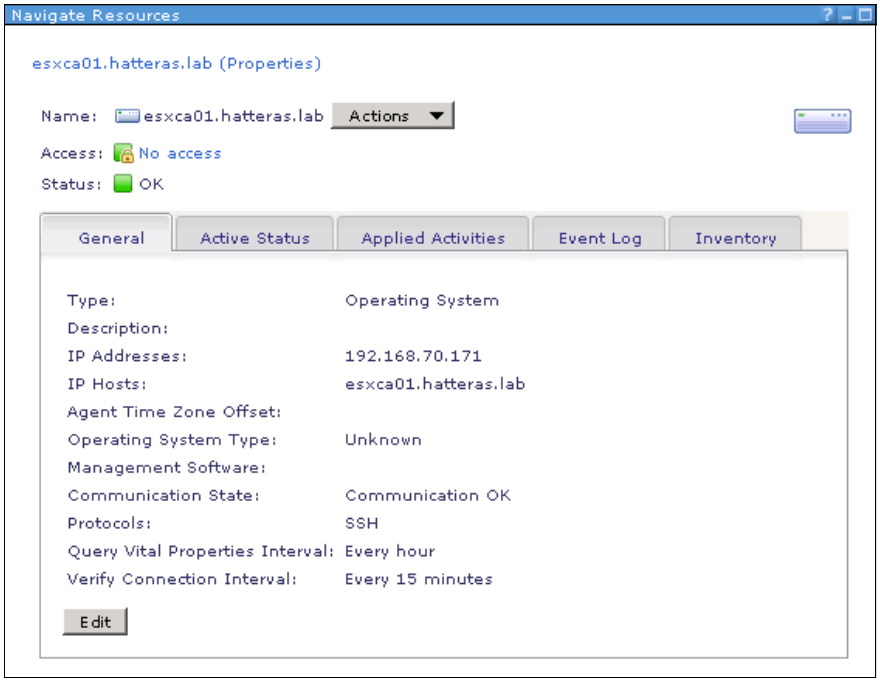


Figure 5-39 Specific resource view for esxca01.hatteras.lab

– The More option: If there are more than 10 results, a More option is displayed. To view all the search results, click **More**. A table is displayed with the search results. Alternatively, you can refine your search results.

5.6 Modifying default navigation settings

The default navigation settings are as shown in Figure 5-40. These preferences include the way that topology map palettes are displayed, the default topology and table sizes, your preferred topology icon size, and more. To open the Navigation Preferences page, go to the navigator on the home page, expand **Settings**, and click **Navigation Preferences**. Figure 5-40 appears.

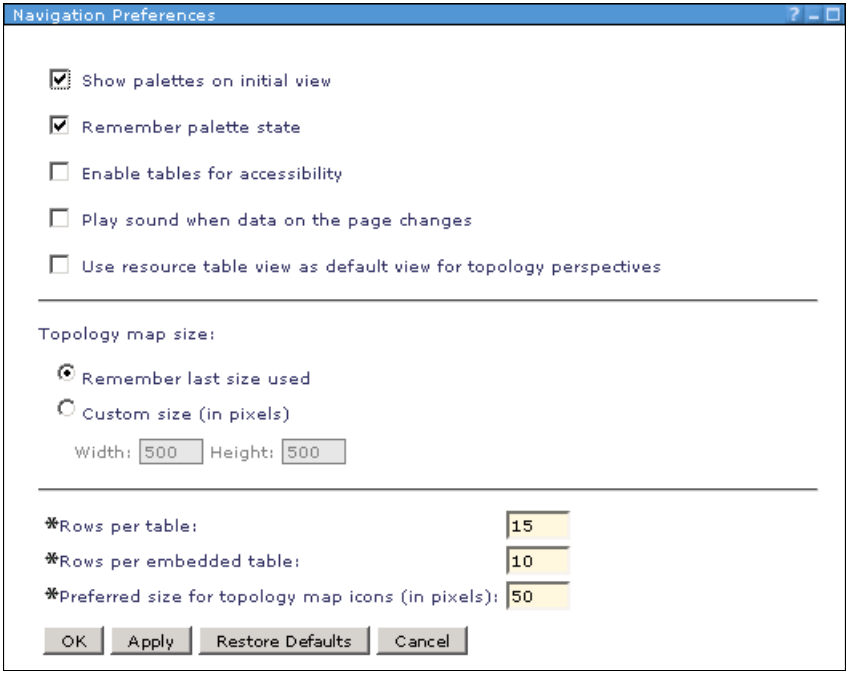


Figure 5-40 Default navigation settings

The fields that can be modified are shown in Figure 5-40 on page 270. We now describe each of the configurable navigation settings in greater detail:

- Show palettes on initial view: This option is selected by default.

  If this option is selected, the Overview, Details, and Filter palettes will be displayed in the topology map view. The default palettes are shown in Figure 5-41.

  If you deselect this option, you will see the topology map without the palettes, as shown in Figure 5-42 on page 272.

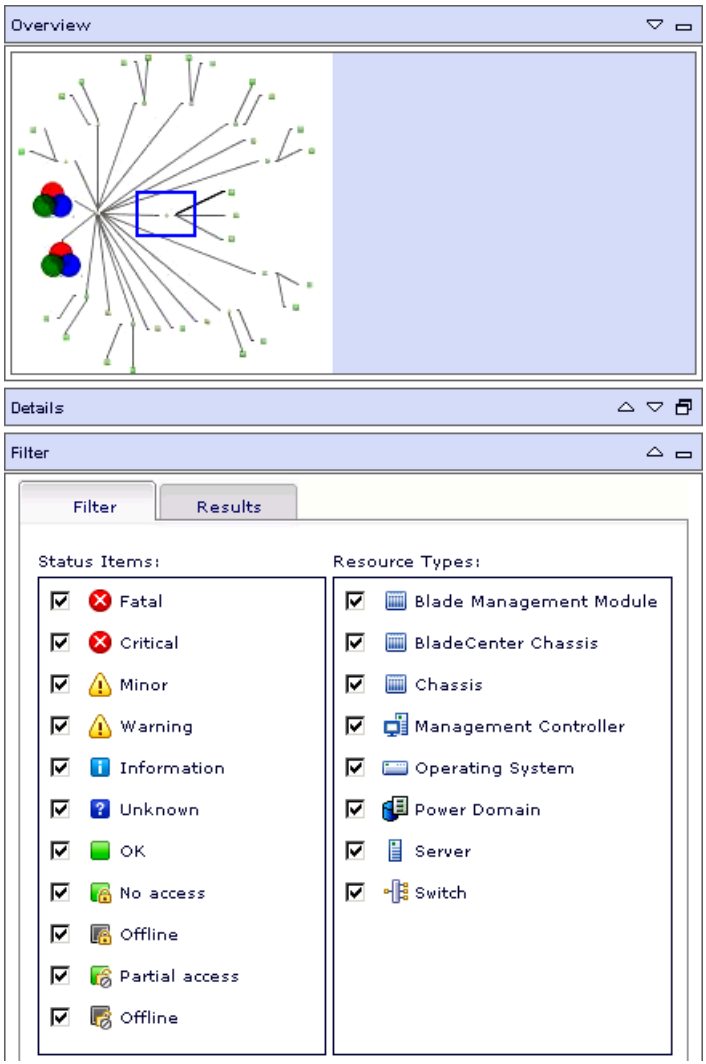


Figure 5-41 Default topology palettes (details pallet minimized)

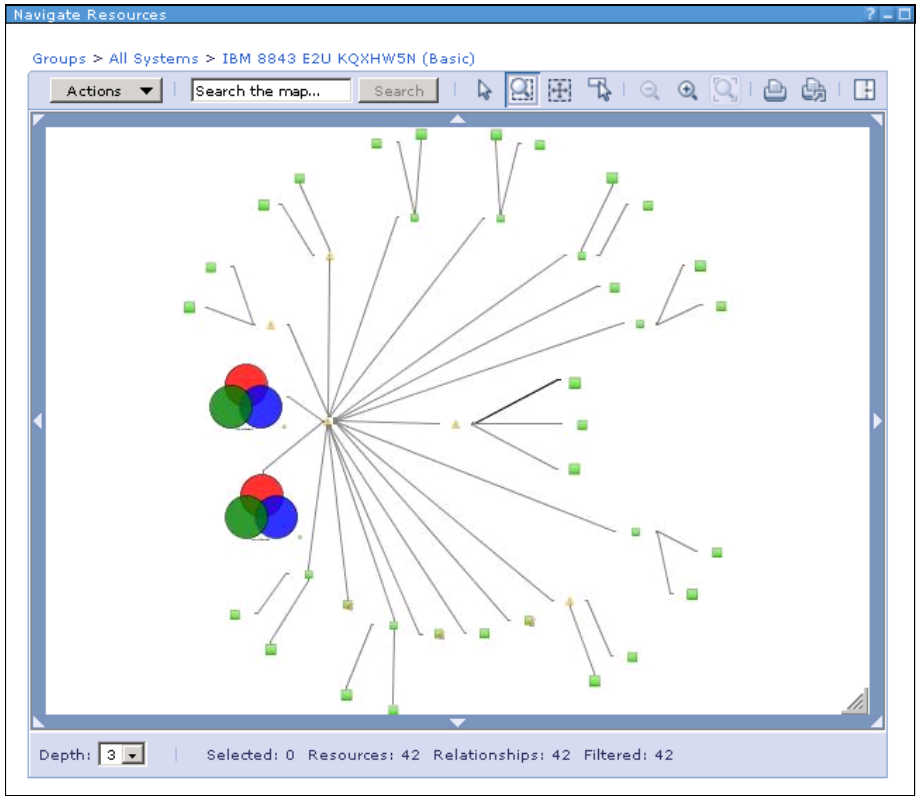


Figure 5-42 Topology view without pallets visible

You can show the palettes again by clicking the Show Palette View icon on the navigation toolbar, as highlighted in Figure 5-43 with the red box.

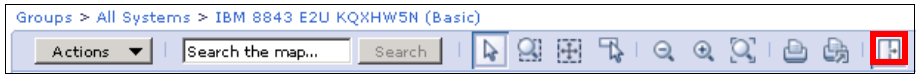


Figure 5-43 Pallet visible enabled: Default setting

- Remember palette state: This option is selected by default.

  Select this option to make sure that the state of your palettes persist even as you navigate away from the topology map view, change to another page in the overall IBM Systems Director Web interface, or log off from the IBM Systems Director Web interface. For example, you can customize the topology map view by minimizing or reordering the overview, details, and filter palettes. By selecting **Remember palette state** you maintain the customized view of your palettes even after you log out of the IBM Systems Director Web interface.

- Enable tables for accessibility: By default this option is not selected.

  Select this option to turn off table features that are not accessible in the interface, such as fixed column width.

- Play sound when data on the page changes: By default this option is not selected.

  Select this option to turn on a notification sound that is played when the graphical user interface is refreshed. Examples of situations that can cause a notification sound include a page refreshing dynamic data, a user selection that displays additional controls or options, a table completes a sort, or a user starts a page refresh.

- Use the resource table view as the default view for topology perspectives: By default, this option is not selected. The topology view is the default view.

  Select the view that you want displayed when you open a resource in the topology map. This setting affects only the view that is shown when the resource is opened. After you have opened the resource, you can switch to a different view.

The next option is to configure the topology map size, specifying the dimensions to use for the topology map view. Options available are:

- Remember last size used: Specify that you want to save the dimensions of the current topology map view and use these dimensions at the next startup. This option is selected by default.
- Custom size (pixels): Specify custom dimensions for the topology map view. The default dimensions are 500 pixels (both width and height).

The final options are:

- Rows per table: The default number of rows is 15.

  Specify the number of rows to display on a page in the table view for Navigate Resources and other navigation tables in IBM Systems Director. The default number of rows is 15, as shown in Figure 5-44, using the Navigate resources view.

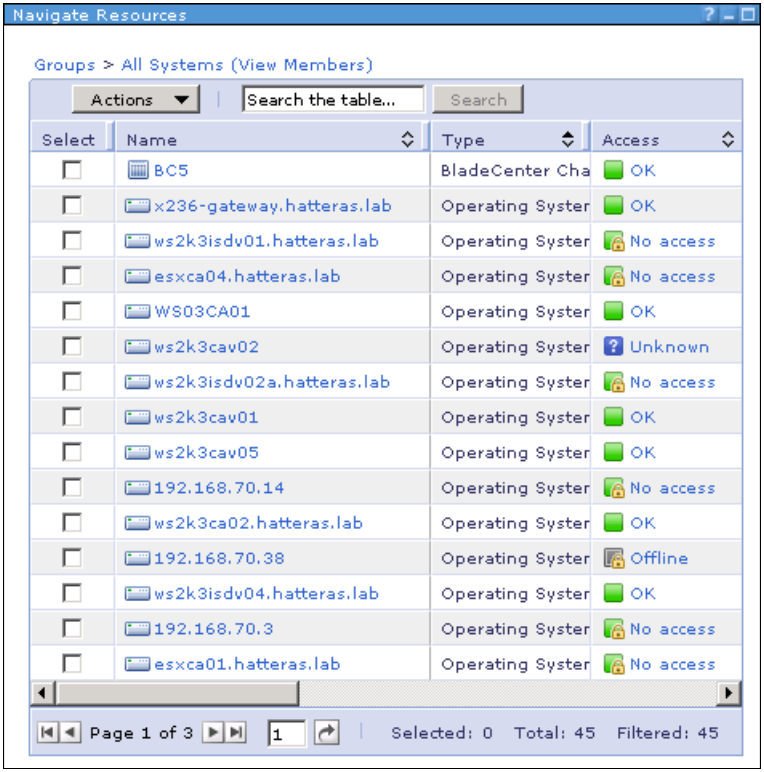


Figure 5-44 Rows per table setting at default value of 15

Tip: From a usability perspective, we do not recommend a setting of more than 18 rows. Displaying more than 18 rows in a table results in an added scroll bar, as shown in Figure 5-45 on page 275, where we set the value for rows per table to 19.

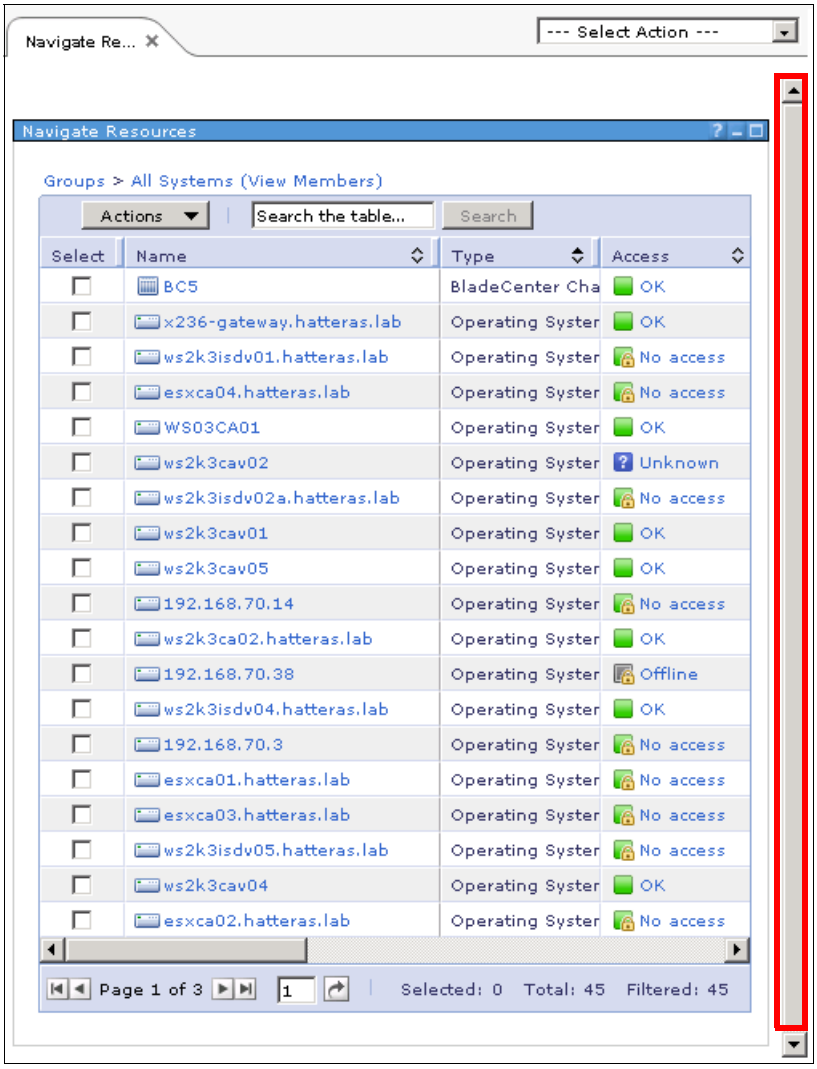


Figure 5-45 Setting the rows per table to more than 18 results in a scroll bar

- Rows per embedded table: The default number of rows is 10.

  Specify the number of rows to display in an embedded table in the table view for Health Summary and other navigation tables in IBM Systems Director.

  Note: When viewing embedded tables on the Health Summary page, the recommendation here is to leave the number of rows for the embedded table to the default setting or reduce them if you need to add additional thumbnails to this view. For more information about customizing the Health Summary page see 5.8.3, “Customizing Health Summary view” on page 304.

- Preferred size for topology map icons (pixels): The default value is 50.

  Specify the size of icons in the topology map when the map is displayed initially. The default value is 50.

  In Figure 5-46 we show the difference in size depending on the value you configure. We selected 20, 50, and 100 as examples.

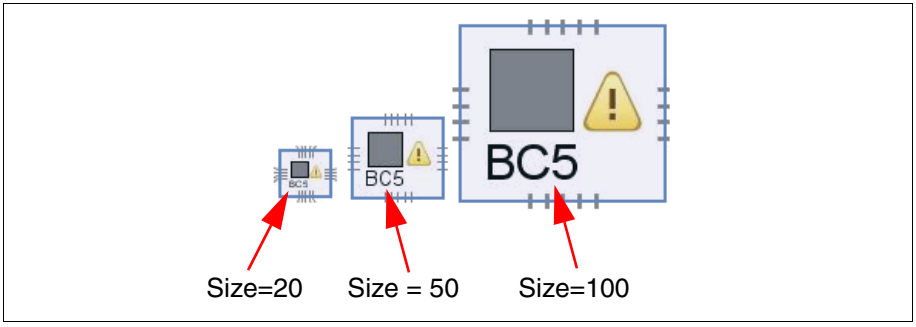


Figure 5-46 Example of icon sizes

5.6.1 Customizing columns in tables

The various tables contained within the views of IBM Systems Director may not present information that is appropriate to your environment. Therefore, there is a certain amount of customization that can be accomplished. In this section we show how to add, remove, and change the position of the columns within the table views. The topics covered are:

- “Add columns” on page 277
- “Change the order of columns” on page 279
- “Remove columns from view” on page 280

Add columns

To add columns to the navigate resource view:

1. Open the **Navigate Resources** view.
2. Click **Actions** and then select **Columns** from the drop-down menu, as shown in Figure 5-47.

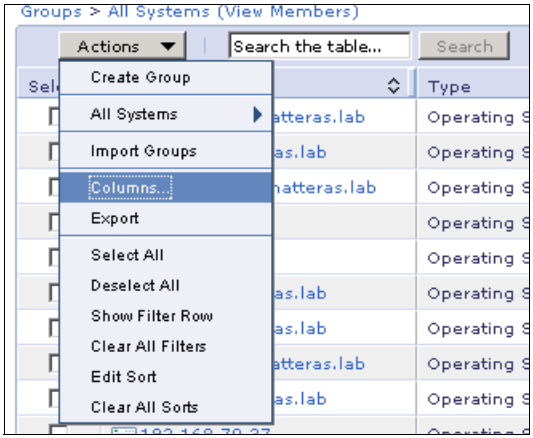


Figure 5-47 Selecting Columns from actions menu

3. You will be presented with the Columns Order view, as shown in Figure 5-48.
4. Select the column that you want to add from the Available Columns option box and click **Add,** as shown in Figure 5-48. This moves the column to the Selected Columns box.

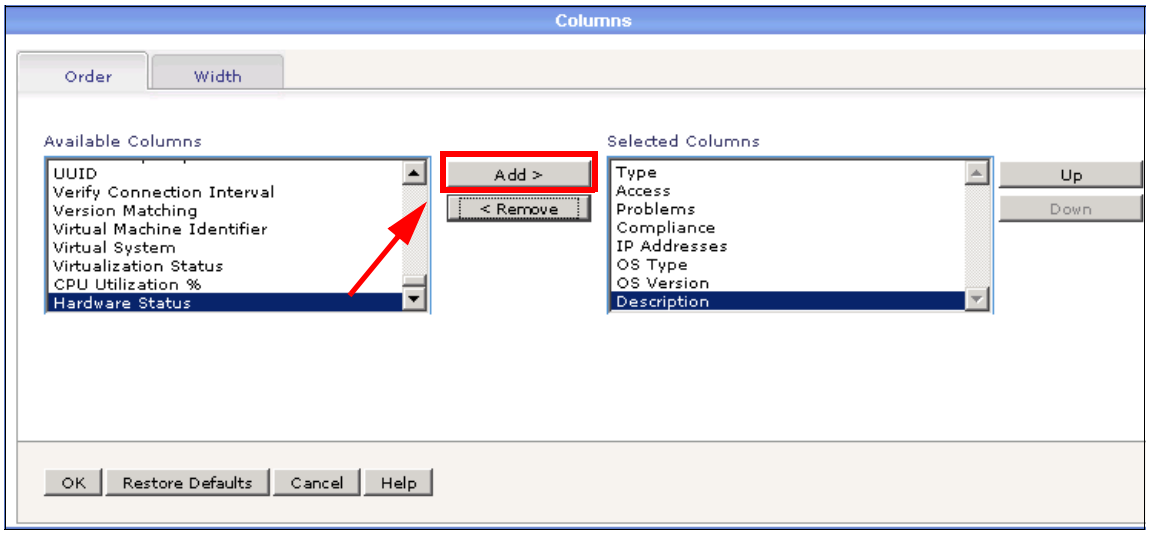


Figure 5-48 Columns Order view

5. You then have the ability to select where you want the column to appear. This is done by clicking the **Up** or **Down** options, as shown in Figure 5-49.

Figure 5-49 Moving position of a column within a view

6. Once you are satisfied with the columns added and the position of the columns, click **OK** to save and close the Columns window.

7. The columns that you added now appear in the position selected in the navigate resource view, as shown in Figure 5-50.

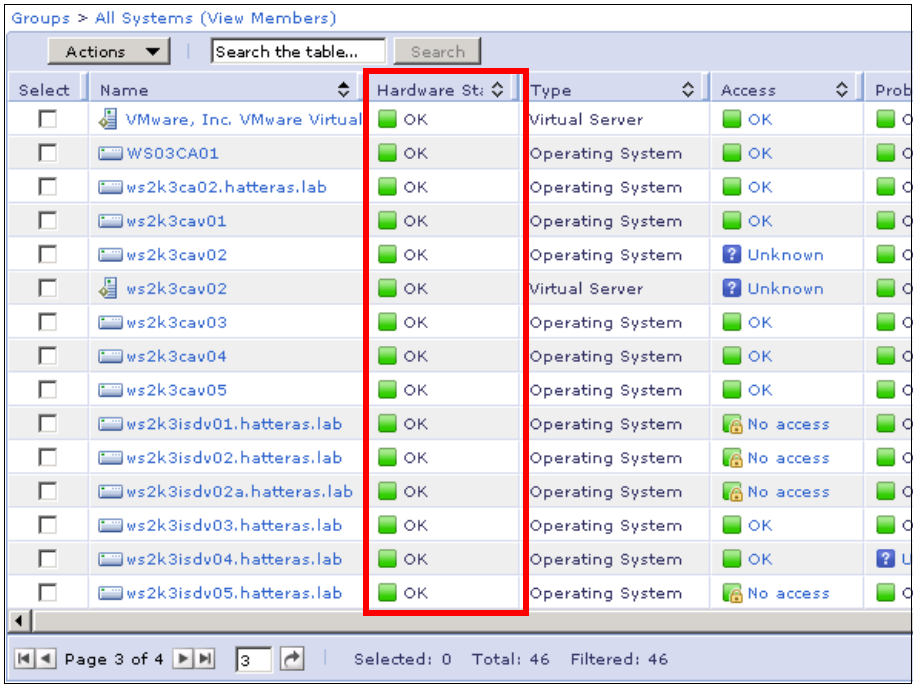


Figure 5-50 Column added to Navigate Resource view

Change the order of columns

To change the order of columns in a view:

1. Click **Actions** → **Columns**, then select the column that you want to move in the Selected Columns view and click the **Up** or **Down** options to place the column where you want it.
2. Click **OK** to confirm and close the Columns window.

3. In the Navigate Resources view, as shown in Figure 5-51, we show that we have moved the IP Addresses column from its default location to a new location between the Name and Hardware Status columns.

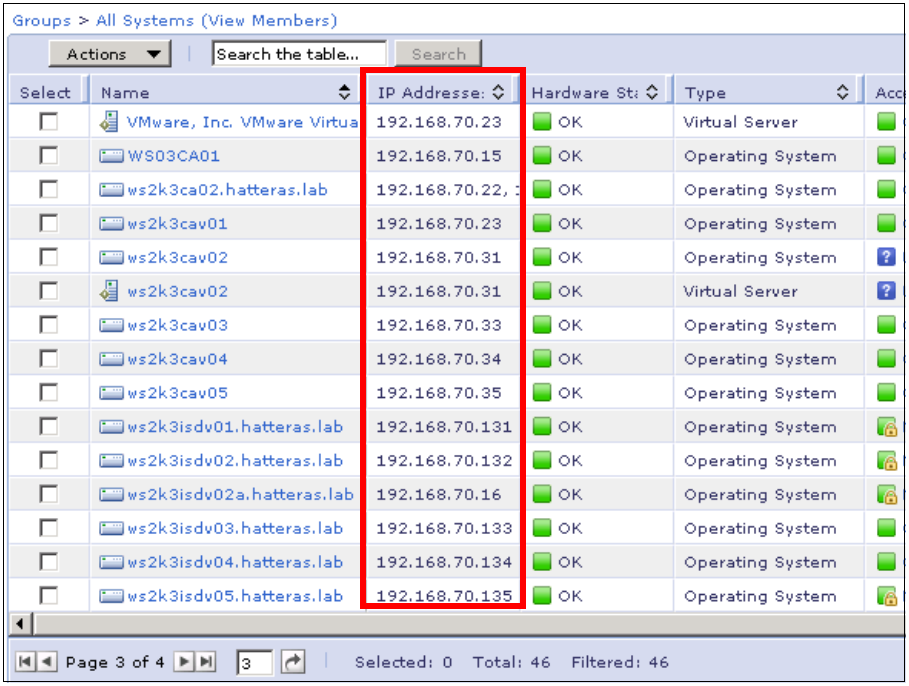


Figure 5-51 New position of IP Address column

Remove columns from view

To remove columns from the table views:

1. Click **Actions** → **Columns**, then select the column that you want to remove from the Selected Columns view.
2. Click **Remove**, as shown in Figure 5-52.

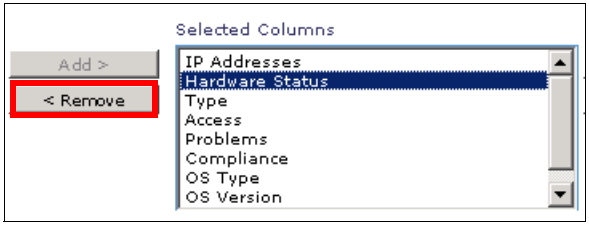


Figure 5-52 Remove column from view

3. Click **OK** to confirm and close the Columns window.

5.6.2 Groups

A group is either static or dynamic. Static groups are defined by a list of resources. Dynamic groups are defined by criteria. You can use groups for organizational purposes and to run tasks on one or more managed resources at a time. The topics that we discuss in this section are:

- "Default groups" on page 281
- "Creating static groups" on page 286
- "Creating dynamic groups" on page 287

Default groups

When you start Navigate Resources, the discovered resources are categorized and displayed in default groups. You can click a group to view subgroups that further categorize the resources for ease-of-use.

Note: You cannot edit or delete default groups.

The default groups are:

- All Systems: All discovered systems in IBM Systems Director, including servers, chassis, operating systems, switches, blades, and storage systems.
- All Operating Systems: All operating systems that can be managed in the IBM Systems Director.
- Groups by System Type: Systems categorized into subgroups by hardware and operating system platform. The available subgroups vary, depending on the plug-ins that you have installed in your IBM Systems Director environment. The subgroups are:
  - BladeCenter Systems
    - BladeCenter Chassis
    - BladeCenter Chassis and Members
    - Power Systems and Blade Servers
    - x86 Blade Servers
    - Cell Blade Servers
    - BladeCenter Ethernet Switches
    - BladeCenter Fibre Channel Switches
    - BladeCenter InfiniBand® Switches
    - BladeCenter SAS Switches
    - BladeCenter InfiniBand Switches to Ethernet Bridges

- BladeCenter InfiniBand Switches to Fibre Channel Bridges
- BladeCenter Pass-Through Modules

– Operating Systems

- Windows Systems
- Linux Systems
- AIX Systems
- IBM i Systems
- z/OS® Systems

– System x

- System x Servers
- Servers with Service Processors
- VMware Hosts
- MSVS Hosts
- Xen Hosts
- Scalable Systems
- Scalable Virtual Servers and Members
- Scalable Systems and Members

– System z

- HMC and Managed System z Servers
- z/VM Hosts
- z/VM Virtual Servers
- Linux on System z
- z/VM Manageability Access Points

– IBM Power Systems

- HMC and Managed Power Systems Servers
- IVM and Managed Power Systems Servers
- Virtual I/O Servers (VIOS) Appliances
- Power Servers
- AIX/Linux Virtual Servers
- IBM i (i5/OS) Virtual Servers
- Virtual I/O Servers (VIOS)
- Isolated Workloads and Hosts
- AIX Workload Partitions (WPAR)
- Linux Containers

- Storage Systems: All groups provided by Storage Management
  - Systems and Volumes
  - Storage Subsystems and Volumes
  - SMI-S Providers
  - Internal RAID
  - Network Storage
  - BladeCenter Storage
  - Network Systems

- Groups by Agent: Systems categorized into subgroups by the degree of management capability available in the IBM Systems Director systems management environment. This default group provides the following subgroups:
  - Systems with No Agent
  - Systems with Platform Agent
  - Systems with Common Agent
- Groups by Status: Dynamic groups that contain systems for which there are unresolved hardware status events. This default group provides the following subgroups:
  - Systems with Problems
  - Systems not in Compliance
- Groups by Access: Dynamic groups that contain systems depending on their current access state. This default group provides the following subgroups:
  - Systems with No Access
  - Systems with Partial Access
  - Systems with Full Access
- Groups with Thresholds: Any groups to which you have applied a threshold.

Note: If you have migrated Event Automation Plans from versions of IBM Director earlier than IBM Systems Director 6.1, Event Automation Plans that use threshold values are migrated to this group.

- Personal Groups: Any groups that you have created or are exclusively associated with your IBM Systems Director user ID. These subgroups include the favorites group.
- Other Groups: Group definitions migrated from versions of IBM Director earlier than IBM Systems Director 6.1.

- Update Groups: All groups provided by update manager. Update groups can be static or dynamic. Both types can be used in compliance policies.
  - Static update groups: Contain individual updates that were explicitly chosen. Once established, the membership changes only when you manually add or delete updates. Static update groups can be used as a baseline for future comparison or update deployment.
  - Dynamic update groups: Automatically contains updates based on selected update types. The membership of this group changes as update information changes.

Note: The membership of an update group is not resolved at the time that a task using the group is scheduled. The membership of the update group is resolved at the time that the task runs.

- Virtualization Groups: All groups provided by Virtualization Manager.

  IBM Systems Director organizes logical sets of resources into groups. Virtualization Manager provides a set of default or predefined groups for virtual resources.

  Table 5-1 lists the names and descriptions of the groups provided by Virtualization Manager.

Table 5-1 Virtualization Manager groups

Group	Description
Virtualization Groups	Contains groups for managing virtualization
Platform Managers	Contains systems capable of managing hosts or farms
Platform Managers and Members	Contains platform managers and their hosts or farms
Hosts	Contains systems capable of hosting virtual servers
Virtual Servers	Contains platform managers and their hosts or farms
Virtual Servers and Hosts	Contains virtual servers and their hosts
Guest Operating Systems	Contains operating systems running on virtual servers
Virtualization Systems	Contains systems with virtualization capabilities, attributes, or relationships
Virtual Farms	Contains virtual farms

- Service and Support groups: These predefined groups are available only if you have installed and activated the IBM Systems Director Service and Support Manager plug-in. Service and Support Manager categorizes systems into subgroups based on their service monitoring status. This default group provides the following dynamic subgroups:
  - Eligible Systems: Contains resources that Service and Support Manager can monitor, but are not currently being monitored.
  - Excluded Systems: Contains resources that are ineligible for monitoring by Service and Support Manager. The eligibility of a resource depends on many factors, such as the type of resource, machine type, manufacturer, model, and serial number.
  - Systems with Service Requests: Contains resources for which a service request has been opened with IBM Support.
  - Monitored Systems: Contains resources that are being monitored by Service and Support Manager.
  - Unknown Systems: Contains resources for which Service and Support Manager eligibility is undetermined. The eligibility of a resource depends on many factors, such as the type of resource, machine type, manufacturer, model, and serial number. Service and Support Manager has not been able to determine the resources' eligibility because the resource information is not available.
- Storage groups: These predefined storage groups are shipped with IBM Systems Director so that you can start working on storage configuration quickly, and can understand which systems have which storage devices attached.

  Note: Do not delete or make changes to these predefined storage groups. Instead, make a copy of one that you want to change and make changes to the copy.

  The subgroups are:
  - BladeCenter Storage: Contains all systems that have IBM BladeCenter S SAS RAID Controller Module storage for IBM Systems Director.

    This group is used to define discovered storage contained within the IBM BladeCenter S SAS RAID Controller Module itself. IBM BladeCenter S SAS RAID Controller Module storage is included in this group as well as in the Network Storage group.
  - Local Storage: Contains all systems that have internal RAID Controllers installed. They could be systems with traditional adapter cards or IBM BladeCenter systems with RAID daughter cards.

- Network Storage: Contains all discovered external storage systems. These are the SAN systems. They could be Fibre Channel, Serial Attached SCSI (SAS) storage systems, or Internet Small Computer System Interface (iSCSI) systems. IBM BladeCenter S SAS RAID Controller Module storage is included in this group as well as in the BladeCenter Storage group.
- SMI-S Providers: Contains all systems that have SMI-S providers installed and running. An example is a system that has installed the SMI-S Provider for IBM Storage System DS4000.
- Storage Subsystems and Volumes: Storage subsystem volume to computer system volume topology.
- Systems and Volumes: Computer system volume to storage subsystem volume topology.

Creating static groups

To make working with a set of resources easier, you can create a static group. Static groups contain a specified list of systems. IBM Systems Director Server does not automatically update the contents of a static group. The members of a static group are fixed unless you change them using the IBM Systems Director Web interface, the **`dircli chgp`** command, or an Event Automation Plan. You also can copy the members of any dynamic group to a static group. For example, you can create a static group for all the servers that you are responsible for in your systems management environment. Groups also can contain other groups. For example, you can have a group called *development systems* that contains three groups—one group for each development team.

To create a static group:

1. In the IBM Systems Director navigation area, click **Navigate Resources**.
2. In Navigate Resources, click **Create Group**.
3. In the Group Editor wizard, the Welcome page is displayed. Click **Next**.
4. On the Name page, type a unique descriptive name for the group that you are creating. Optionally, you also can type a description of the group. Click **Next**.
5. On the Type and Location page, select **Static** from the Group type list.

6. From the Member type list, select the type of member that you want included in the group. A member type acts like a filter. Only resources of the specified type can be part of the group that you are creating.
   - Any: Group membership is unlimited. Any resource can be in the group, including systems, software, and management applications.
   - Managed System: Group membership is limited to system types such as different type of servers, fabric, farms, hardware control points, controllers, operating systems, chassis, switches, and storage.
   - Update: Group membership is limited to update types such as for firmware, IBM Systems Director, and operating systems.
   - Group: Group membership is limited to other existing groups.
7. From the Location list, select the parent group to contain the group that you are creating. In Navigate Resources, a parent group is created and is located under Personal Groups. Click **Next**.
8. On the Define page, select one or more groups of resources from the Available list and click **Add**. You also can drill down into a group and select one or more resources. If you want to remove a group or resource, select it from the Selected list and click **Remove**.

   Note: You cannot add a group's parent to itself. For example, if you define the parent group location for Group1 to be Personal Groups, then you cannot add Personal Groups to Group1.

   If you select a resource to add, but the Add button is unavailable, then the selected resource is not a valid selection due to its member type.

   Click **Next**.
9. On the Summary page, verify the details of the group. If you must make changes, click **Back**. Otherwise, click **Finish**.
10. The static group is created and is displayed in Navigate Resources. A confirmation message about the group creation is displayed also.

Creating dynamic groups

Dynamic groups are based on specified system criteria. You can create a dynamic group by specifying criteria that the attributes and properties of the systems must match. IBM Systems Director automatically adds or removes systems to or from the group when their attributes and properties change and affect their matches to the group criteria. The criteria available for selection are derived from inventory.

For example, You can quickly group existing systems by creating a dynamic group using the criterion Windows operating system. You can further refine the systems that can be in the dynamic group by using logical AND with an additional criterion selection of Windows systems with critical problems. Then create an Event Automation Plan to notify you when these systems have problems.

You also can schedule tasks to run on all systems that match a certain criterion, such as Collect AIX Inventory on a group called AIX systems.

To create a dynamic group:

1. In the IBM Systems Director navigation area, click **Navigate Resources**.
2. In Navigate Resources, click **Actions** → **Create group**.
3. In the Group Editor wizard, the Welcome page is displayed. Click **Next**. You can opt to not see the welcome page by deselecting the **Show this Welcome page next time** option.
4. On the Name page, type a unique descriptive name for the group that you are creating. For our example, we want to create a group showing which systems and devices are used within the virtualized environment. Optionally, you also can type a description of the group. Click **Next**.
5. On the Type and Location page, select **Dynamic** from the Group type list.
6. From the Member type list, select the type of member that you want included in the group. A member type acts like a filter. Only resources of the specified type can be part of the group that you are creating:
   - Managed System: Membership is limited to system types such as different type of servers, fabric, farms, hardware control points, controllers, operating systems, chassis, switches, and storage.
   - Update: Membership is limited to update types such as for firmware, IBM Systems Director, and operating systems.
   - Any: Membership is unlimited. Any resource can be in the group, including systems, software, and management applications.

   For our example, we select **Managed System**.
7. From the Location list, select the parent group to contain the group that you are creating. Click **Browse** to open the groups view, and make your selection on where you want your group to be located.

Note: You must delete any already selected options before you can select the group location that you want. To remove, highlight the selected option and click **Remove**. You will now be able to select a new group location and add this into the Selected location box.

In Navigate Resources, a parent group is created and is located under Personal Groups.

8. Click **Next**.

   If you selected Any or Managed System, the Define page is displayed. Continue to the next step.

   If you selected Update, the Updates page is displayed. Go to step 15 on page 290.

9. On the Define page, click **Add**. The Add Criterion window is displayed.

10. Refine the criteria from which you can select.

    – If you selected Any:

      i. In the Resource category list, select the type of resource with the criteria that you want to evaluate.

      ii. In the Type of device to add list, select the device type to further refine the available criteria.

    – If you selected Managed System, in the Type of system to add list, select the system type to further refine the available criteria.

      i. In the Select criteria to refine group contents list, expand the tree and select a criterion for the dynamic group to evaluate. Your selection is displayed below the list.

      ii. Click **Operators** to select how you want the criterion evaluated by the value that you provide.

      iii. Click **Value** to select the value by which you want to evaluate the criterion. If you want to specify a custom value, select **Use entry from below** and type the custom value in the field.

      Important: The custom value must match the value stored in the IBM Systems Director Server database. Partial matches are not accepted. If the value does not match, nothing is returned for this criterion.

      iv. Click **OK**. On the Define page, the criterion is displayed in the Criteria preview field.

11. If you want to add additional criteria, click **Add** and repeat step 10.

    After adding another criterion, the Define page displays the logical AND and the logical OR selections. These selections determine how the criterion that you create now will affect the criterion that you created previously.

    You can use the logical AND only if your selected criteria belongs to the same resource type or managed system type. For example, a criteria of (Battery.description='Sony') AND (DiskDrive.NeedsCleaning='true') is never true because a resource cannot be both a disk drive and a battery. Therefore, if your criteria contain different resource types or managed system types, the

selection is set to logical OR and cannot be changed. If you do select logical AND and subsequently add another criterion, the Add Criterion window automatically displays the criteria that are valid for the resource type or managed system type that you already selected.

12. If you want to change a criterion, select the criterion from the Criteria list and click **Edit**. The Edit Criterion window is displayed with the settings for the selected criterion. Change the settings and click **OK**.
13. If you want to delete a criterion, select the criterion from the Criteria list and click **Delete**. A confirmation window is displayed. Click **Delete** and the selected criterion is deleted from the list.
14. Click **Next** and go to step 17.
15. On the Updates page, in the Available update types list, select the updates that you want to add to the group and click **Add**. To make multiple selections, press the Ctrl key and click your selections, then click **Add**.
16. Click **Next**.
17. On the Summary page, verify the details of the group. If you must make changes, click **Back**. Otherwise, click **Finish**.
18. The dynamic group is created and is displayed in Navigate Resources. A confirmation message about the group creation is also displayed.

5.7 Launched tasks

IBM Systems Director provides some tasks that start outside of the Web interface and may still require a client-based application. These tasks are launched tasks and are identified on menus by the Launched tasks icon ().

When you select a launched task, the task can be displayed in one of the following ways:

- In another instance of your Web browser. The task provides its own Web interface.
- As a separate program on your system desktop.
- The IBM Systems Director Launched Tasks program is displayed and opens the task that you selected.

The IBM Systems Director Launched Tasks program can open the following tasks:

- Event Action Editor: Used to create advanced event actions. See 9.3.3, “Selecting and creating actions” on page 437, for more information.
- Event Filter Builder: Used to create advanced event filters. See 9.3.2, “Selecting and creating filters” on page 429, for more information.
- File Transfer: Used to transfer files from one system to another. See 11.1, “File transfer” on page 516, for more information.
- Command Automation: Formerly called Process Management Tasks and used process automation. See Chapter 9, “Automation Manager” on page 405, for more information.
- Remote command line: Formerly called Remote Session and used to open a remote command-line session with a managed system. See 11.3, “Remote command line” on page 521, for more information.
- SNMP browser: Used to view and configure the attributes of Simple Network Management Protocol (SNMP) devices, for example, hubs, routers, or other SNMP-compliant management devices.
- MIB Management: Used to compile and load Management Information Base (MIB) files on the management server.

Before you can launch any Launch tasks you must install Java Web Start (JWS) on IBM Systems Director Server. To download JWS:

1. If your browser system requires JWS, a message window is displayed at the time that you invoke the task. Complete the following applicable steps:
   - For Windows and AIX, click **Download Now**.
   - For Linux, select the applicable Java Runtime Environment (JRE™) for your browser system and click **Download Now**.
2. Select to save the file to your hard disk drive or open and run the file immediately, as applicable for your operating system.
3. When the JWS installation is complete, retry the launched task that you wanted to use.

To use a launch task:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resources**.
2. Locate the resource on which you want to start the task and right-click and select one of the launch tasks, as shown in Figure 5-53.

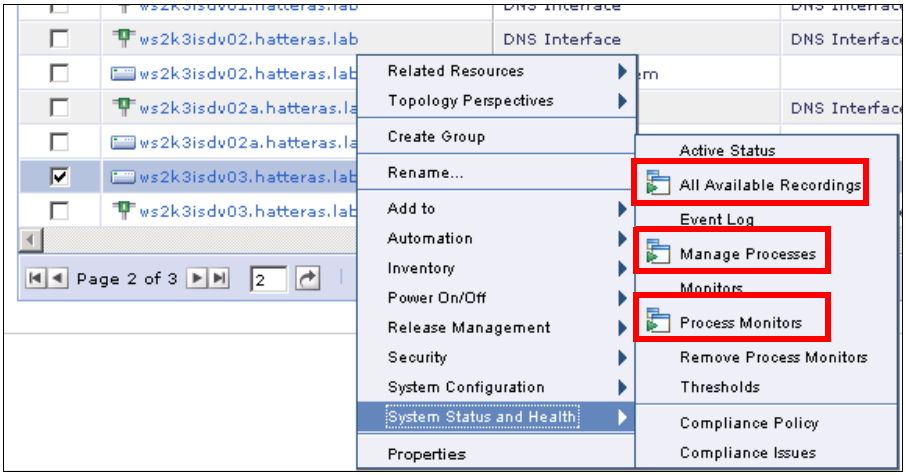


Figure 5-53 Launch tasks available

3. Clicking any one of these options opens the Opening launch.jnlp window notifying you that you must specify an available program for launch. The default option selected is Java Web Start Executable, as shown in Figure 5-54.

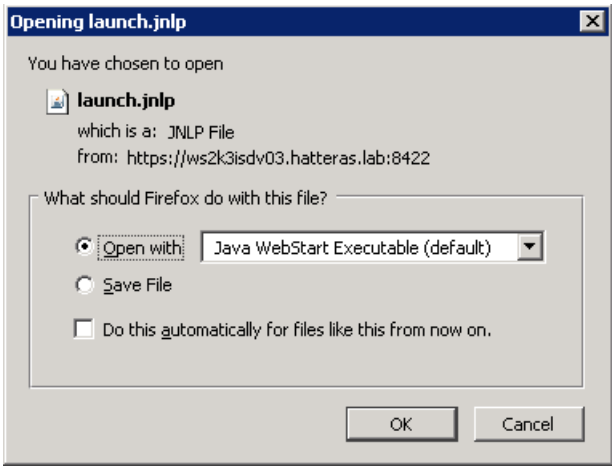


Figure 5-54 JWS Executable

To open, ensure the **Open file** is selected and click **OK**. You can optionally select to launch Java Web Start automatically by selecting the **Do this automatically for files like this from now on** option.

4. You may be notified that the Web site's certificate cannot be verified, as shown in Figure 5-55. To avoid seeing future instances of this message, select the **Always trust content from this publisher** option and click **Yes**.

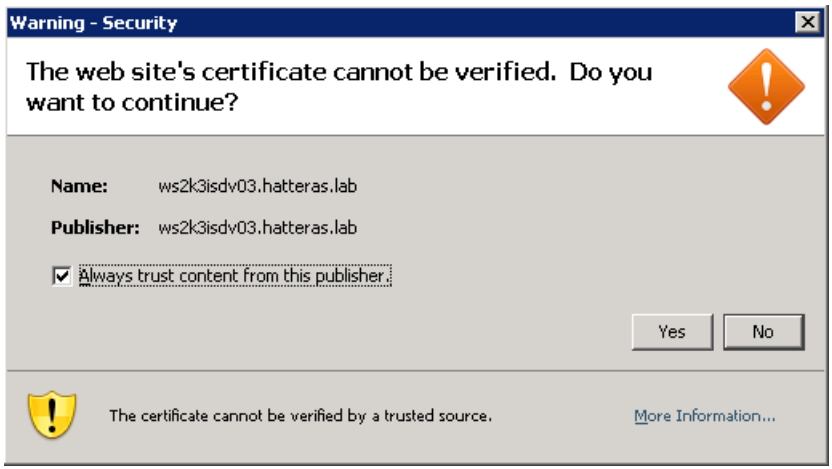


Figure 5-55 Certificate verification required

5. The certificate is then verified and prompts you to run the task, as shown in Figure 5-56. Click **Run**.

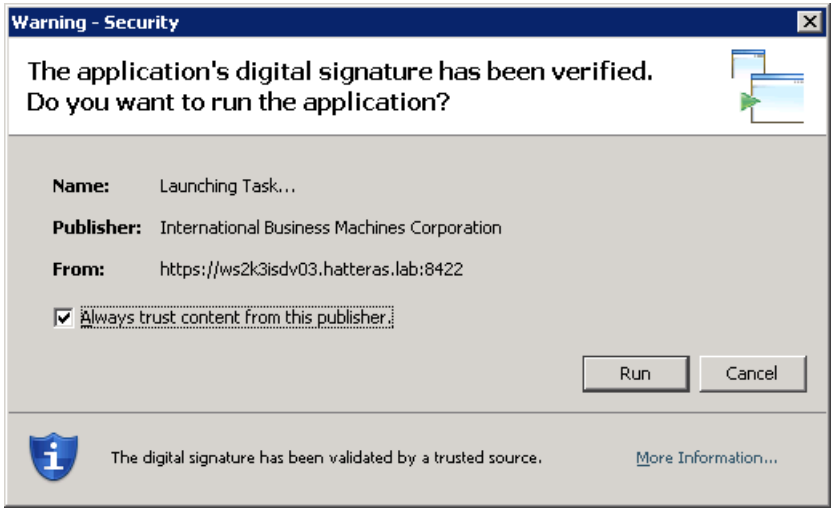


Figure 5-56 Certificate verified

Download of the task begins, with a status window shown in Figure 5-57.

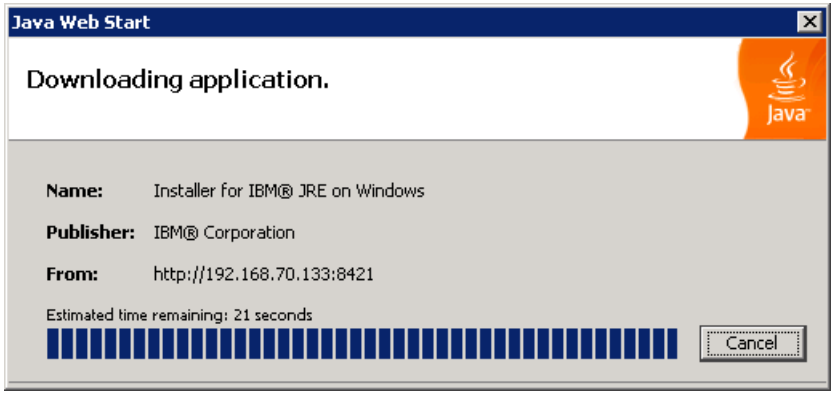


Figure 5-57 Downloading application

6. Once the task has downloaded, you see another status window, as shown in Figure 5-58.

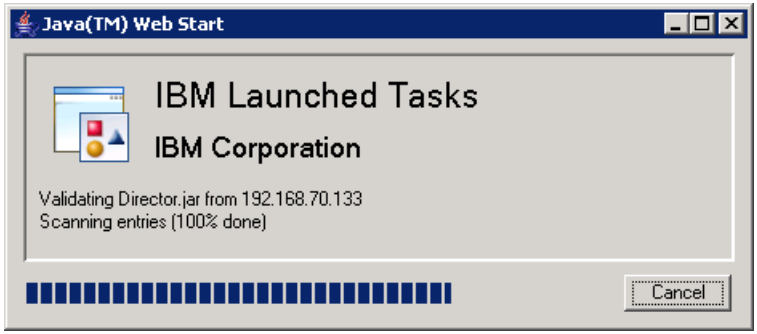


Figure 5-58 IBM Launching Tasks status bar

The mini IBM console appears, as shown in Figure 5-59. This lets you know which tasks have been opened. In our example, we open the Process Monitors task.

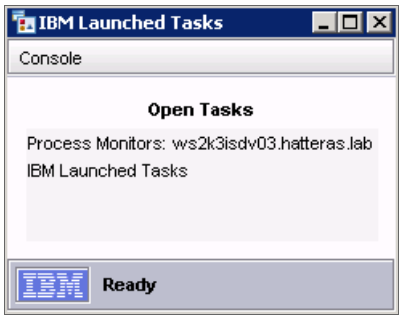


Figure 5-59 JWS mini console showing launched tasks

The Process Monitors Task is also opened, as shown in Figure 5-60.

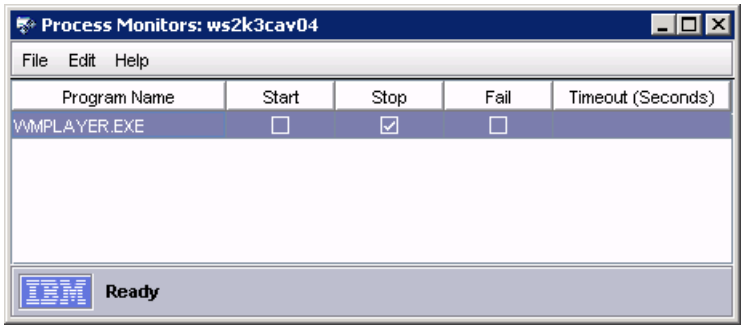


Figure 5-60 Launch task: Process monitors

5.8 Customizing the Health Summary page

The Health Summary page enables you to quickly view and monitor the resources that are most important to you.The scoreboard, dashboard, and health summary display the status and health of your environment.

You can perform actions on a resource by using the Actions menu. You can also drill down to display the properties and other details for each resource.

In this section we describe how to customize the Dashboard and Health Summary views. The topics that we discuss are:

5.8.1 The Dashboard view

The Dashboard section of the Health Summary page displays a real-time, graphical representation of resource status based on the measurable properties for the resource that you have set. You can display this data in a variety of formats to help monitor resources. You must use the Monitors task to add items to the dashboard.

To display information in the dashboard, you must first set up and configure the monitors to indicate the information that you want retrieved. By default, the dashboard is initially empty. To add charts to the dashboard, you must use the Monitors task to display existing monitors and target systems. From the Monitors page, you can find the appropriate monitors and then add them to the dashboard.

Monitors are dynamic in nature and can be easily monitored graphically by configuring IBM Systems Director to display the information. When you select **Add to Dashboard** for an individual monitor on the Monitors page, a graphical representation of that monitor is added to the dashboard.

Creating monitors and adding monitors to the Dashboard

Before you can display any graphical monitors on the dashboard, IBM Systems Director must first discover the systems that you want to monitor. After you have discovered the applicable systems, you can add them to a group. You can then add individual monitors to the dashboard.

To configure the dashboard to display the monitors that you want:

1. In the IBM Systems Director Web interface navigation area, expand **System Status and Health** and click **Health Summary**. The initial view on the Dashboard is a notification like the one shown in Figure 5-61. Click **Close Message**.

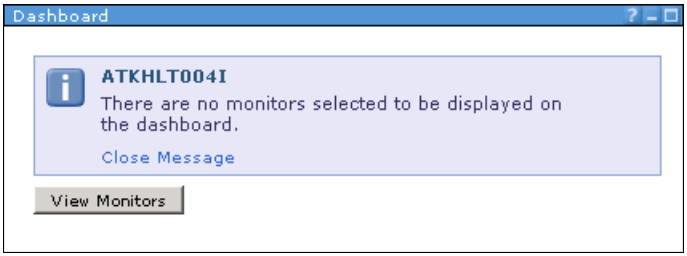


Figure 5-61 Dashboard information message

2. In the dashboard, click **View Monitors**. The Monitors page is displayed, as shown in Figure 5-62.

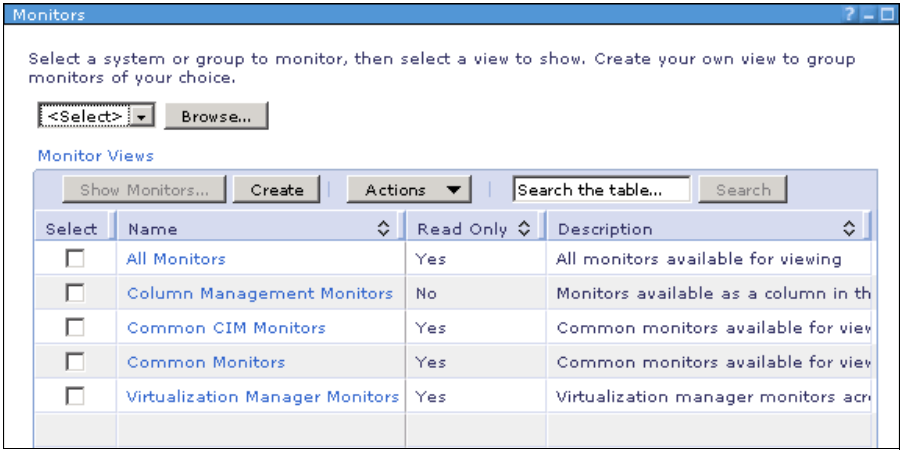


Figure 5-62 Monitors view

3. To select one or more target resources, click **Browse**. The Context Chooser is displayed.

4. Use the Context Chooser to add one or more resources or groups of resources as a target:
   a. To add a group, select the group that you want to add as a target. To add a single resource, drill down from the group that includes the resource that you want to add and select the resource. Click **Add**.
   b. Continue selecting groups or resources as needed.
   c. When you are finished adding targets, click **OK**.
5. From the Monitor selection page, select the monitor view that you want to be displayed for the targets that you selected, then click **Show Monitors**.

Note: As a quicker method you can click the link to open the same tab.

In our example, we selected **All Monitors**. The Monitor View page listing that monitors for the targets that you selected is then displayed, as shown in Figure 5-63. Be aware that this opens a new tab.

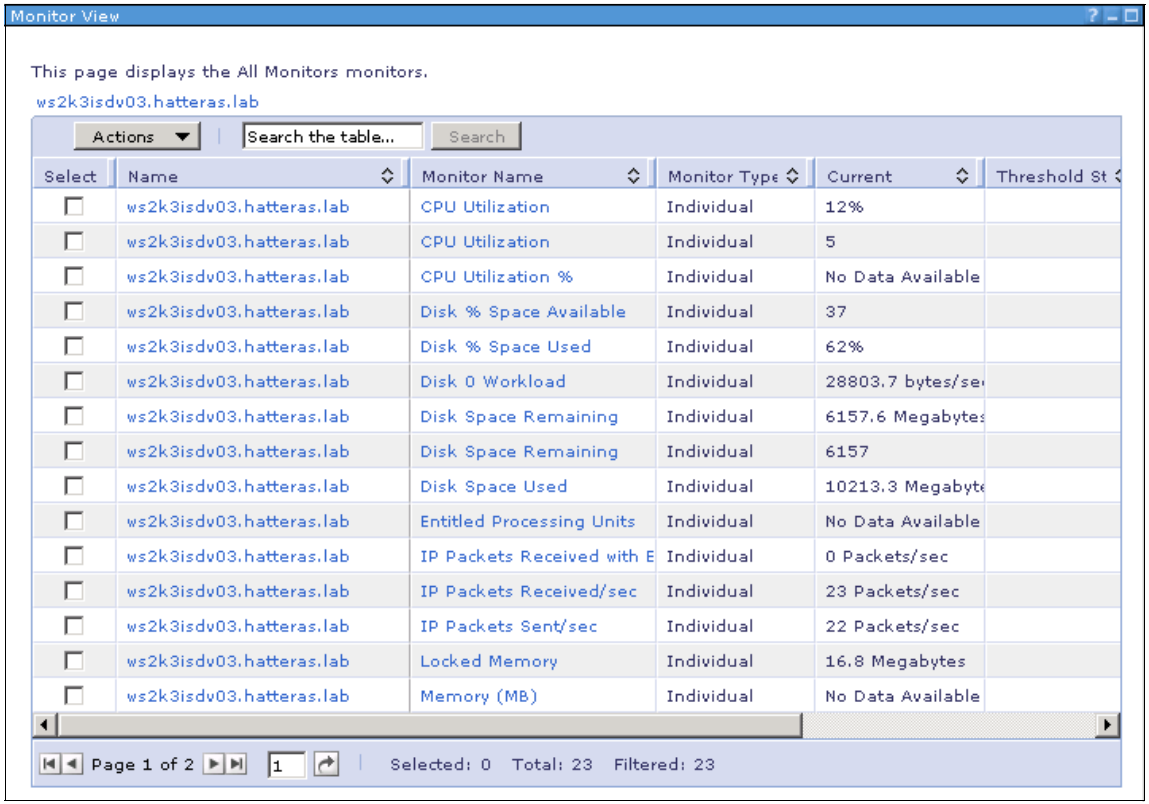


Figure 5-63 All Monitors available for ws2k3isdv03.hatteras.lab

Tip: In the example in Figure 5-63 on page 299, we rearranged the columns to be able to see the current value of the monitors. To modify column views, refer to “Change the order of columns” on page 279.

6. Right-click the monitor that you want to be displayed on the dashboard and select **Add to dashboard**.

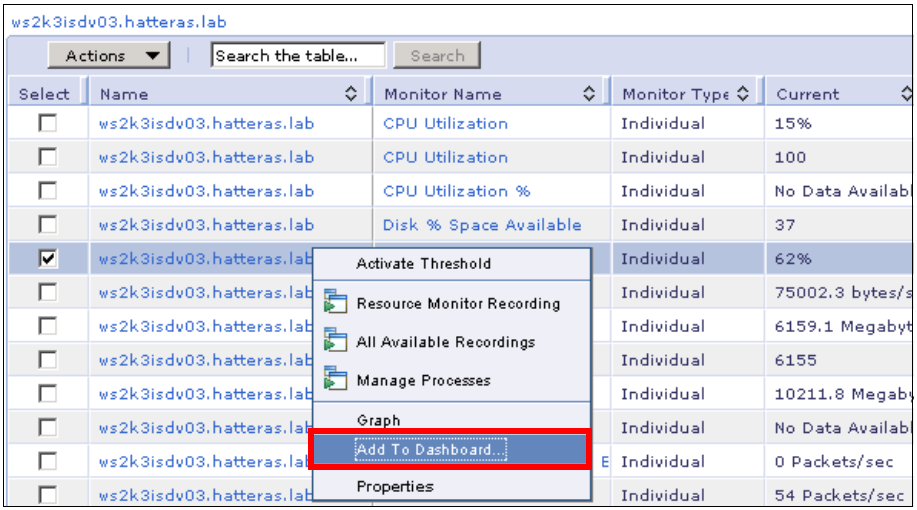


Figure 5-64 Right-click monitor and select Add to Dashboard

7. You are prompted to enter the details for the chart, as shown in Figure 5-65.

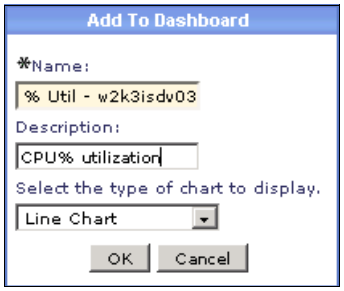


Figure 5-65 Prompt for adding monitors to the dashboard

There are different types of charts that you can select, as shown in Figure 5-66.

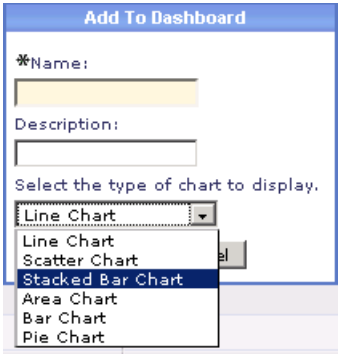


Figure 5-66 Chart type options

8. Make your selection and click **Next** to continue.
9. Click **Finish**.
10. After adding a monitor to the health summary, navigate to the Health Summary page to verify that the monitor is displayed in the dashboard, as seen in Figure 5-67.

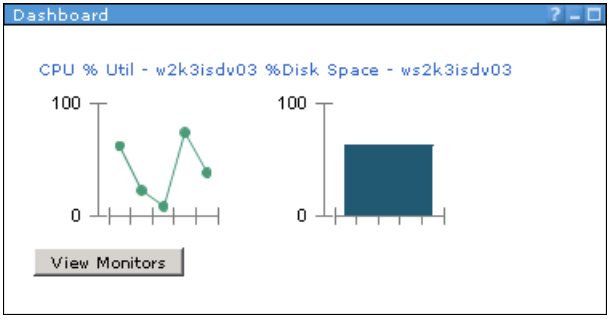


Figure 5-67 Dashboard view with monitors added

5.8.2 The Scoreboard view

The Scoreboard section of the Health Summary page is used to identify areas within your environment that might have problems or issues that require resolution. The scoreboard displays a table in which each row represents an area or category of information, as shown in Figure 5-68.

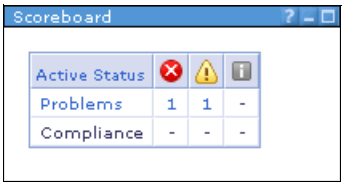


Figure 5-68 The Scoreboard table

Each element of the table, including column headers, row headers, and cell data, is potentially clickable and displays specific data. Each column header in the scoreboard identifies a severity status associated with the corresponding categories.

At the intersection of each row and column is a number that represents the number of resources that adhere to the conditions of both the row and the column that intersect. Clicking the number displays the resources.

Note: Each resource is counted only once, regardless of the number of issues it has. Before you can view the status of any resources, IBM Systems Director must first discover those resources. The scoreboard counts and then displays only those systems that have been discovered and are accessible, and have reached a critical, warning, or informational status level.

The scoreboard displays the status of important areas of your environment using three severity levels:

- Critical
- Warning
- Informational

Systems with Common Agent or Platform Agent installed on them generate events that numerically indicate their health status to IBM Systems Director Server. The numeric values indicated by the event correspond to one of three severity levels in IBM Systems Director:

- Critical
- Warning
- Informational

Each applicable IBM Systems Director system generates a numeric value that aligns it with one of the following three severity levels:

Critical A system that has generated an event with a severity of 5 or 6 is the most severe and is identified in IBM Systems Director as being in a critical state. These systems have already lost or will imminently lose data, have had system down time, or are on the verge of losing some other services. System operation might be impacted if the problem is left uncorrected.

Warning A system that has generated an event with a severity of 3 or 4 is identified in IBM Systems Director as being in a warning state.

These systems can escalate to a critical state if left uncorrected. System operation might not be impacted and normal use of the hardware can continue.

Informational A system that has generated an event with a severity of 1 or 2 is identified in IBM Systems Director as being in an Informational state. These systems are operating normally, and typically no action is required.

A system that reports multiple severities is always grouped under the highest severity. For example, if a system has both critical and warning events, it is shown under critical and is not listed under warning. From the totals, icons, and category names in the scoreboard, you can drill down to view various details about the systems that are reporting system health and performance issues.

Each clickable option in the table details the following:

- Active Status: Provides access to a centralized interface that you can use to get a quick snapshot of the resources that trigger a status set entry.
- Critical icon: If systems in your environment have problems or require updates associated with a critical status, this icon becomes a clickable link. When you click the link, it displays a list of all critical problems and updates.
- Warning icon: If systems in your environment have problems or need updates associated with a warning status, this icon becomes a clickable link. When you click the link, it displays a list of all problems and updates in the warning state.
- Information icon: If systems in your environment have problems that require your awareness, or have updates that are associated with an informational status, this icon becomes a clickable link. When you click the link, it displays a list of all problems and updates in the informational state.

- Problems: Includes systems with all types of issues including hardware, software, inventory, and power-related status issues.
- Compliance: Includes systems with software-update and compliance-related status issues. See “System compliance” on page 464 for more information about this.

5.8.3 Customizing Health Summary view

The Health Summary tab of the Health Summary page displays selected resources that you have chosen to watch.

To view the Health Summary tab, expand **System Status and Health** in the Navigation pane and click **Health Summary**. The tab displayed is shown in Figure 5-69.

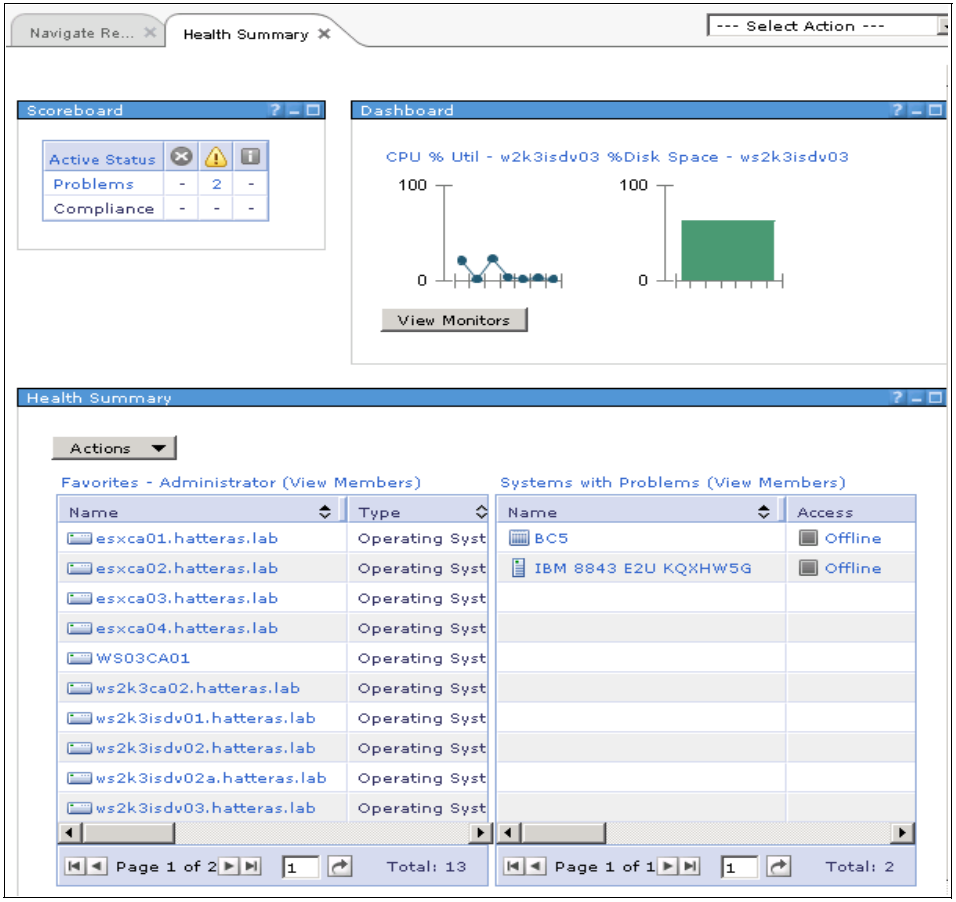


Figure 5-69 Health Summary page

The Favorites group and the Systems with Problems group both appear in the health summary by default. They remain empty until you add agents and devices to your favorites or there is an event triggered on the agent, respectively. You can add or remove groups of resources from the health summary. You can also create new health summary groups.

To display information in the health summary, you must first set up and configure the groups that you want to display.

After you have discovered applicable resources, use the Health Summary Group Editor wizard to add the most important or critical systems in your environment to a health summary group. After a health summary group has been created, you can add the group to the health summary.

Note: The Health Summary view is specific to a user and provides a different view for each logged-in user.

Add a group to the health summary

In our example we created health summary groups for the following OS types:

- Windows Server 2003 systems (dynamic group)
- Windows Server 2008 systems (dynamic group)
- VMware ESX hosts (static group)

To open the Health Summary Group Editor wizard and add the groups created:

1. Click **Navigate Resources** from the navigation view.
2. Click **Personal Groups** from the groups listed.
3. Click the current user. In this case it would be **Administrator.WS2K3ISDV03**, as shown in Figure 5-70.

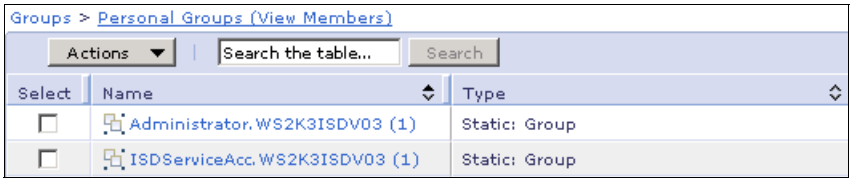


Figure 5-70 Personal Group members

4. Right-click Health Summary - Administrator.WS2K3ISDV03 (2), which takes you into the Health Summary Group Editor wizard, as seen in Figure 5-71. If the welcome window appears, click **Next** to continue. You can deselect the option to show the welcome window the next time that you open the wizard.

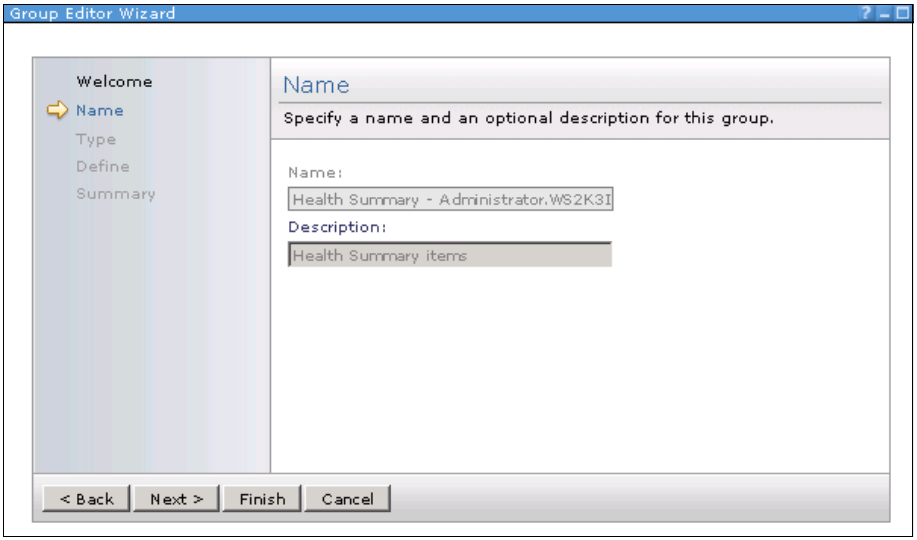


Figure 5-71 Health Summary Group Editor wizard

Click **Next** to continue. The name and description cannot be modified.

5. You will then be presented with the Define panel seen in Figure 5-72, where you will select the groups to add to the Health Summary view on the Health Summary page.

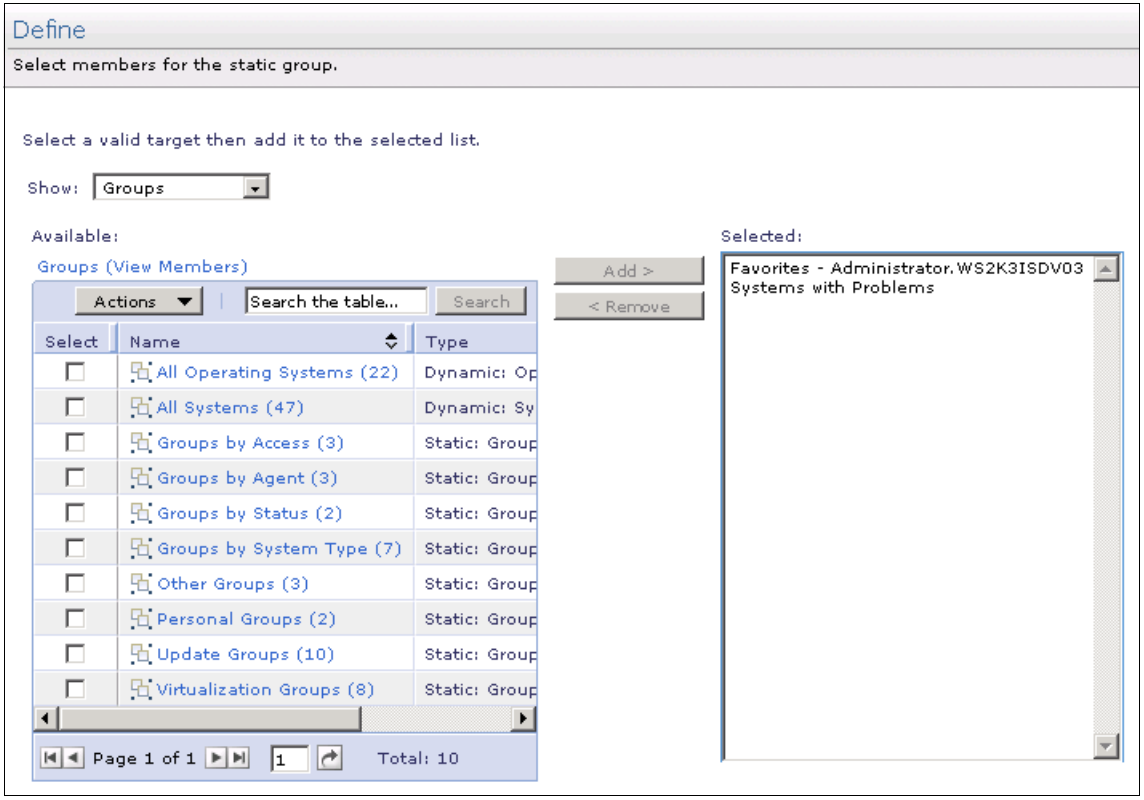


Figure 5-72 Define view to add groups

6. Click the group **Other Groups** to view members of that group.
7. Within Other Groups are the three groups that we created earlier.

8. Highlight all three groups and click **Add**, as shown in Figure 5-73.

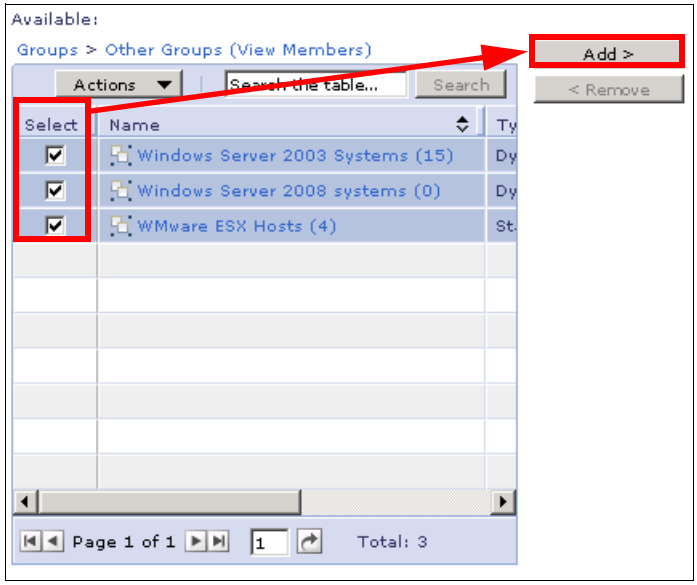


Figure 5-73 Selecting Groups to add to Health Summary page

The selected groups now show in the selected box. Click **Next** to continue.

9. The Summary view is displayed showing your choices, as seen in Figure 5-74.

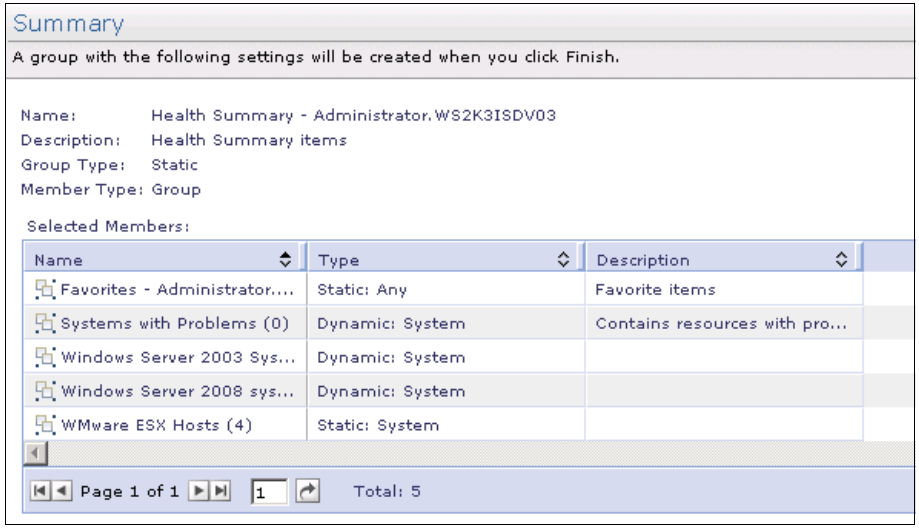


Figure 5-74 Summary view

10. Click **Finish** to complete and close the wizard. You should see a small message window stating that the group was successfully edited, as seen in Figure 5-75.

Figure 5-75 Notification message for successful group edit

11. Click **Close Message**.

12. Open the Health summary page and you will see the groups now added within the Health Summary view, as seen in Figure 5-76.

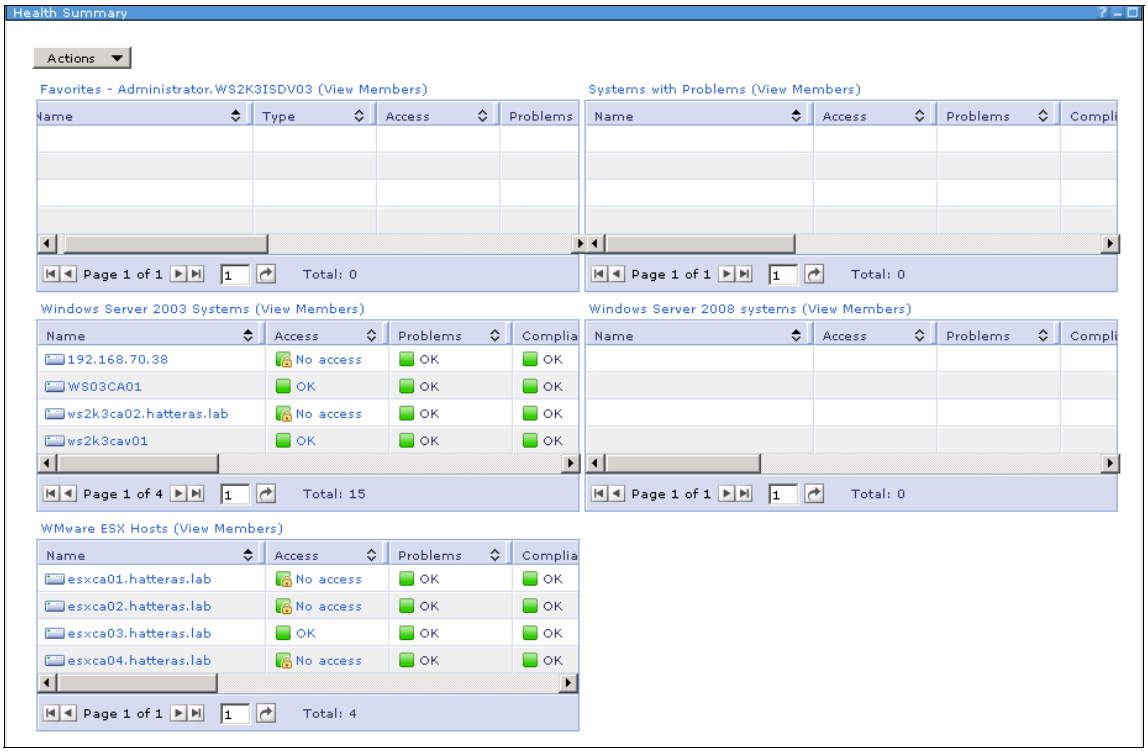


Figure 5-76 Updated Health Summary view on Health Summary page

Adding resources to the Favorites view

You can save resources that you refer to frequently in a special location: your Favorites view. Having all these resources in one location makes managing your systems management environment easier.

You can add a resource to your Favorites view from many places in the IBM Systems Director Web interface. Whenever the Actions menu or a pop-up menu provides the Add to → Favorites selection you can add the resource to your Favorites.

To add a resource to your favorites:

1. Click **Navigate Resources** from the navigation view.
2. From the list of resources available navigate to the resource that you want to add to your favorites. If you want to add multiple resources to your favorites at once, select each resource in the table that you want to save.
3. Right-click a resource and then click **Add to** → **Favorites**. Or click **Action** and select **Add to** → **Favorites**, as shown in Figure 5-77.

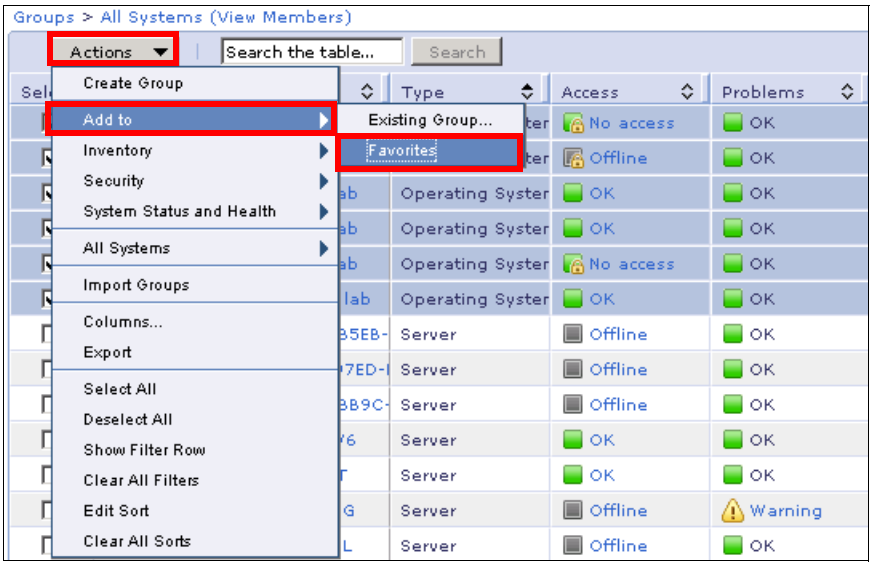


Figure 5-77 Add resources to Favorites

A confirmation message is displayed, as shown in Figure 5-78.

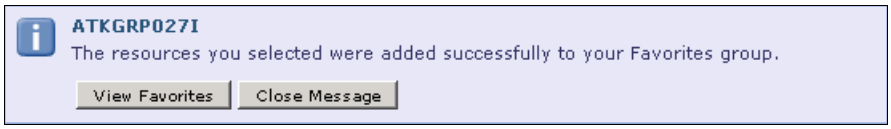


Figure 5-78 Message received once you add a resource to favorites

4. Click **View Favorites** from the message displayed in Figure 5-78 on page 310. This takes you to the Health Summary Page, where you can see the resources that you added to the favorites table, as shown in Figure 5-79.

   Alternatively, you can navigate to the Health Summary page. In the IBM Systems Director Web interface navigation area, expand **System Status and Health** and click **Health Summary**.

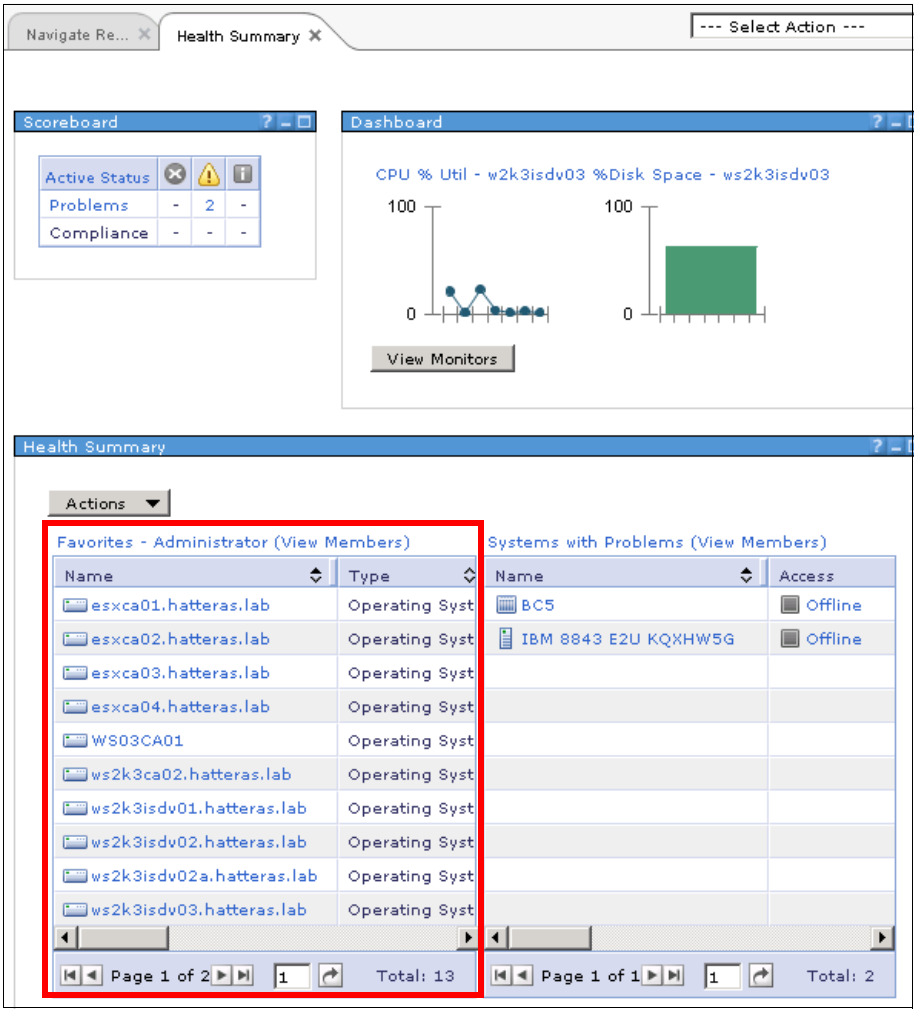


Figure 5-79 Resources added to favorites

5. Above the Favorites table you will see Favorites - *userid*, where *userid* is your user ID.

Deleting groups from the Health summary page

If you want to change or delete the groups included, from the Health summary view, follow the steps below.

Note: You cannot remove the default groups from the Health Summary view. You can remove only groups that have been created after installation.

To open the Health Summary Group Editor wizard and remove any group previously added:

1. Repeat step 1 on page 305 to step on page 306.
2. You are then presented with the Define view seen in Figure 5-72 on page 307, where you will select the groups to be removed from the Health Summary view on the Health Summary page.
3. From the Selected box highlight the group that you want to remove, as shown in Figure 5-80, and click **Remove**.

Figure 5-80 Remove group from Health Summary view

4. Click **Finish**. You will then see a notification message, like the one shown in Figure 5-75 on page 309, notifying you that the edit was successful.

5. Open the Health summary page and you will see that the group has been removed. In our case, the Windows Server 2008 Systems group is no longer visible within the Health Summary view, as shown in Figure 5-81.

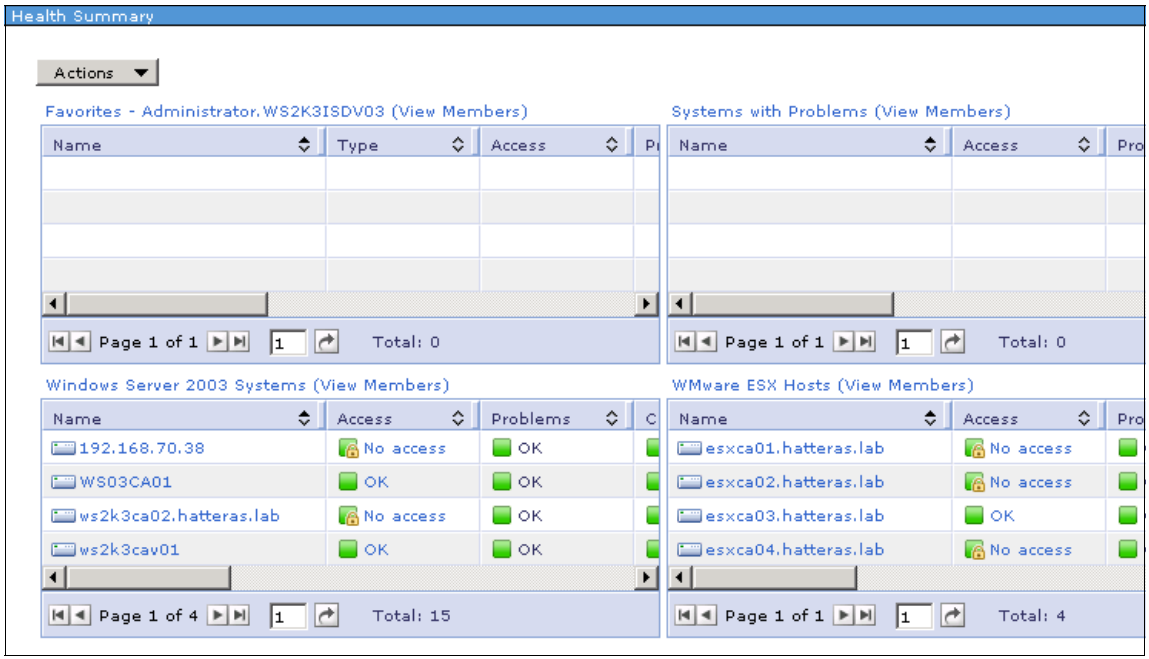


Figure 5-81 Health Summary view: Windows Server 2008 Systems group has been removed

For additional information about other aspects of the IBM Systems Director Web interface see the “Using the Web interface” topic in the IBM Systems Director Information Center, which can be found at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

6

Discovery Manager

Before any system can be managed by IBM Systems Director it must be discovered. It is also important to gain management access to the system and collect inventory from it before other capabilities in Systems Director can be configured and used to manage it.

This chapter provides information about the discovery and inventory collection processes, including the following:

6.1 Overview

Discovery is the process by which IBM Systems Director identifies and establishes a connection with objects, such as systems that it can manage. A system is one type of resource that Systems Director can manage. It is an operating-system-based or hardware-based endpoint that has an IP address and host name and can be discovered and managed by Systems Director. Before Systems Director can manage a system or device, that resource must be discovered by IBM Systems Director Server. IBM Systems Director manages these types of systems:

- Blade administrative server
- Boot server
- Cluster
- Fabric
- Farm
- Hardware Management Console
- Management controller
- Operating system
- Print server
- SAN
- Server
- Storage system
- Switch
- System chassis

IBM Systems Director uses a *discovery profile* for each type of managed endpoint that it discovers. A discovery profile is a configurable set of discovery settings for a specific type of manageable endpoint. You can use IBM Systems Director to create, configure, or remove the profiles that are used for discovery. You also can create multiple profiles for a specific type of manageable endpoint. Being able to configure multiple profiles provides the flexibility to schedule the appropriate type of discovery for specific IP ranges in your network at specific times.

IBM Systems Director gives you two options for discovery:

- System Discovery: See 6.4, “System discovery” on page 321.
- Advance System Discovery: See 6.5, “Advanced system discovery” on page 324.

Before discussing these we cover the various protocols used by Systems Director to perform discovery.

6.2 Discovery protocols

A discovery protocol is any network communication protocol that is used by IBM Systems Director during the discovery process to discover a system. During system discovery, Systems Director Server attempts to communicate with target resources by using a predetermined list of protocols. When using advanced system discovery, the management server attempts to communicate with target resources by using only the protocols that have been configured.

IBM Systems Director supports the following discovery protocols:

- Agent Manager Discovery

  Agent Manager discovery is used particularly to discover Common Agent installed on manageable endpoints. Service Location Protocol (SLP) is not supported, so IBM Systems Director queries the Agent Manager that knows about the agents in the environment. Selection of Agent Manager is customizable to the user.

- Common Agent Services discovery

  Common Agent Services (CAS) discovery utilizes SLP discovery, with which clients can locate servers and other services in the network.

- Common Information Model (CIM) discovery

  CIM discovery also utilizes SLP for discovery. With CIM discovery, clients can locate servers and other services in the network. You can use either unicast or multicast and broadcast to perform CIM discovery. You can also configure directory agents.

- Interprocess Communication (IPC) discovery

  IPC leverages services provided by IBM Systems Director that components use to communicate with each other. By using these services, a server task can communicate with an agent task running on a target.

- Secure shell (SSH) discovery

  SSH is a UNIX-based command interface and protocol for securely accessing a remote computer.

- Service Location Protocol (SLP) discovery

  SLP is a protocol for service discovery. With SLP discovery, clients can locate servers and other services in the network. In SLP discovery, IBM Systems Director sends a request message and an SLP Service Agent that replies to the request that is identified in IBM Systems Director as a platform-managed system.

- Simple Network Management Protocol (SNMP) discovery

  SNMP is a network management standard widely used in TCP/IP networks. SNMP performs management services by using a distributed architecture of management systems and agents. SNMP provides a method of managing network hosts such as workstation or server computers, routers, bridges, and hubs from a centrally located computer running network-management software.

- Windows Distributed Component Object Model (DCOM) discovery

  Use Windows DCOM configuration to specify either a single IP address or a range of IP addresses upon which to run discovery.

6.3 Discovery Manager

Discovery Manager is the central repository for all the discovered systems and also central control point for performing all the discovery and inventory-related actions.

To launch Discovery Manager from the IBM Systems Director Web console go to **Welcome** → **Discovery Manger**. This opens the Discovery Manager page, as shown in Figure 6-1.

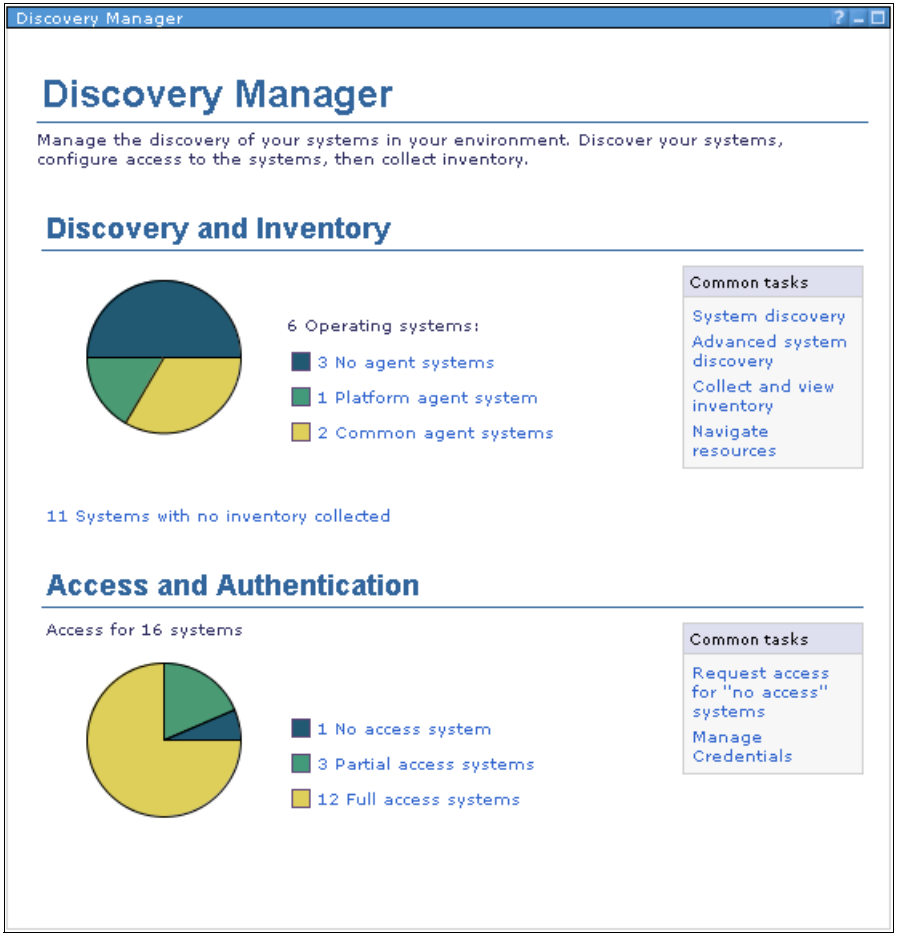


Figure 6-1 Discovery Manager page

The Discovery Manager page is broadly classified in two parts:

- Discovery and inventory
- Access and authentication

6.3.1 Discovery and inventory

All the systems discovered by IBM Systems Director are listed in this section. The discovered systems are classified into three parts based on the agent used for discovering:

- No agent systems
- Platform Agent systems
- Common Agent systems

The pie chart in Figure 6-1 on page 319 provides you with the visual representation of these classified discovered systems.

You can also find the following common tasks, which you can launch from the same page:

- System discovery
- Advanced system discovery
- Collect and view inventory
- Navigate resources

6.3.2 Access and authentication

All the systems discovered in Systems Director listed in this section are classified into three parts:

- No access systems
- Partial access systems
- Full access systems

You can click each classification title to see the list of systems under each respective classification. For example, you can click **Partial access systems** to see a list of all discovered systems currently having partial access, as shown in Figure 6-2.

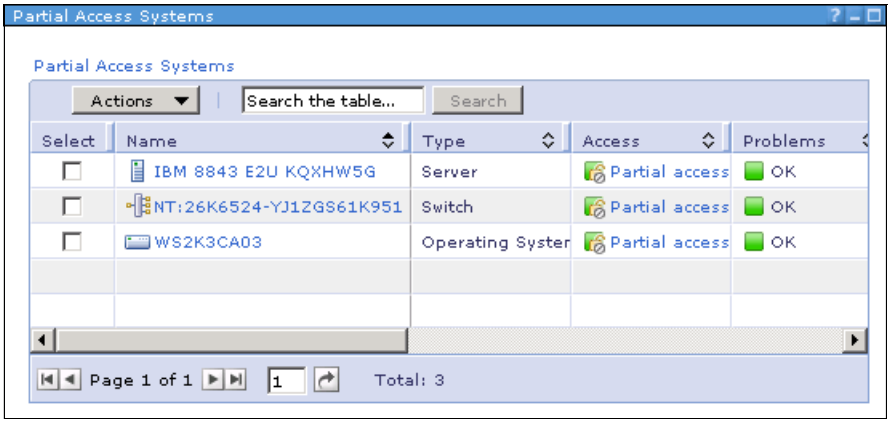


Figure 6-2 Partial access systems list

You can also perform the following common tasks for requesting access to a system or configuring the authentication credentials:

- Request access for *no access* systems
- Manage credentials

6.4 System discovery

To discover manageable endpoints at a specific network address or range of addresses, use system discovery. This method is useful in networks where both broadcasts and multicasts are filtered. System discovery discovers manageable endpoints by unicasting its request to one or more addresses. IBM Systems Director Server sends one request to each manageable endpoint at a time.

System discovery provides the following functions:

- Discovery based on a single IP address
- Discovery based on a range of IP addresses
- Discovery based on a host name

Refer to Figure 6-3.

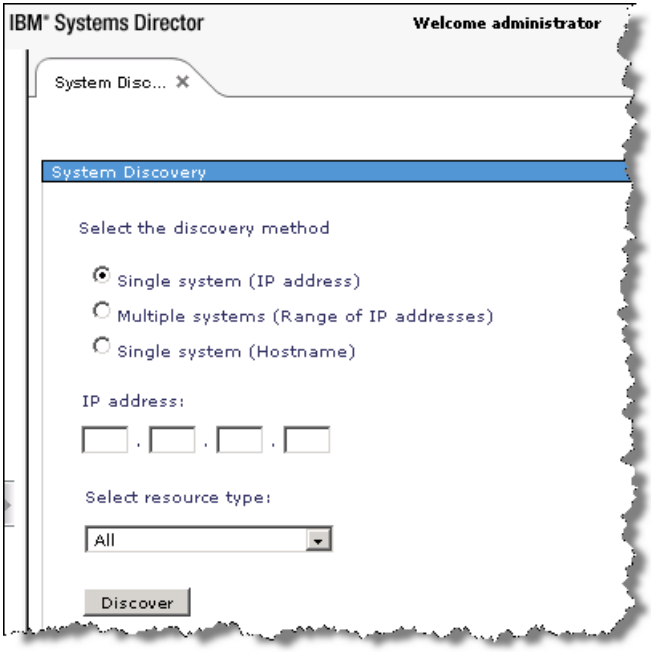


Figure 6-3 System Discovery Page in IBM Systems Director 6.1

Once the system is discovered it is shown in the Discovered Systems table, as shown in Figure 6-4.

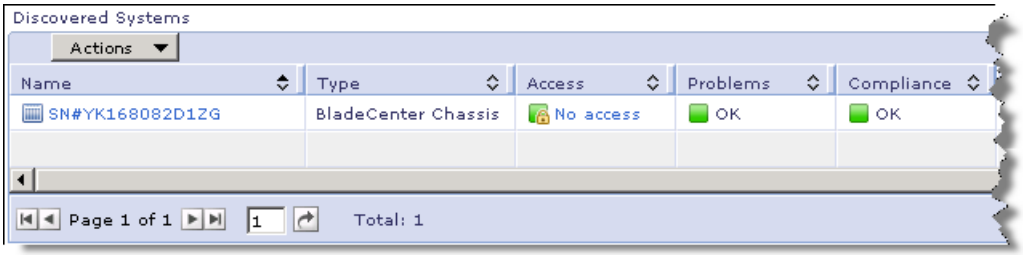


Figure 6-4 Discovered Systems table

For system discovery, when you discover any system by default it will have no access. You can check the access status in the Discovered System table under the Access column for each respective systems.

To request the access you need to select the **No access** reference. This opens the Request Access Wizard, as shown in Figure 6-5.

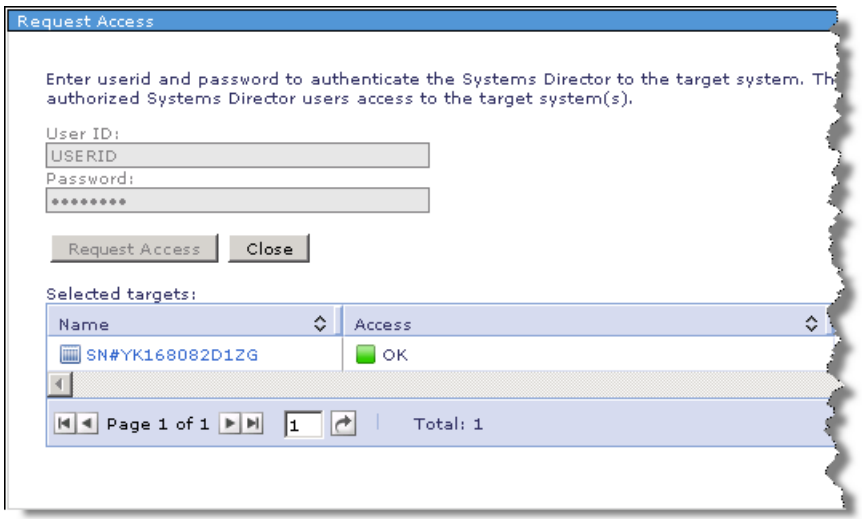


Figure 6-5 Request Access page

You must specify the correct credentials to access the system. Once the system is unlocked, IBM Systems Director will be able to access and collect inventory for the system. You can also create the credential mappings for your systems. For more details on how to create credential mappings, see Chapter 3, “Security” on page 85.

6.5 Advanced system discovery

Use advanced system discovery to identify and manage a specific type of resource. Advanced system discovery is helpful when you want to limit your discovery using criteria that you specify. Advanced system discovery provides a list of default discovery profiles. As shown in Figure 6-1 on page 319, IBM Systems Director provides an Advanced Discovery Wizard for creating customizable discovery profiles. Each profile corresponds to one or more types of resources that can be discovered. Refer to Figure 6-6.

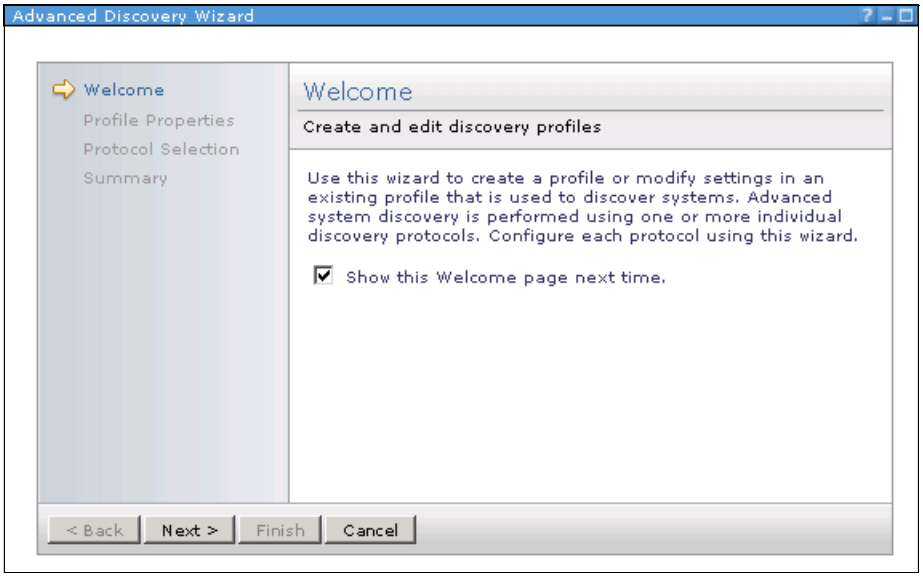


Figure 6-6 Advanced Discovery Wizard in IBM Systems Director 6.1

6.5.1 Discovery profiles

A discovery profile is a group of discovery settings that are saved by IBM Systems Director Server that indicate the type of resources discovered and the communication protocols that are used during the discovery process. Advanced System Discovery uses discovery profiles to manage the discovery tasks that you undertake. Using the advanced system discovery wizard you can:

- Create, copy, edit, or delete discovery profiles.
- Run a discovery profile on specific resources.
- Schedule a profile to run at specific times or in response to specific events.

Each discovery profile that you create corresponds to one or more types and subtypes of resources that can be discovered. You can choose from the

following resource types, which are also called system types or profile types, and their subtypes:

- Generic network device: Printers
- Switch: Switch module
- Operating system
  - Systems with Common Agent
  - Systems with Platform Agent
  - Systems with no agent
- BladeCenter Chassis
- Server
  - Hardware Management Console (HMC) managing Power Systems
  - HMC managing System z
  - System x servers with service processors
  - Integrated Virtualization Manager (IVM) managing Power Systems
  - Power System servers with service processors

Depending on the profile type and protocol that you choose, you might need to specify some of the following configuration parameters when creating a discovery profile:

- Select the Agent Managers for discovery.

  Specify individual Agent Managers or select to use all available Agent Managers.

- Specify the IP address or range of IP addresses.

  Input a single IP address, multiple IP addresses, or a range of IP addresses. You can also import IP addresses from a line delimited file.

- Enable mulitcast.

  Choose to use multicast, for which you need to specify an IP address and time-out period. By default, IBM Systems Director uses 224.10.1.118 as the multicast address. You can specify the time-out period (in seconds), which is the number of times that packets will pass between the subnets before discarding. Not all network configurations allow multicast if they are configured to prevent multicast requests from passing between subnets.

- Enable general broadcast.

  Choose to use general broadcast. When you enable general broadcast, Systems Director issues a general IP broadcast to discover service agents on the local subnet. Some environments might not allow the use of general IP broadcast to discover systems, in which case you should not select this option.

Note: By default, agentless systems are not discovered using broadcast discovery. Agentless systems are discovered using unicast discovery, and an IP address range must be specified for the unicast.

- Enable directed broadcast.

  Choose to use directed broadcast, for which you specify an IP address and subnet mask. In directed broadcast discovery, IBM Systems Director sends the discovery request message to the specific managed system.

- Enable relay broadcast.

  Choose to use relay broadcast, for which you specify the agent that will send the broadcast. This discovery method is useful when IBM Systems Director and the managed systems belong to different subnets and the network is configured to filter broadcast requests across those subnets.

  To perform the broadcast relay discovery, the system that performs the general broadcast must have already been discovered by IBM Systems Director. You might want to consider broadcast relay discovery if you have multiple physical locations in which manageable endpoints reside, with lower-bandwidth network infrastructure (such as T1 or frame relay) between these physical sites as it generates less network traffic.

- Configure directory agents.

  Directory agents are a type of SLP agent and is used during SLP discovery. Use directory agents to configure a proxy using their IP addresses or host names. The Directory Agent is a software entity that acts as a centralized repository for service location information. If you have configured a directory agent, you can configure IBM Systems Director to use the directory agent to discover service agents.

- Specify a scope.

  Specify a scope, which is used to group agents, within which to search for directory agents.

- Configure access request automation.

  Choose to automatically request access to resources as they are discovered. When any managed resource is discovered in IBM Systems Director, it shows the default access type as no access. You can decide to automatically request access for managed resources as they are discovered in Systems Director. You must specify the credentials (user ID and password) to enable access to the system.

- Configure inventory discovery automation.

  Choose to automatically collect inventory from resources as they are discovered. If you want to collect inventory for every managed system automatically once it is discovered by the current profile in the Systems Director, you can select this option. You can also choose not to run inventory discovery automatically as a part of a discovery profile and can separately execute inventory discovery.

  Tip: You need to gain access to a system (via the request access function) before you can run inventory discovery.

- Configure SNMP community names.

  Specify SNMPv1 or SNMPv2c community names for discovery.

- Configure SNMP profiles.

  Create, edit, or delete SNMPv3 profiles.

- Configure a direct connection.

  Configure a direct connection to a hardware resource, specifying the hardware type, protocol, IPv4 IP address, and port. For example, you can specify parameters for the Management Module or Advanced Management Module for BladeCenter.

6.5.2 Renaming discovered systems automatically

Following discovery, IBM Systems Director assigns a name to each discovered system that might not be suitable to understand. To help you better organize your systems and ensure consistency among system names, it is often beneficial to rename each system to follow a certain convention. IBM Systems Director facilitates the user to automatically rename each discovered system to a name that matches a specified, predefined template.

To automatically rename discovered systems, from IBM Systems Director Web navigation area go to **Settings** → **Auto Rename**. This opens the Auto Rename wizard, as shown in Figure 6-7.

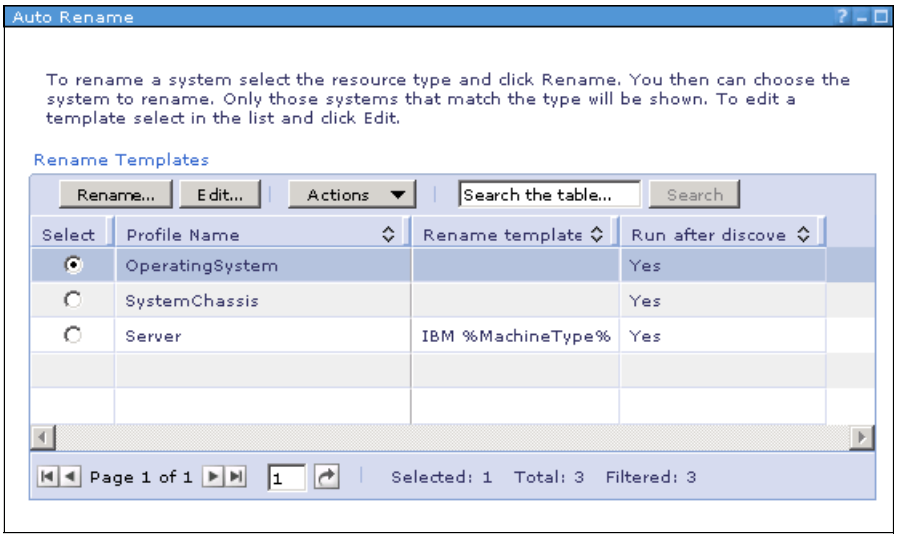


Figure 6-7 Add Rename Wizard in IBM Systems Director 6.1

This lists the resource types and their respective default rename template. To change or create a new rename template click **Edit**.

Using the Edit Template wizard you can specify the convention (template) to be used when systems are automatically renamed and enable the auto rename task:

- All the resource variables are listed in a drop-down menu on the right-hand side. Depending on the resource type, you can select from the list of variables to specify their order during the display of the resource name.
- Use the %Text% variable to specify a hard-coded value to be inserted into the name template. Inserting this variable opens a window where you can specify your hard-coded name variable, as shown in Figure 6-8.

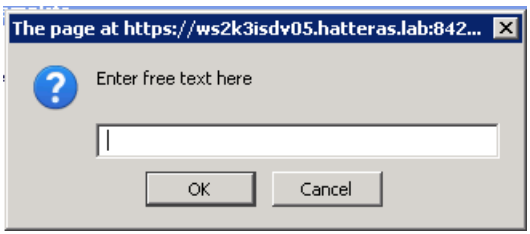


Figure 6-8 Input box to enter hard-coded rename variable

- Use the %Clear% variable to clear the template.
- You can select to automatically rename each system after it is discovered in the IBM Systems Director.Otherwise, you can also choose to run the rename utility separately for discovered systems.

To open then Run - AutoRename wizard click **Rename**. The Run - AutoRename wizard is used to set up targets and options for your auto rename task:

- Use the Targets page to add to the template the targets on which the auto rename task will run.
- Use the Schedule page to set the auto rename task to run immediately or at a specified time and date in the future. You can also schedule the task to repeat at a specified frequency.
- Use the Notification page to choose options for an e-mail notification that you can receive as the auto rename process progresses.
- Use the Options page to specify the time to use for the system time and how to handle unavailable systems.

6.6 Collecting and viewing inventory data

To manage a platform resource within your organization's environment or view inventory data about it, that resource must first be discovered and inventory must be collected. That is, the resource must be recognized and added to the comprehensive list of native resources and native attributes for the system.

Inventory collection is the process by which Systems Director establishes connections with network-level resources that have already been discovered and collects data about the hardware and software that is currently installed on those resources. This process provides information about components such as:

- Physical, logical, and virtual hardware
- Software applications, operating systems, middleware, firmware, BIOS, and diagnostics
- Network information
- System-contained resources

6.6.1 View inventory

To view the inventory for a managed resource, you should have the resource discovered in IBM Systems Director and its inventory collected. Then from the IBM Systems Director Web navigator area you can select **Inventory** → **View** and **Collect Inventory**. This opens the View and Collect Inventory page, as shown in Figure 6-9.

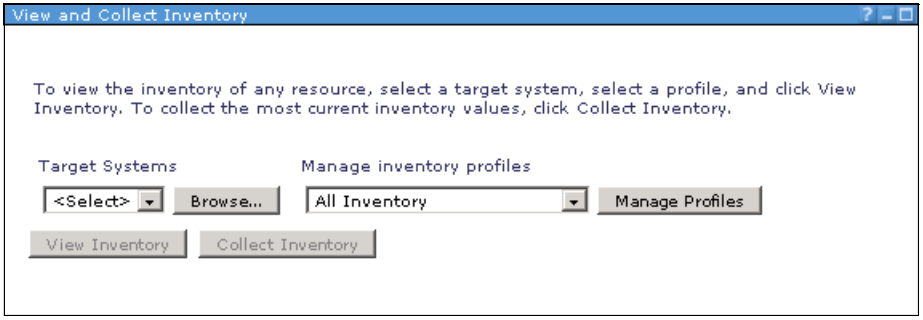


Figure 6-9 View and Collect Inventory page

You can select the resource whose inventory information you want to see by clicking the **Browse** button. You can also select the inventory profile to filter your inventory view as per the profile configuration. You can also create your own inventory profile for a customizable inventory view. (See 6.6.3, “Inventory collection profiles” on page 331.) Once you view the inventory, you can refresh the view by clicking the **Refresh** button so that any inventory changes are updated in the view.

6.6.2 Collect inventory

To collect inventory for a managed resource you must have that respective resource discovered in IBM Systems Director. Once a resource is discovered you can select **Inventory** → **View and Collect Inventory** from the IBM Systems Director Web navigation area. You can browse through the discovered resources to select the resource for which you want to collect inventory. You can also customize the inventory discovery by selecting the appropriate inventory profile.

By default, IBM Systems Director provides four inventory profiles (see 6.6.1, “View inventory” on page 330). You can also create your own inventory profiles. (See 6.6.3, “Inventory collection profiles” on page 331.)

As shown in Figure 6-10, you can choose to schedule inventory collection and set notification options.

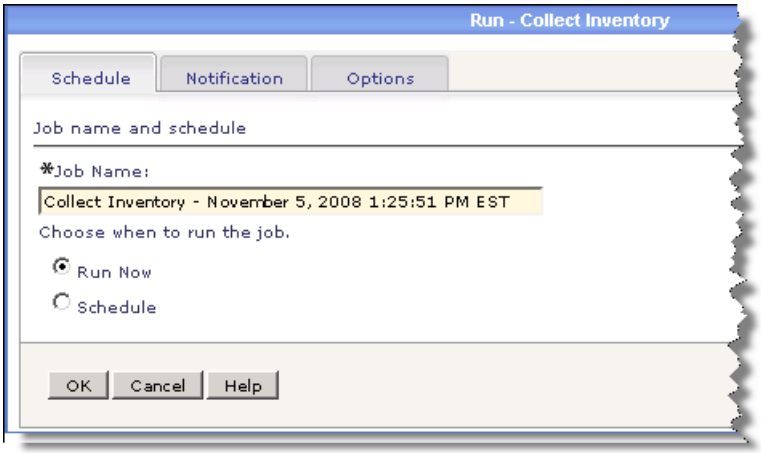


Figure 6-10 Run Now: Collect Inventory page

6.6.3 Inventory collection profiles

Inventory profiles are used to define the inventory data to be collected as a part of inventory discovery. Inventory data comprises three parts:

- Inventory item
- Inventory attribute
- Inventory value

IBM Systems Director defines the following default inventory profiles:

- All Inventory
- Basic system information
- All hardware inventory
- All software inventory

You can edit these profiles to make any changes. You can also create your own customized inventory profiles. To change the existing inventory profiles or to create new profiles go to **Inventory** → **View and Collect Inventory**. Click **Manage Profiles**. See Figure 6-11.

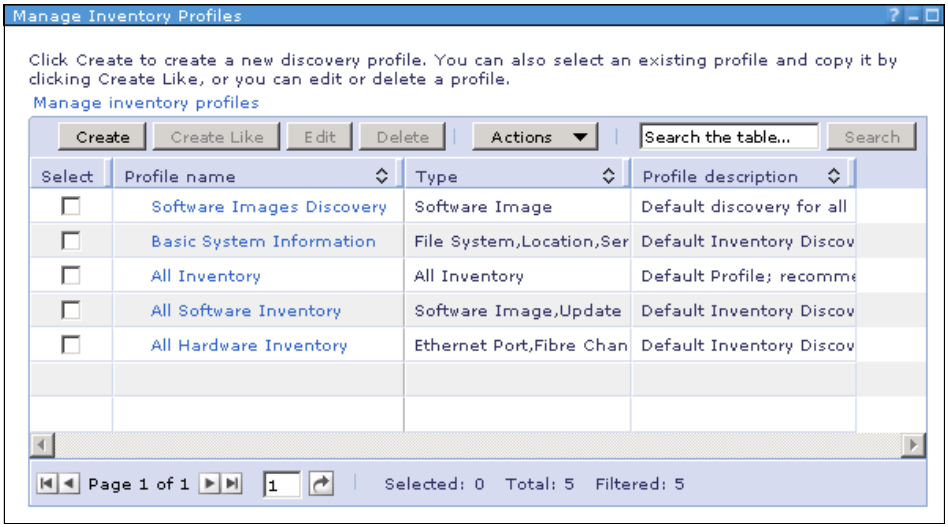


Figure 6-11 Manage inventory profile page

To edit the existing profiles, select any profile and then click **Edit**. This opens the Edit Inventory Profile Wizard, which guides you through making changes in the profile.

To create a new Inventory profile, click **Create**. This opens the Create Inventory Profile Wizard, as shown in Figure 6-12.

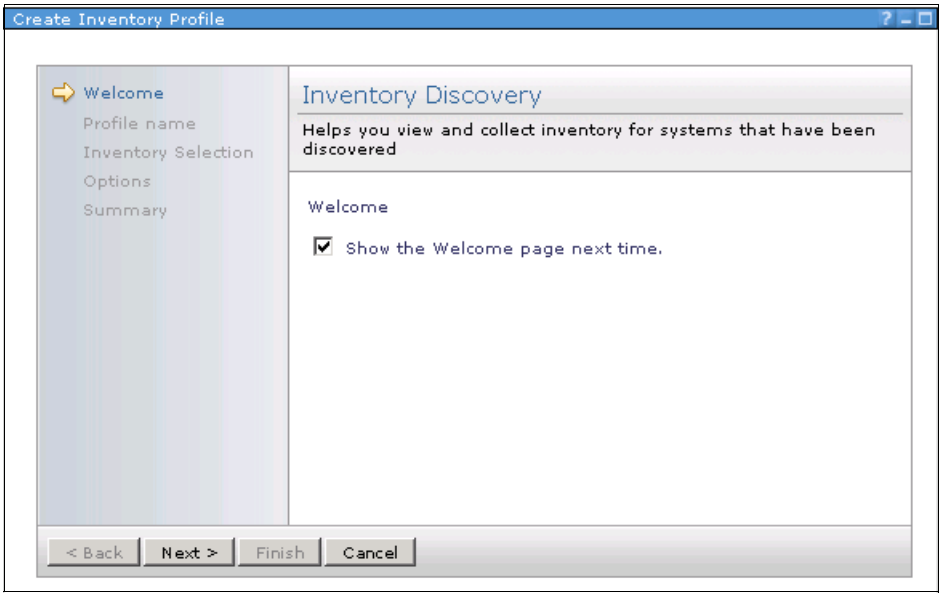


Figure 6-12 Create Inventory Profile wizard

You must specify the profile name and optionally the profile description on the Profile Name page, as shown in Figure 6-13.

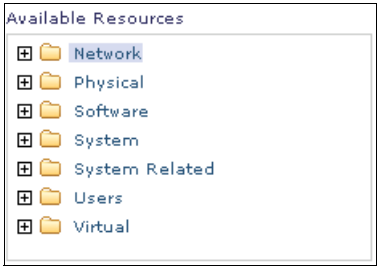


Figure 6-13 Available inventory resources during inventory profile creation

As shown in Figure 6-13, on the inventory selection page, you can select from inventory resources in the list and also their respective inventory items that you want to be part of your inventory profile.

In the Timeout period field, type the number of minutes that you want to allot before an inventory collection event terminates. If the time-out value elapses before the response is received from the destination no inventory data will be

collected from that target. In the Maximum simultaneous collections field, type the maximum number of agents from which IBM Systems Director Server can simultaneously collect inventory.

Tip: To help reduce network traffic, specify the lowest possible number of agents.

Once the inventory profile is created it can be used to view the inventory or to collect the inventory as per the configurations defined in the profile.

7

Status Manager

Being aware of the status of the resources in your environment is one of the primary reasons to implement a systems management tool like IBM Systems Director. You can monitor the health and status of your systems and other resources using Status Manager.

This chapter describes the following topics regarding Status Manager:

7.1 Status Manager overview page

The Status Manager plug-in allows you to monitor not only the health of a system but also the status of resources and processes. You can access the different functions of Status Manager either by clicking **Status Manager** on the Welcome page or one of the System Status and Health tasks in the tasks pane of the Web console, shown in Figure 7-1.

Note: The term *plug-in* refers not only to management function that can be added to IBM Systems Director after initial installation, but also to the multiple *manager* functions that come preinstalled in the base IBM Systems Director product.

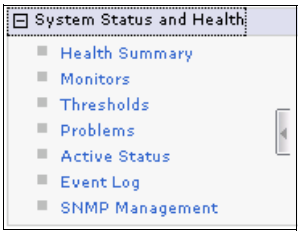


Figure 7-1 Navigation area showing system status and health tasks

When you click **Status Manager** on the Welcome page you get the Status Manager overview page, as shown in Figure 7-2.

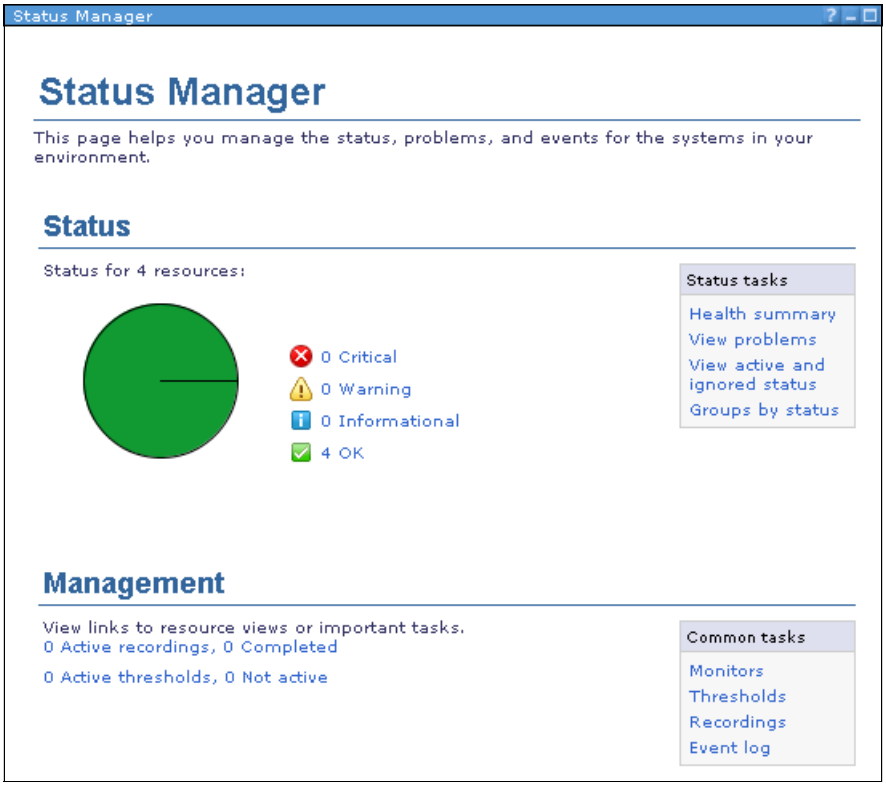


Figure 7-2 Status Manager overview page

That page gives you a convenient overview of the health of your environment and several common tasks that you may use. This makes that page very useful as a startup page or for use by an operations or systems administration team. See 5.4, “Customizing the Web interface” on page 244, for details on setting up Startup pages.

Under the Status heading in Figure 7-2 on page 337 is a pie chart showing the overall heath of your environment. The pie chart shows that all systems being monitored are OK. Next to that is a list of the different severity statuses and the number of systems that have reported each status. Clicking either the pie chart or the severity text takes you to a page showing the related resources, as seen in Figure 7-3.

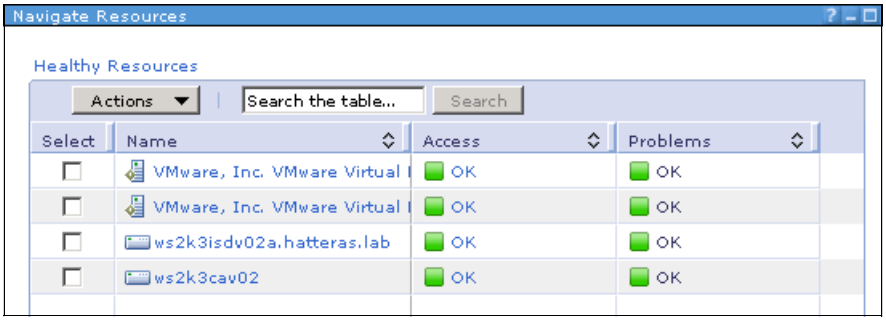


Figure 7-3 Healthy Resources list

To the right of the status pie chart are several common tasks related to overall status of your environment, including Health summary, View problems, View active and ignored status, and Groups by status. See 7.2, “Health summary” on page 340, and 7.7, “Active status: System status” on page 372, for more information about the Health summary, View problems, and View active and ignored status links.

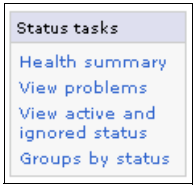


Figure 7-4 Status Manager: Status tasks

Tip: Problems are a subset of active status. If you click **View active and ignored status** you will see both problems and compliance events. If you click **View problems** you will see only problem events.

Next is the Management section. This section shows you any recordings or thresholds defined in the environment.

Figure 7-5 Status Manager: Management

Clicking either **Active recordings** or **Active thresholds** takes you to the appropriate page.

Note: To open the Active recordings page you must have Java Web Start installed. If you do not have Java Web Start installed you will see a warning, as shown in Figure 7-6, and be given a chance to install it.

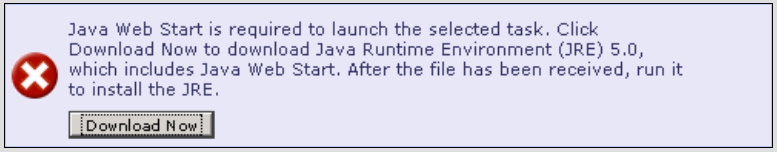


Figure 7-6 Java Web Start required warning

To the right of the active recordings and active thresholds is a list of common tasks related to managing systems, including monitors, thresholds, recordings, and event log, as shown in Figure 7-7. Clicking these links takes you to the appropriate pages.

Figure 7-7 Status Manager: Management common tasks

See the following sections for more information about these topics:

- 7.3, “Monitors” on page 343
- 7.5, “Thresholds” on page 360
- 7.6, “Recordings” on page 365
- 7.8, “Event log” on page 376

7.2 Health summary

The health summary page gives you a view of the overall health of your environment. This page includes a scoreboard, customizable dashboard, and health summary with both of your favorite groups and a list of problem systems. See Figure 7-8.

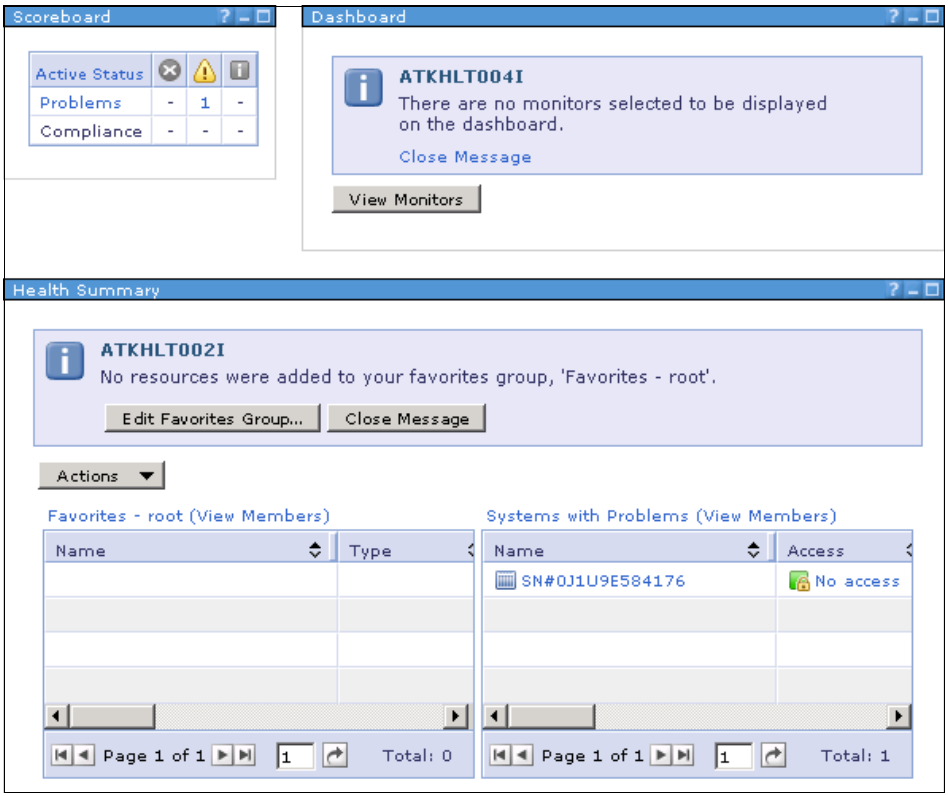


Figure 7-8 Health Summary page

Unlike the Status Manager page, this page focuses exclusively on the health of your environment.

7.2.1 Scoreboard

The scoreboard gives you a quick look at the health of your environment. Unlike the Status Manager page, this element shows the number of resources reporting either problems or compliance issues categorized by severity.

Clicking the **Active Status** heading takes you to the Active Status page. Clicking the **Problems** or **Compliance** links also takes you to the Active Status page, but filters the events based on the that link you click. See 7.7, “Active status: System status” on page 372, for more information about the Active Status page.

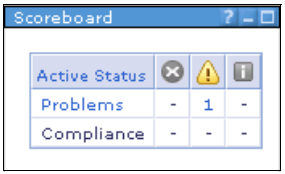


Figure 7-9 Status Manager Scoreboard

7.2.2 Dashboard

The dashboard allows you to watch selected monitors. When you first log in to IBM Systems Director 6.1 there are no monitors in your dashboard. See 5.8.1, “The Dashboard view” on page 297, for more information about customizing the dashboard.

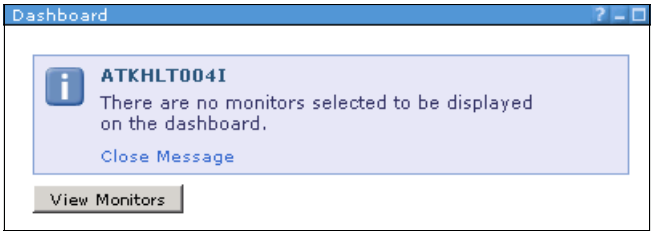


Figure 7-10 Status Manager dashboard without monitors

After customizing the dashboard, it looks similar to Figure 7-11.

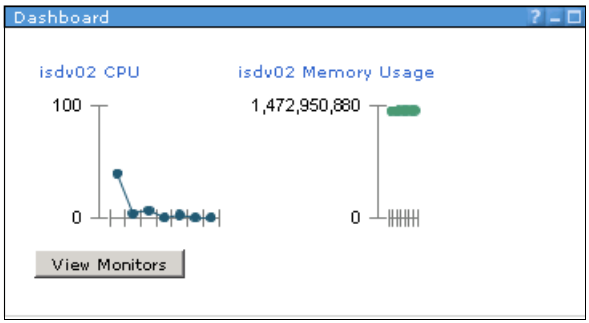


Figure 7-11 Status Manager Dashboard with monitors

See “Creating monitors and adding monitors to the Dashboard” on page 297 for more information about adding monitors to the dashboard.

7.2.3 Health Summary section

The Health Summary section shows the detailed health status of resources that you have added to your favorites and any resources with active problem events. When you first install IBM Systems Director 6.1, there are no resources in your favorites group. See “Adding resources to the Favorites view” on page 309 for more details about adding resources to your favorites group.

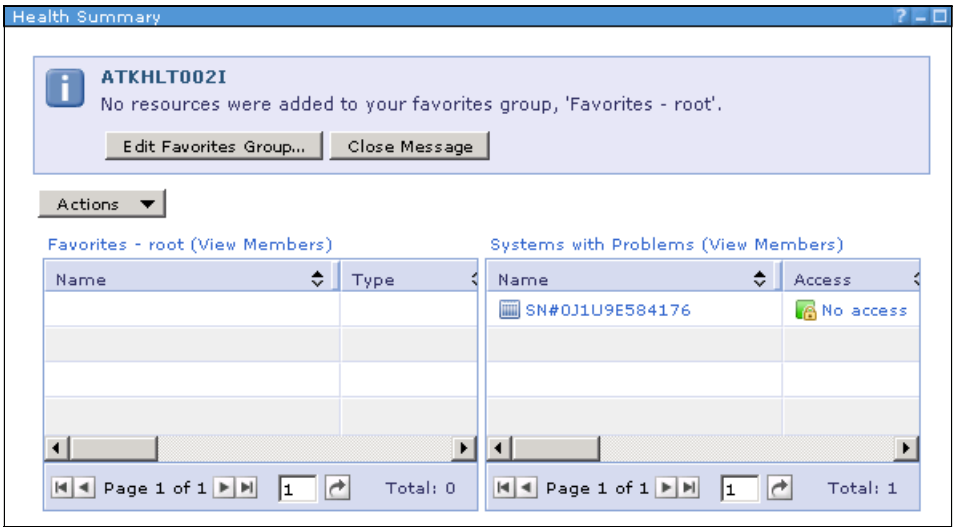


Figure 7-12 Status Manager Health Summary

By having the resources that you most need to monitor in your favorites group you can easily see their health status on this page. If we focus on one of the summary lists, you will see the different statuses that a system may report.

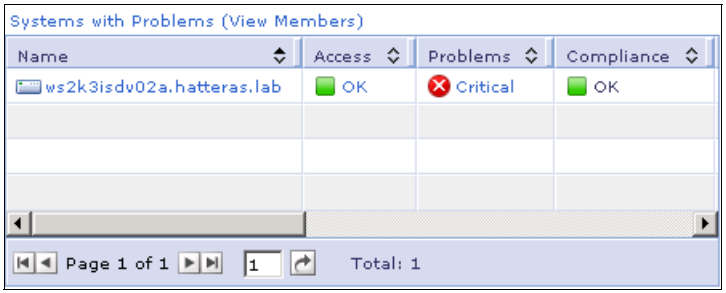


Figure 7-13 Health Summary: Systems with Problems

The basic information that you see listed here is the system name and the three status columns:

- Access: Does IBM Systems Director have access to the resource?
- Problems: The highest severity of any problems reported by the resource.
- Compliance: The highest severity of any compliance issues reported by the resource.

Further to the right, you see additional information about the resource, such as IP address, operating system, and version.

7.3 Monitors

The term *monitors* in IBM Systems Director refers to the counters on a specific resource that you can watch (for real-time monitoring), record (for historical information), or set a threshold on (for alerting and automation). The specific monitors available vary based on the type of resource and the operating system that it is running.

When you click the **Monitors** task you see a list of monitor views (Figure 7-14).

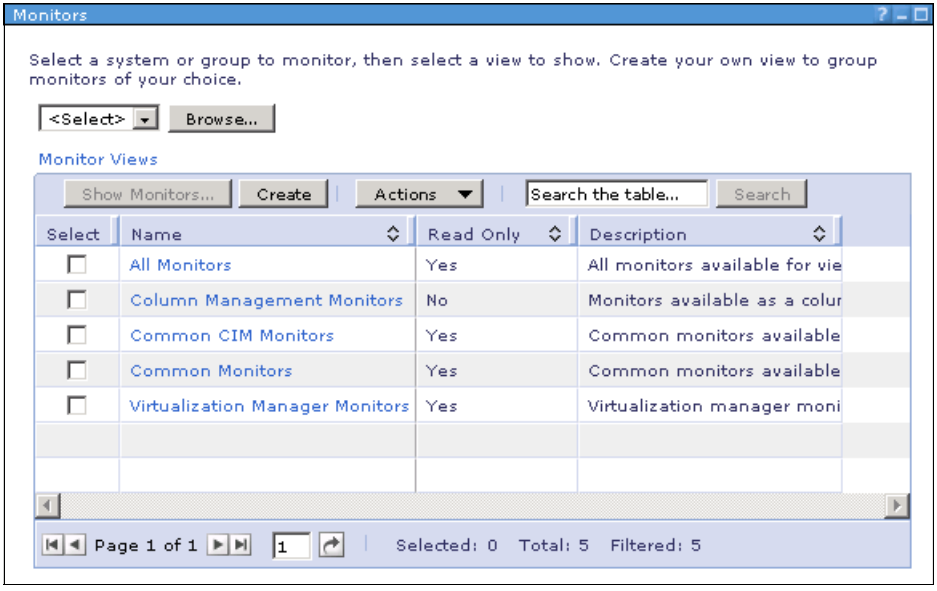


Figure 7-14 Monitors view showing categories of monitors available

Here you can select the systems that you want to target, as well as which monitor or groups of monitors you want to view. See 7.3.2, “Monitor views” on page 345, for more information about Monitor views.

7.3.1 Monitor targets

In order to look at a resources monitor you need to *target* it (that is, tell IBM Systems Director which system monitors you want to see). When you first go to the Monitors page there are no systems selected.

Figure 7-15 Select target for monitors

Click the **Browse** button to see the Context Chooser window, which allows you to select systems on which to target the selected monitors.

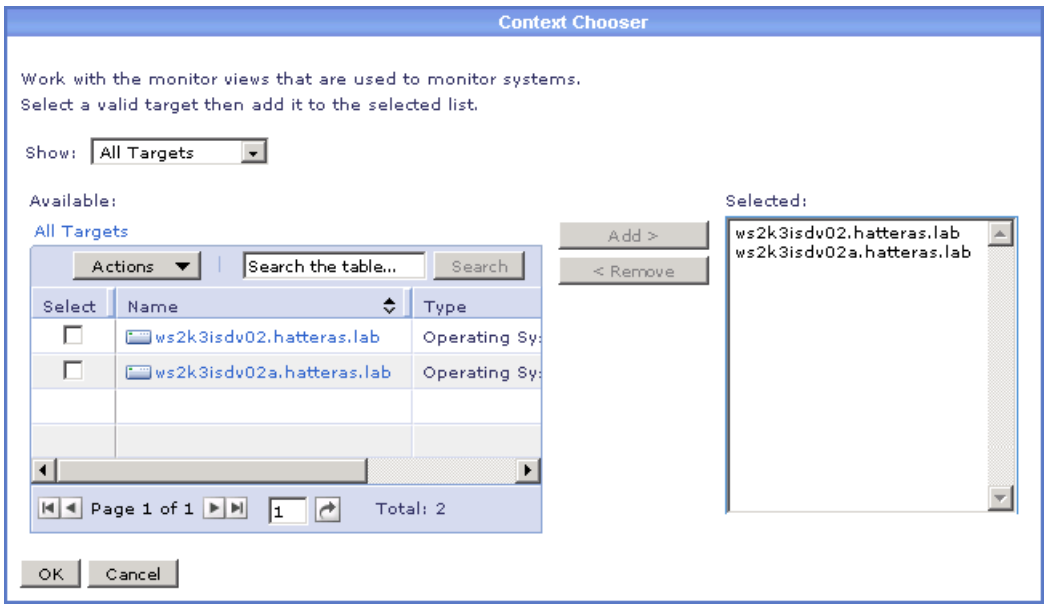


Figure 7-16 Monitors context chooser

Select the systems that you want to target then click the **Add** button to add them to the target list. See 5.5.3, “Breadcrumb trail” on page 261, for more information about finding resources.

7.3.2 Monitor views

Monitor views allow you to group monitors together in logical groups. This provides a couple of benefits:

- You can find the monitor that you are looking for more easily by not having to search through all available monitors.
- You can see a group of monitors that you use frequently in one step, rather than having to select each monitor individually.

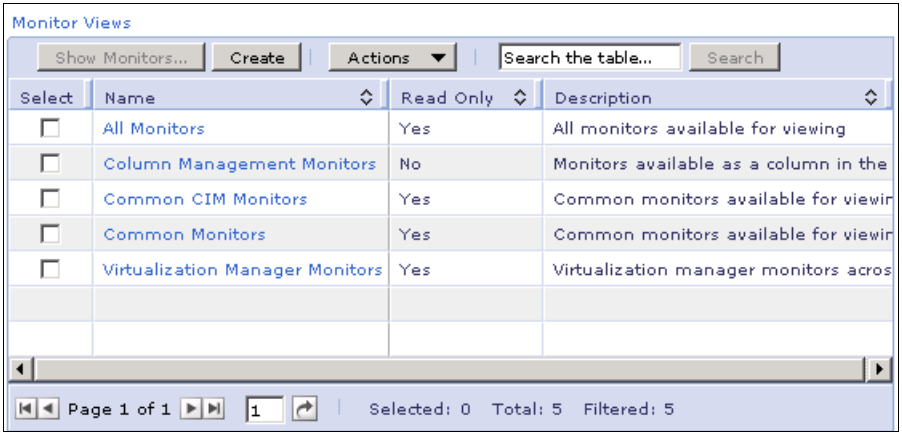


Figure 7-17 Monitor Views window

When IBM Systems Director 6.1 is installed several default Monitor views are created. As you can see in Figure 7-17 on page 345, most of the views are designated as read only. This means that you can use the views, but not edit them. To view all the monitors in the view targeted at selected resources, select a monitor group and click **Show Monitors**. Alternately, you can select the view and select specific monitors to view. An example is shown in Figure 7-18.

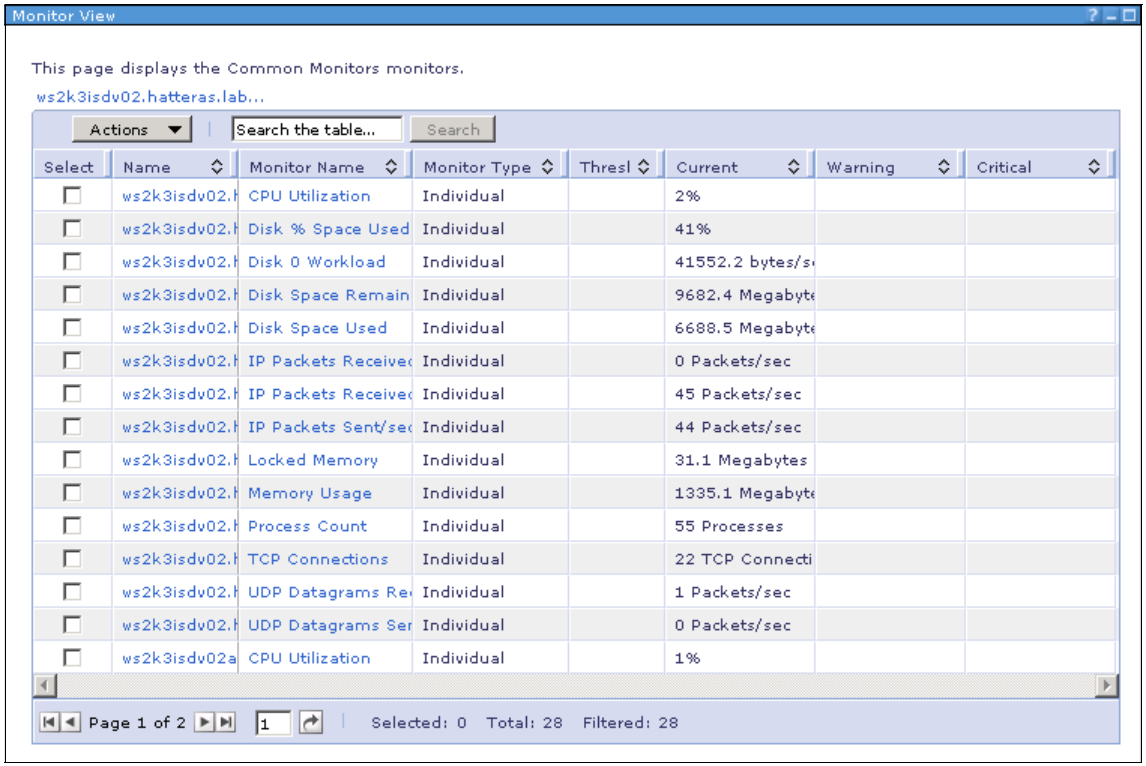


Figure 7-18 Show Monitors view

In Figure 7-18 we see all the counters for all systems that we targeted. Each row includes the system name, the name of the monitor, the type of monitor (group or individual), whether there is an active threshold, what the current value of the monitor is, and the warning and critical values for the threshold.

Figure 7-19 shows a Monitors view in which active monitor thresholds have been applied to two monitors.

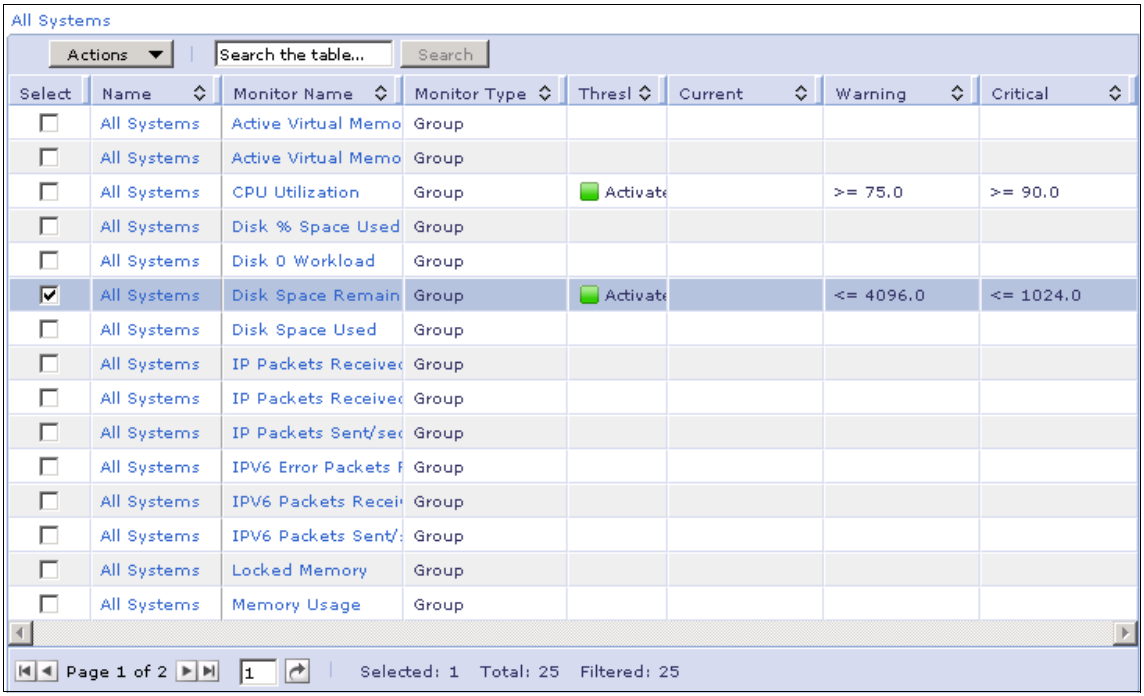


Figure 7-19 Show monitors with active thresholds

7.3.3 Creating monitor views

To create your own monitor views, click the **Create** button on the Monitor Views frame, seen in Figure 7-20.

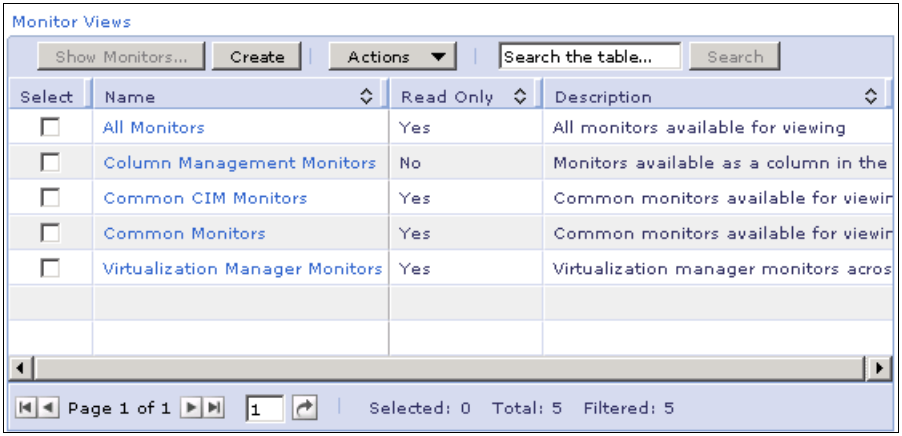


Figure 7-20 Monitor Views frame

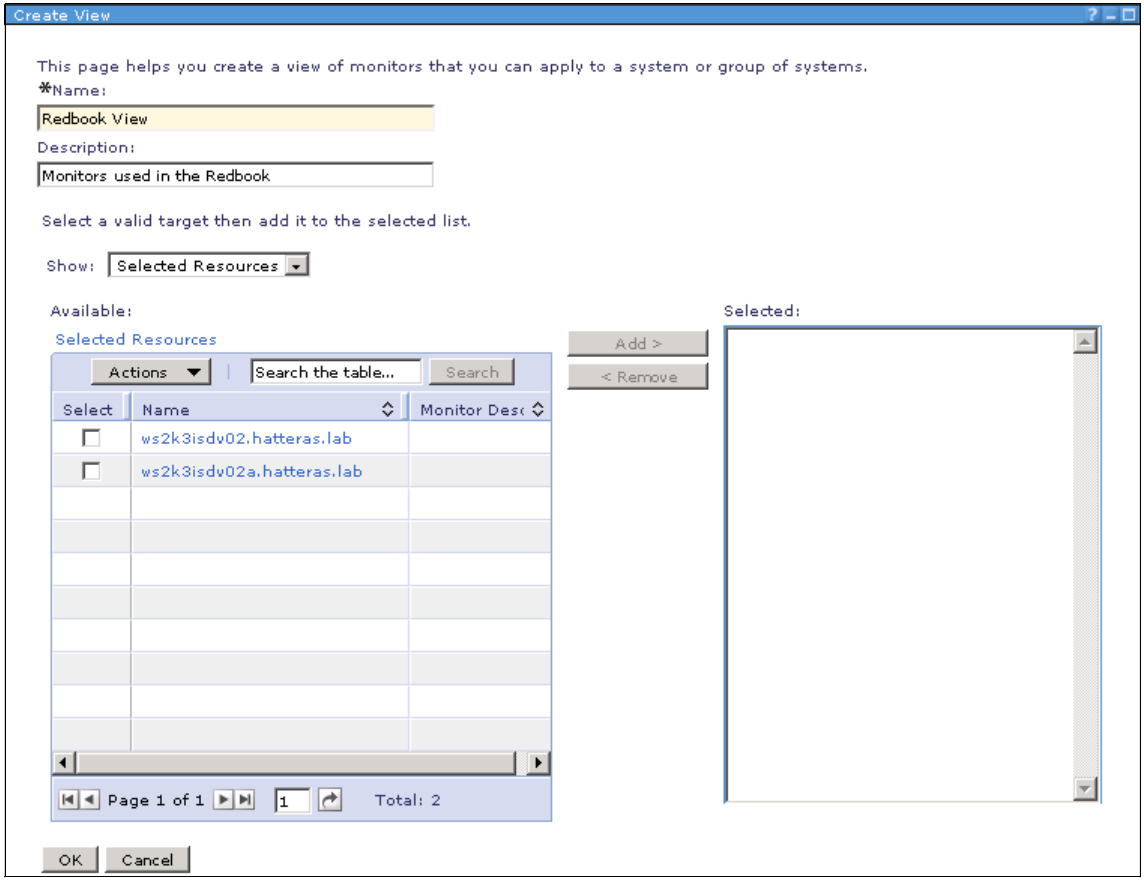


Figure 7-21 Create Monitor View window

When you create a view you must give it a name and optionally a description. Then select which monitors to include in the view. To find monitors, you can either search the monitors available for the resources that you have targeted in the Monitor Views page or search one of the existing views. See Figure 7-22.

Figure 7-22 Show selected resources during monitor view creation

To search through existing monitor views, select **Monitor Views** from the Show pull-down, as shown in Figure 7-23. Then drill into the views, check the monitors that you want to add, and click the **Add** button.

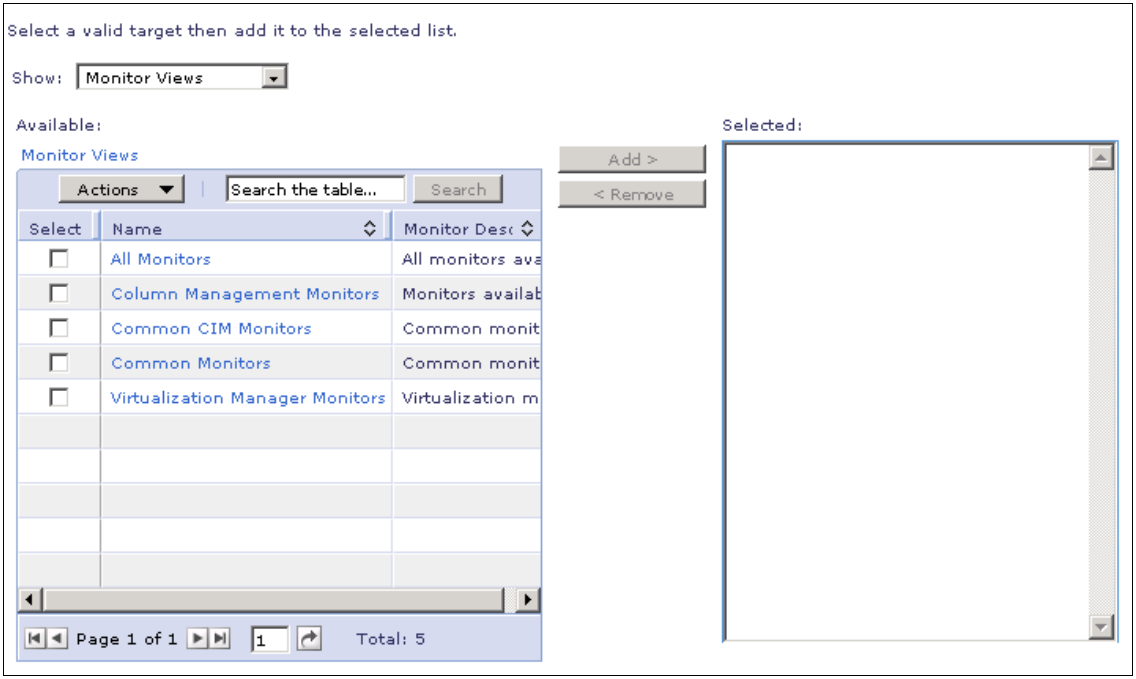


Figure 7-23 Create view from monitor views

You can also add any monitors in the resources that you have selected. Just choose **Selected Resources** from the Show pull-down, drill down into the systems, and **Add** them to the chooser, as shown in Figure 7-24.

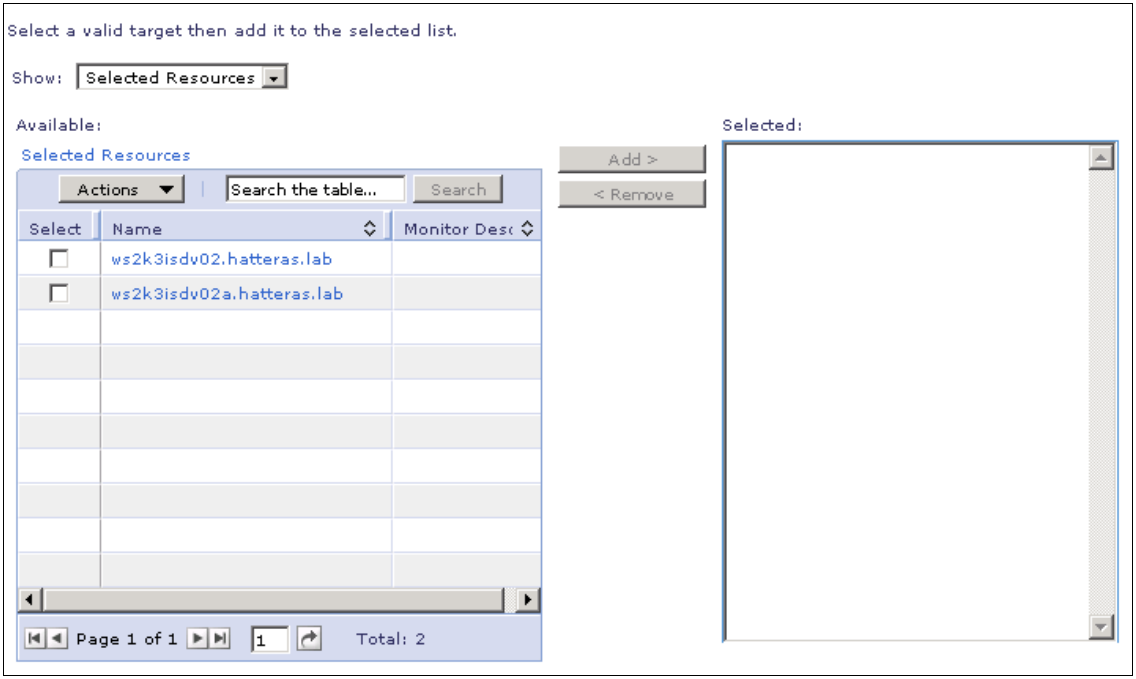


Figure 7-24 Create view from selected resources

You can choose specific types of monitors, as seen in Figure 7-25 and Figure 7-26.

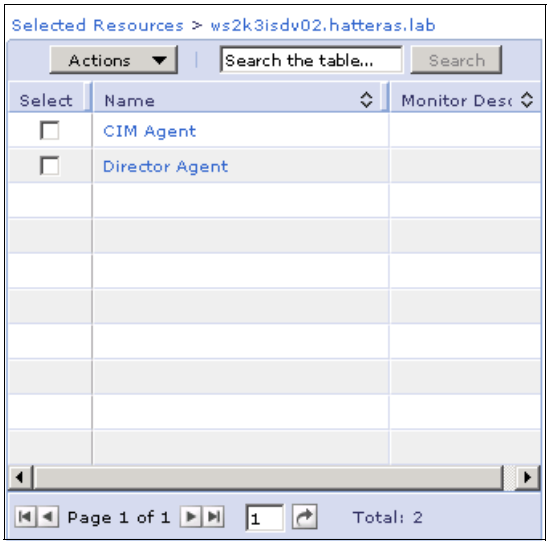


Figure 7-25 Monitor types

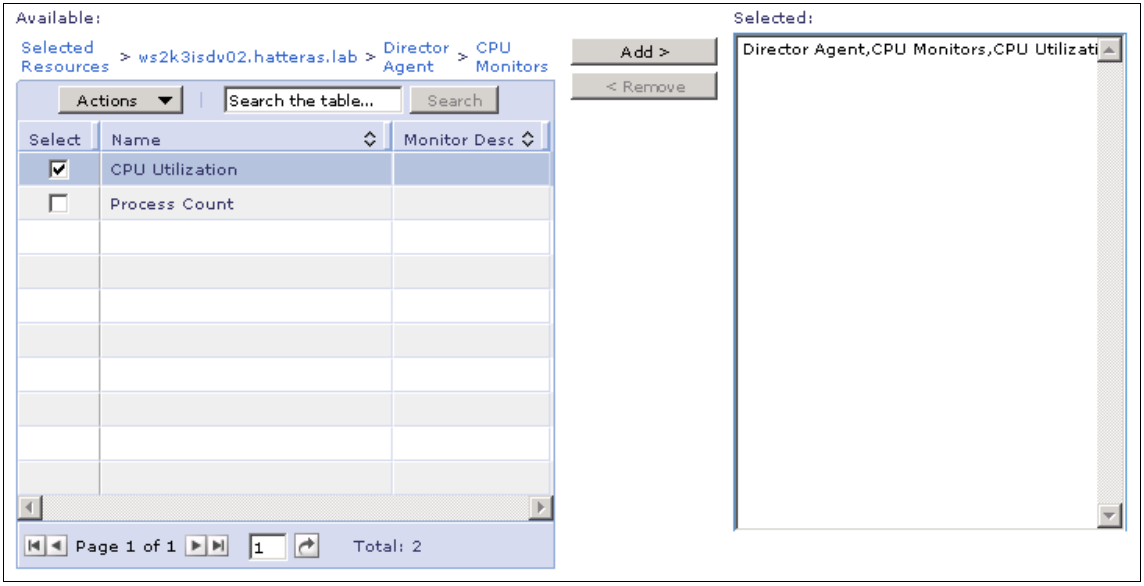


Figure 7-26 Specific monitor

Once you have selected all the monitors that you want in your view, click **OK** and the new view appears in the list of views, as shown in Figure 7-27.

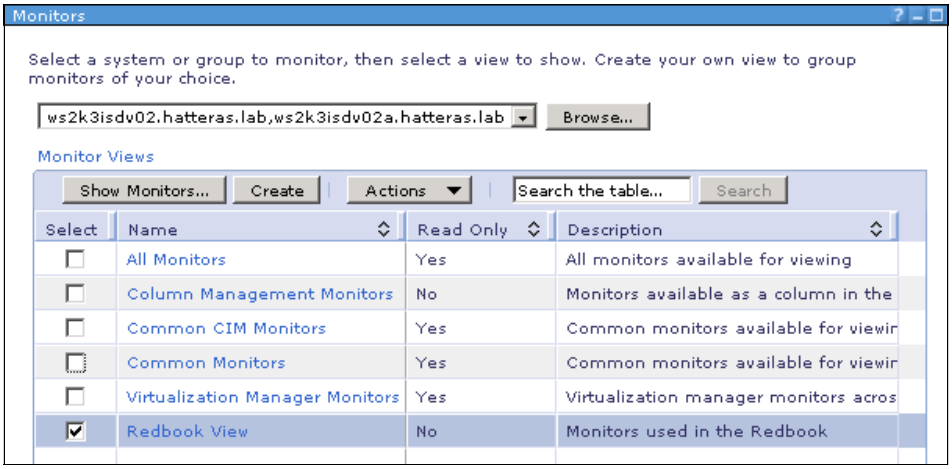


Figure 7-27 New monitor view

Note: When you create a view it displays `No` in the Read Only column. While anyone can use the view, only the creator or an SMAdmin can edit the view.

7.4 Process Management

Unlike monitors, which can be targeted to multiple systems and groups, the Process Management task targets only a single system. For this reason, you start Process Management by finding the system resource that you want to target, right-clicking it, and then selecting **Systems Status and Health** → **Manage Processes**. See Figure 7-28.

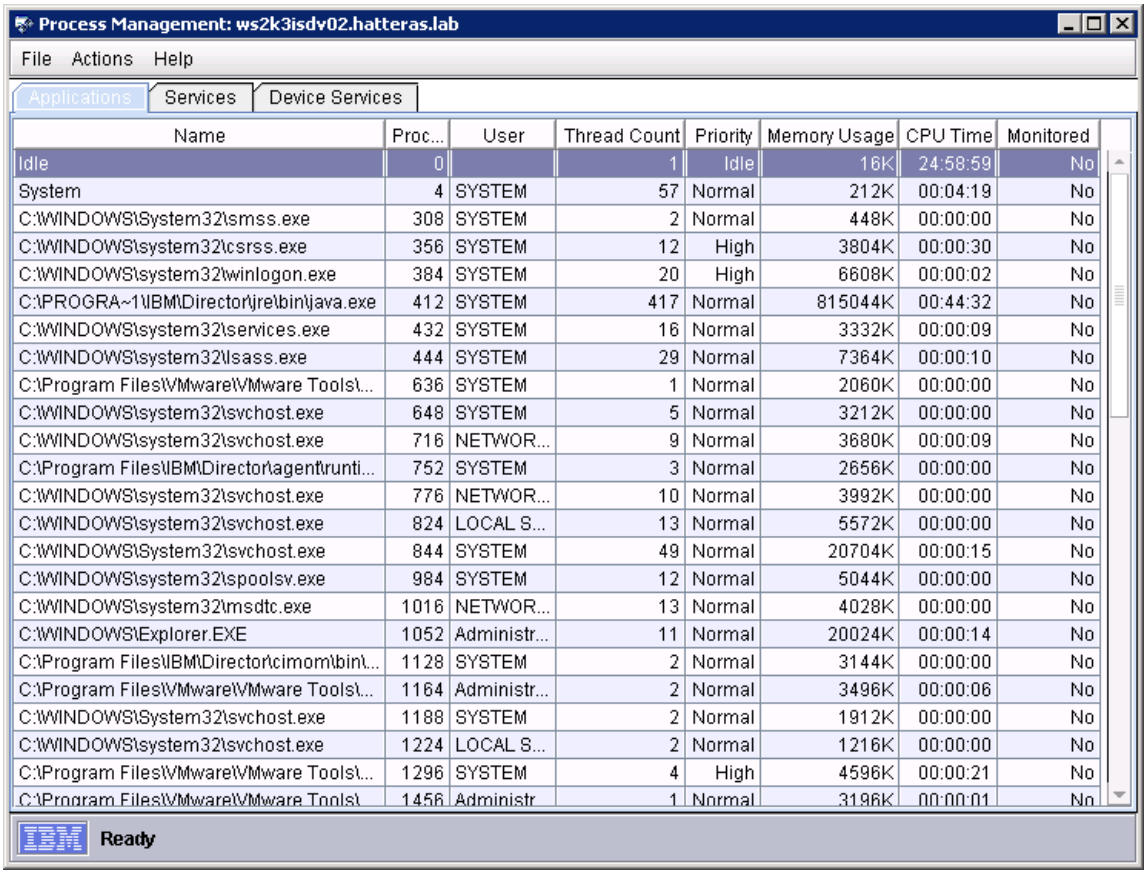


Figure 7-28 Process Management window

7.4.1 Applications tab or Processes tab

The Applications tab or Processes tab (depending on the target operating system) lists all of the applications or processes currently running on the target system. Each process shows the following information, depending on the installed operating system:

- Name
- Process ID
- User
- Thread count
- Priority
- Memory usage
- CPU time
- Monitored

When you right-click a process you get a context menu from which you can add the process to monitors, close the application, or set the priority of the process. See “Process monitors” on page 365 for more information about process monitors.

Figure 7-29 Process management context menu

7.4.2 Services tab

The Services tab (on Windows-managed systems only) shows you information about the services installed in the operating system, as shown in Figure 7-30.

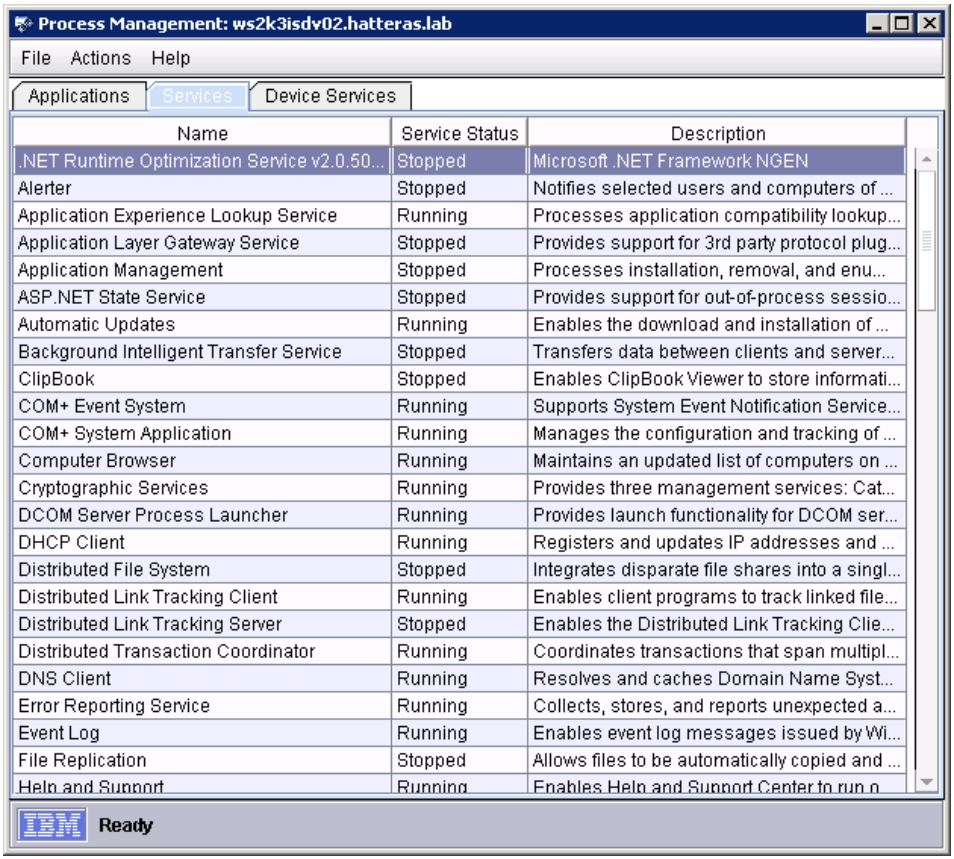


Figure 7-30 Process Management: Services tab

On this tab you can see the following information about these services:

- Name
- Service status
- Description

Right-clicking on a services brings up a context menu where you can create a threshold for the service or change the status of the service, as shown in Figure 7-31.

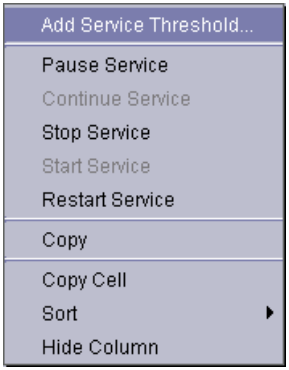


Figure 7-31 Process Management: Services context menu

If you click **Add Service Threshold** you see a window to define a Service Monitor, Figure 7-32.

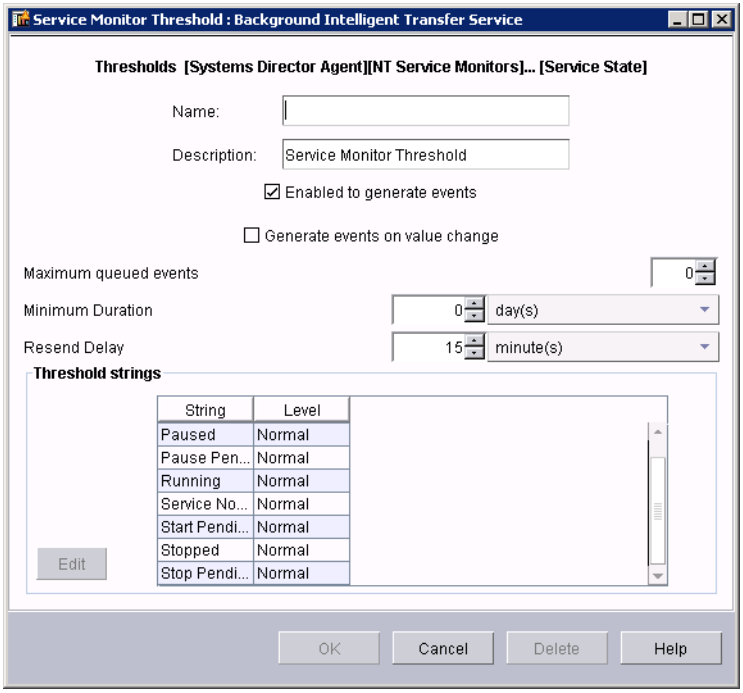


Figure 7-32 Process Management Service Monitor

Tip: While the context menu says **Add Service Threshold**, the window that is opened is called Service Monitor. Do not get confused by the change in terminology.

While the page is different, refer to “Textual thresholds” on page 362 and “Generate events when the value changes.” on page 363 for more information about how to select appropriate settings for service monitors.

7.4.3 Device Services tab

In addition to Windows services, IBM Systems Director Process Management allows you to see and control the Windows device services that are installed on a managed system.

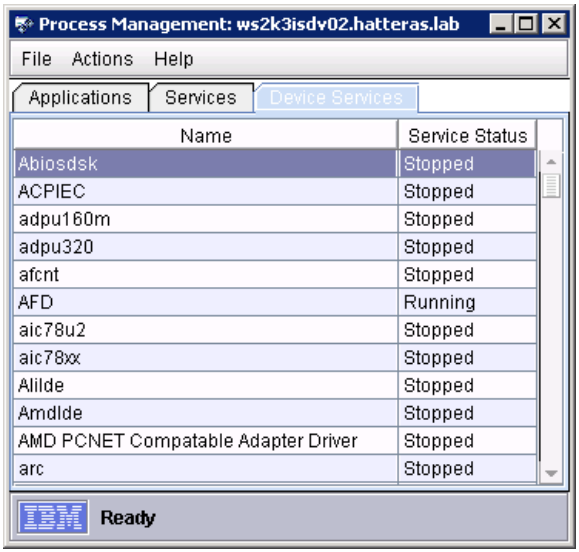


Figure 7-33 Process Management - Device Services tab

This tab shows you the following information about the device services

- Name
- Service Status

Right-clicking a device service brings up a context menu that allows you to create a device threshold or change the status of the device service.

Figure 7-34 Process Manager: Device services context menu

When you click **Add Device Threshold** you see a window to define a service monitor (Figure 7-35).

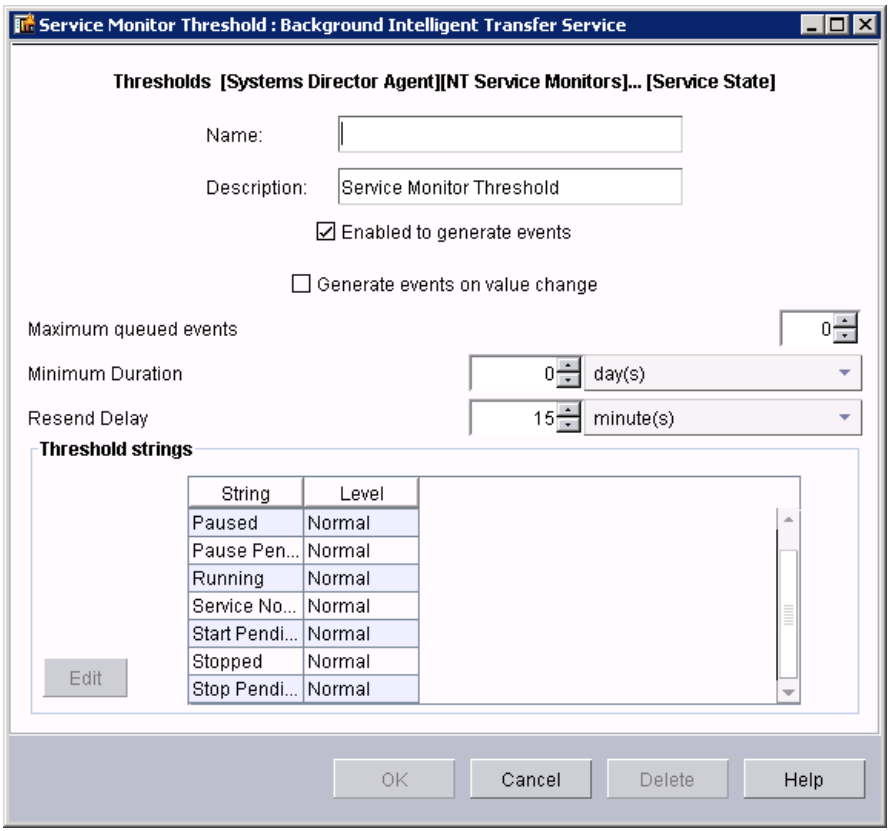


Figure 7-35 Process management service monitor

Note: While the context menu says Add Device Threshold, the window that is opened is called Service Monitor. Do not get confused by the change in terminology.

When the page is different, refer to “Textual thresholds” on page 362 and “Generate events when the value changes.” on page 363 for more information about how to select appropriate settings for device service monitors.

7.5 Thresholds

Thresholds are the method that IBM Systems Director uses to generate an alert when a monitor exceeds a limit that you set, either high or low.

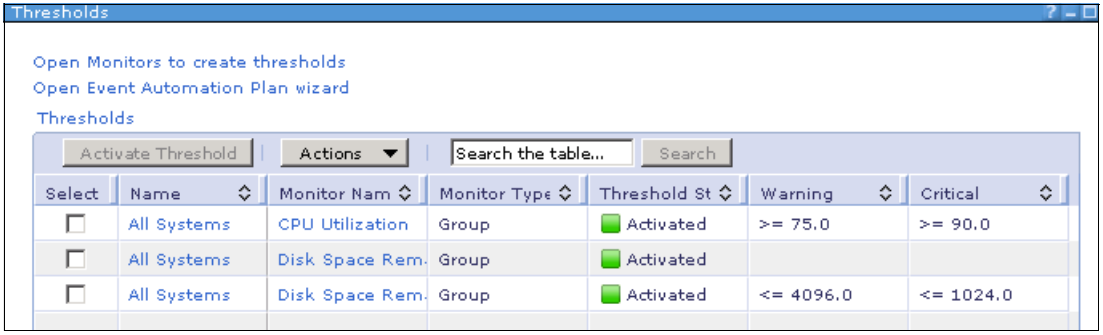


Figure 7-36 Thresholds page

The Thresholds page, shown in Figure 7-36, shows a list of all thresholds set on resources in your environment. Clicking a threshold shows you its properties. Also, you can click **Open Monitors to create thresholds** to create additional thresholds. See 7.3, “Monitors” on page 343, for more details on monitors.

Clicking **Open Event Automation Plan wizard** takes you to the Event Automation Plan wizard where you can define how events are handled, including those from monitor thresholds. See Chapter 9, “Automation Manager” on page 405, for more information about the Event Automation Plan wizard.

Creating thresholds

With the exception of Process Monitors, the easiest way to create a threshold is to find the monitor that you want to set the threshold on, right-click the system name (the Name column, not the Monitor Name column), and select **Activate Threshold**. See “Process monitors” on page 365 for details on how to create a Process Monitor.

Numeric thresholds

When you activate a threshold on a numeric monitor you get the page shown in Figure 7-37.

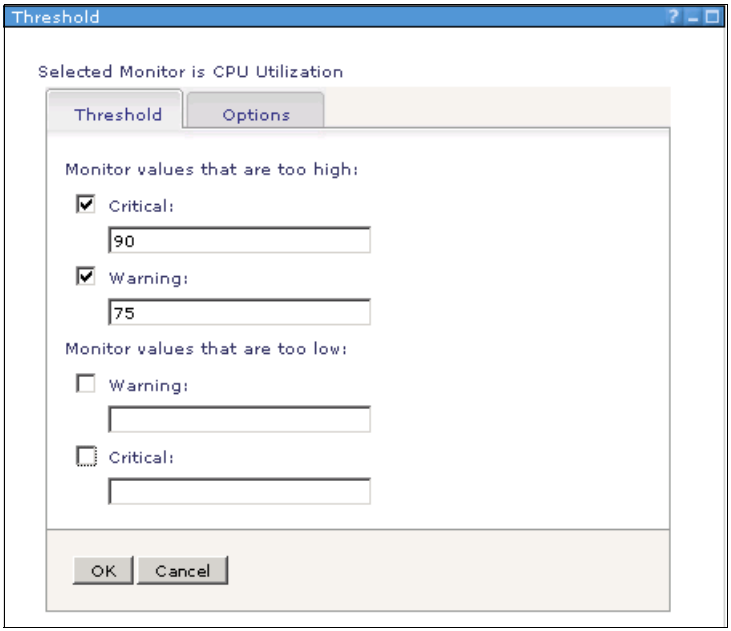


Figure 7-37 Create numeric threshold

On the Threshold tab you can choose which severity and values you want to set for the threshold. In Figure 7-37 we create a threshold for CPU utilization, so we selected to set a warning status at 75% and a critical status at 90% on the monitor values that are high. Also notice that we did not enable events for low values, since we are not concerned about low CPU utilization.

Once you set the values click **OK** to activate the threshold.

Textual thresholds

When the monitor on which you set a threshold uses text strings rather than numerical values to indicate its status, IBM Systems Director provides a different window to configure the threshold (Figure 7-38).

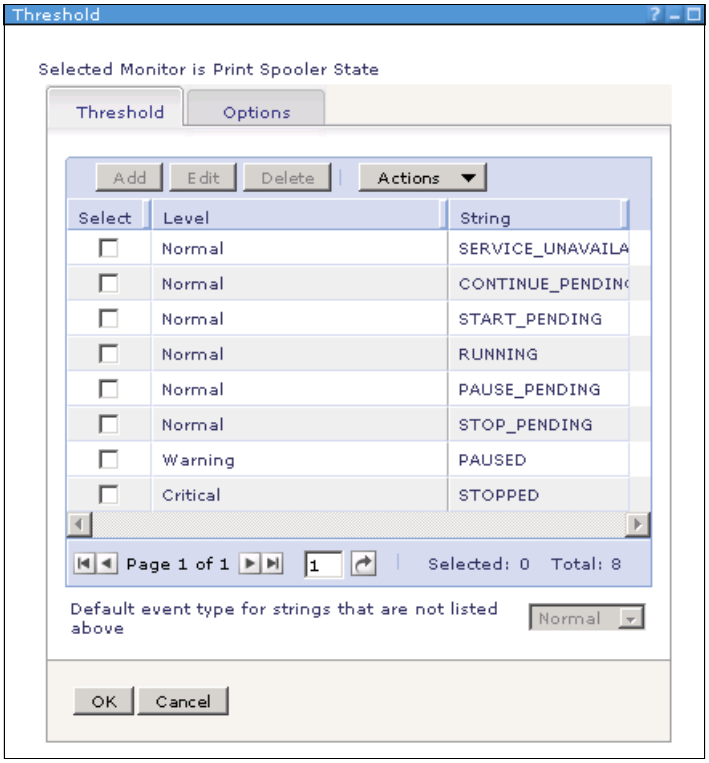


Figure 7-38 Create textual threshold

In Figure 7-38 on page 362 we see a list of possible values for the Windows Print Spooler service monitor, along with the severity level of each. Notice that we set the severity for the PAUSED and STOPPED strings to warning and critical, respectively. By default, all strings have a severity level of normal. You can edit the severity level by selecting a string (one at a time) and clicking **Edit**, as shown in Figure 7-39.

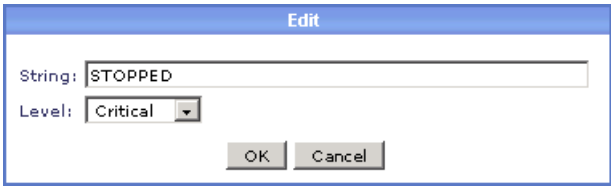


Figure 7-39 Edit textual threshold severity

In the pop-up window, choose the severity level that you want to establish in the case where the value of the monitor becomes equal to the string shown.

If the value of the monitor becomes equal to a string that is not listed, the threshold will have a severity status of normal.

Threshold options

For both numeric and textual thresholds you can set the options shown in Figure 7-40 on page 364. Specifically, you can set the following options:

- Enable event generation.

  Since you probably will not be creating a threshold that you did not plan to use, Enable event generation is checked by default. This means that when the status of the threshold changes an event will be sent to IBM Systems Director Server. If you wish to disable a threshold without deleting it, you can uncheck this box.

- Generate events when the value changes.

  Checking **Generate events when the value changes** means that whenever the value of the monitor changes it will generate an event to the management server regardless of whether the new value causes a change in status. While we do not normally use this for numeric thresholds, it can be quite handy for textual thresholds where you want your Event Automation Plan to use the text of the monitor status rather than its severity.

- Maximum queued events.

  If a managed system cannot send an event to its IBM Systems Director Server, it queues the event for later transmission. While this is not normally a problem, if you create a threshold that generates events at a very high rate, this can cause serious problems, depending on available network bandwidth.

The Maximum queued events field allows you to limit the maximum number of events that an agent will queue to the server for this threshold.

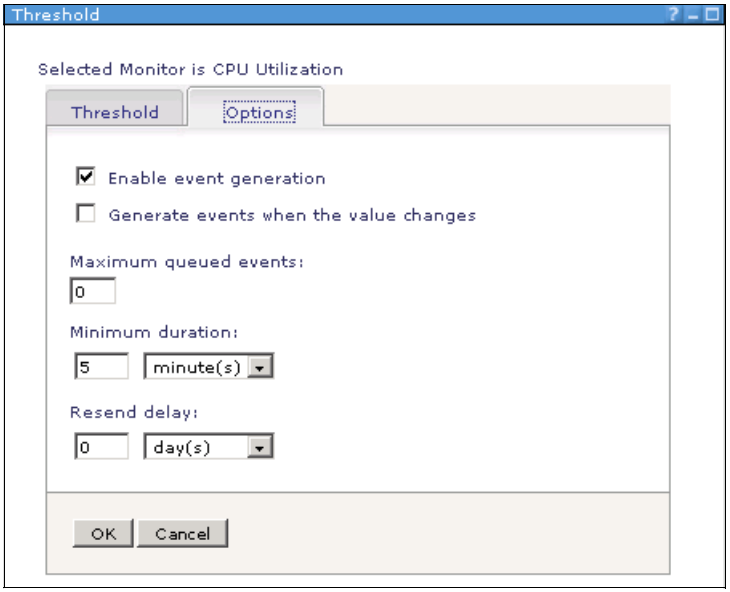


Figure 7-40 Threshold options

- Minimum duration

  A threshold that changes status for a short period of time may not be of a concern to you. For example, it is not uncommon for a server to spike the CPU utilization for a few seconds when performing certain tasks. To help you eliminate extraneous events from being triggered, use the Minimum duration setting to set how long the status must remain changed before an event is sent to the server.

  Note: If the status of the threshold changes before the minimum duration has elapsed then no event will be generated. For example, assume that you have a 5-minute minimum duration for a threshold. If that threshold changes from a normal to a warning state and then four minutes and 50 seconds later changes to a critical state, no warning event will be sent. An event will be sent for the critical state change only after an additional five minutes at the critical state.

- Resend delay

  Some thresholds are important enough that you may want the system to resend them if they are not resolved within a certain amount of time. Setting a

Resend delay allows you to set how frequently the threshold will resend the event if a warning or critical state does not change.

Process monitors

Unlike numeric or textual thresholds, process monitors can only target individual system resources. Also, process monitors are not created on the Monitors page, but by finding the system resource that you want to set the monitor for, right-clicking it, and selecting **Systems Status and Health then Process Monitors**. Once this is done, you will see the Process Monitors window for the system that you targeted, as shown in Figure 7-41.

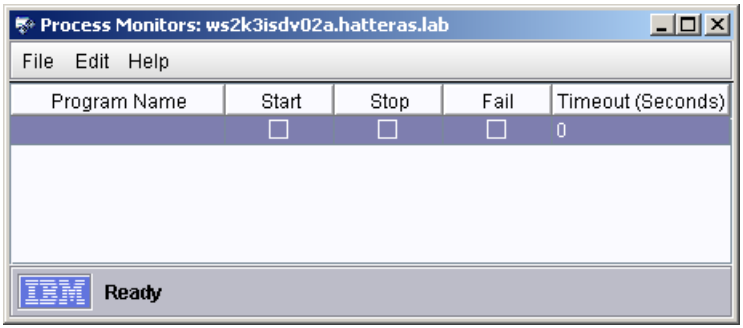


Figure 7-41 Process Monitors window

Note: To open the Process Monitors page you must have Java Web Start installed. If you do not have Java Web Start installed you will see a warning and will be given a chance to install it.

In the Process Monitors window you can enter the process name that you wish to monitor and check whether you want a system to generate an event when a process starts, stops, or fails to start within the time-out that you specify.

Alternately, you can add a process monitor from the Process Management window. See 7.4, “Process Management” on page 354, for details on how process management works.

7.6 Recordings

Resource Monitor Recordings (or just recordings) allow the data from monitors to be recorded on the IBM Systems Director Server. You set up a recording by:

1. Right-click a system name (Name column, not the Monitor Name column) of the monitor that you want to record in the Monitor view and clicking **Resource**

Monitor Recording, as shown in Figure 7-42. You can also view all recordings by clicking **Recordings** from the Management section of the Status Manager page.

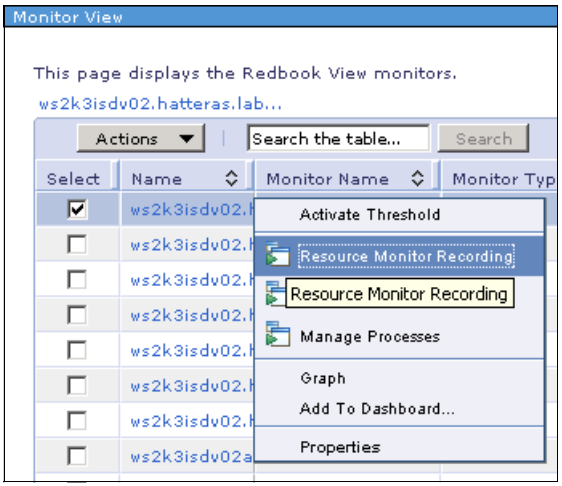


Figure 7-42 Resource Monitor Recording

2. Once the Resource Monitor Recording window is open, as shown in Figure 7-43, click **File** → **New** to create a new recording.

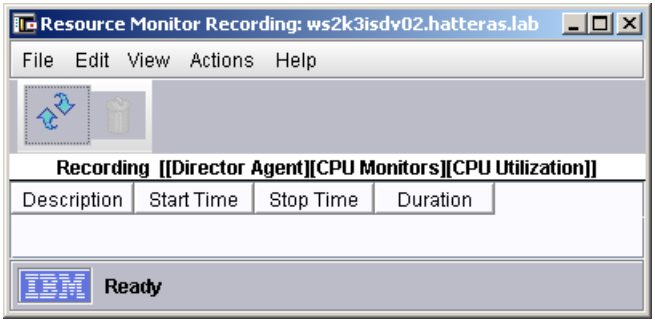


Figure 7-43 Monitor recordings

3. In the New Recording page, shown in Figure 7-44, enter a description for the recording and a duration, then click **OK**.

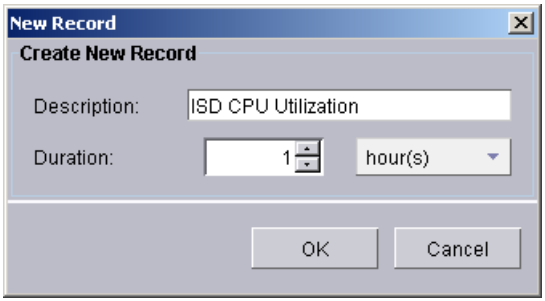


Figure 7-44 New Recording

The new recording will be listed in the Resource Monitor Recordings window, as shown in Figure 7-45.

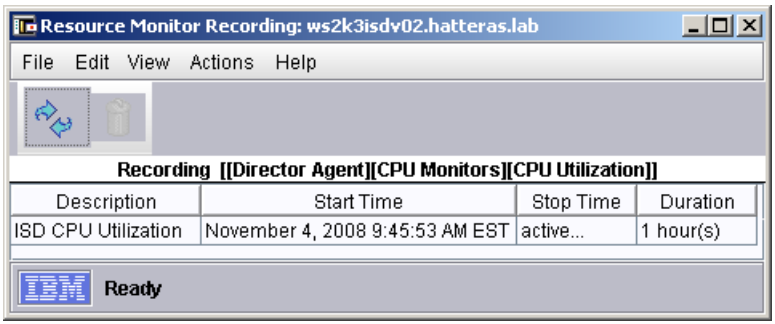


Figure 7-45 Resource Monitor Recordings

Note: Since recordings must send the recorded data back to the management server, they put additional load on the managed system, management server, and the network. For this reason, we recommend limiting the number of recordings that you use and limiting their time frame.

Once you have started recording data, you can work with a recording, either with the Windows menus or the context menu by right-click the recording. From these menus you can:

- Export or graph the data.
- Delete, stop, or copy the recording.
- Copy the contents of one of the cells
- Sort the recordings.

See Figure 7-46.

Figure 7-46 Monitor Recording context menu

Export

When you select **Export** you are given the chance to select where to save the file as well as the file format, as shown in Figure 7-47.

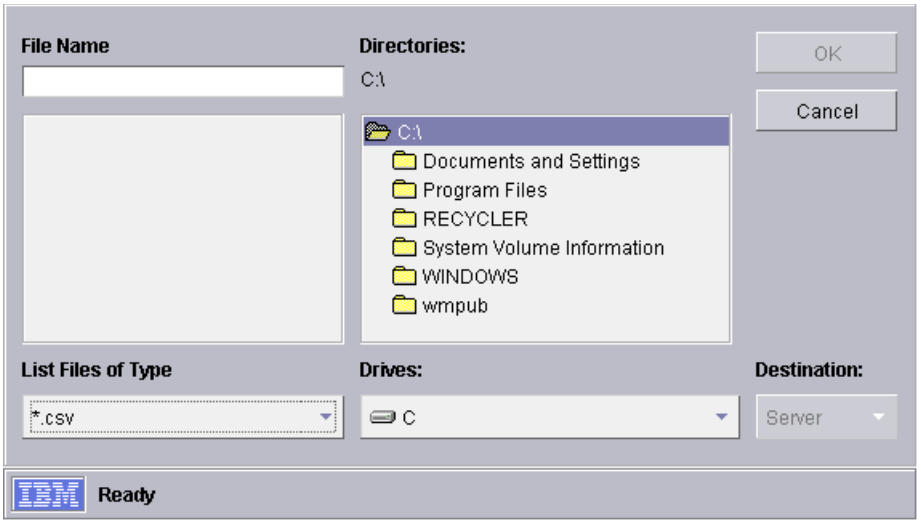


Figure 7-47 Save recording window

You can save an export in any of the following formats:

- CSV
- HTM
- TXT
- XML

Note: The data file is saved on the management server, not the system on which you are running the Web console.

CSV format

This format is most commonly used to import data into different analysis programs, databases, and spreadsheets. Data exported as a csv file will look similar to that shown in Example 7-1.

Example 7-1 Monitor Recording csv file

```
"Machine Name   = ws2k3isdv02.hatteras.lab","",""
"Attribute Path = [[Director Agent][CPU Monitors][CPU Utilization]]","",""
"Description    = ISD CPU Utilization","",""
"Start Time     = November 4, 2008 at 9:45:53 AM","",""
"Stop Time      = November 4, 2008 at 10:26:24 AM","",""
"Sampling Rate  = 5000 msecs","",""
"","",""
"Date","Time","Data"
"November 4, 2008","9:45:57 AM","11.801242236024844"
"November 4, 2008","9:46:02 AM","13.437500000000002"
"November 4, 2008","9:46:07 AM","13.437500000000002"
"November 4, 2008","9:46:12 AM","15.552099533437014"
"November 4, 2008","9:46:18 AM","9.345794392523366"
"November 4, 2008","9:46:23 AM","9.345794392523366"
"November 4, 2008","9:46:28 AM","13.622291021671828"
"November 4, 2008","9:46:33 AM","13.622291021671828"
"November 4, 2008","9:46:38 AM","4.976671850699843"
"November 4, 2008","9:46:43 AM","4.976671850699843"
"November 4, 2008","9:46:48 AM","6.987577639751552"
"November 4, 2008","9:46:53 AM","6.987577639751552"
"November 4, 2008","9:46:58 AM","5.607476635514019"
...
```

HTM format

Use the format shown in Figure 7-48 to view the data in a Web browser.

Recorded Monitor Data for ws2k3isdv02.hatteras.lab

Attribute Path = [[Director Agent][CPU Monitors][CPU Utilization]]

Description = ISD CPU Utilization

Start Time = November 4, 2008 at 9:45:53 AM

Stop Time = November 4, 2008 at 10:26:24 AM

Sampling Rate = 5000 msecs

Date	Time	Data
November 4, 2008	9:45:57 AM	11.801242236024844
November 4, 2008	9:46:02 AM	13.437500000000002
November 4, 2008	9:46:07 AM	13.437500000000002
November 4, 2008	9:46:12 AM	15.552099533437014
November 4, 2008	9:46:18 AM	9.345794392523366
November 4, 2008	9:46:23 AM	9.345794392523366
November 4, 2008	9:46:28 AM	13.622291021671828
November 4, 2008	9:46:33 AM	13.622291021671828
November 4, 2008	9:46:38 AM	4.976671850699843
November 4, 2008	9:46:43 AM	4.976671850699843
November 4, 2008	9:46:48 AM	6.987577639751552
November 4, 2008	9:46:53 AM	6.987577639751552
November 4, 2008	9:46:58 AM	5.607476635514019

Figure 7-48 Recorded Monitor data in htm file

TXT format

The text format is a tab-separated file. Use this to read the data in a standard text editor since it is easier to read than the csv format. Example 7-2 provides a sample of a txt export.

Example 7-2 Recorded monitor data txt file

```
Machine Name   = ws2k3isdv02.hatteras.lab
Attribute Path = [[Director Agent][CPU Monitors][CPU Utilization]]
Description    = ISD CPU Utilization
Start Time     = November 4, 2008 at 9:45:53 AM
Stop Time      = November 4, 2008 at 10:26:24 AM
```

```
Sampling Rate  = 5000 msecs

   Date                Time          Data
   November 4, 2008    9:45:57 AM    11.801242236024844
   November 4, 2008    9:46:02 AM    13.437500000000002
   November 4, 2008    9:46:07 AM    13.437500000000002
   November 4, 2008    9:46:12 AM    15.552099533437014
   November 4, 2008    9:46:18 AM    9.345794392523366
   November 4, 2008    9:46:23 AM    9.345794392523366
   November 4, 2008    9:46:28 AM    13.622291021671828
   November 4, 2008    9:46:33 AM    13.622291021671828
   November 4, 2008    9:46:38 AM    4.976671850699843
   November 4, 2008    9:46:43 AM    4.976671850699843
   November 4, 2008    9:46:48 AM    6.987577639751552
   November 4, 2008    9:46:53 AM    6.987577639751552
   November 4, 2008    9:46:58 AM    5.607476635514019

...
```

XML format

The xml format is used to transfer data between different programs. A sample of such a file is shown in Figure 7-49 (as viewed in a Web browser).

```
<?xml version="1.0" encoding="UTF-8" ?>
- <MonitorRecordingExport DataRate="5000 msecs" Description="ISD CPU
  Utilization" DisplayablePath="[[Director Agent][CPU Monitors][CPU
  Utilization]]" ManagedObjectName="ws2k3isdv02.hatteras.lab"
  PageTitle="Recorded Monitor Data for ws2k3isdv02.hatteras.lab"
  StartTime="November 4, 2008 at 9:45:53 AM" StopTime="November
  4, 2008 at 10:26:24 AM">
  - <TableHeaderRow>
      <TableHeaderCell CellName="Date" ColumnDisplayName="Date" />
      <TableHeaderCell CellName="Time" ColumnDisplayName="Time" />
      <TableHeaderCell CellName="Data" ColumnDisplayName="Data" />
    </TableHeaderRow>
  - <TableRow>
      <TableCell CellName="Date" CellValue="November 4, 2008" />
      <TableCell CellName="Time" CellValue="9:45:57 AM" />
      <TableCell CellName="Data" CellValue="11.801242236024844" />
    </TableRow>
  - <TableRow>
      <TableCell CellName="Date" CellValue="November 4, 2008" />
      <TableCell CellName="Time" CellValue="9:46:02 AM" />
      <TableCell CellName="Data" CellValue="13.437500000000002" />
    </TableRow>
```

Figure 7-49 Recorded monitor data in xml format

7.7 Active status: System status

Within IBM Systems Director, system status is maintained by tracking *status set* entries. Status set entries are reported by the resources in your environment to track either problems or compliance issues. When a resource reports a problem or when the Systems Director Server determines that an agent is out of compliance, a status set entry is generated.

These entries are listed on the Active Status page, shown in Figure 7-50. In addition, the overall status of a resource can be seen on many pages within the IBM Systems Director Web interface.

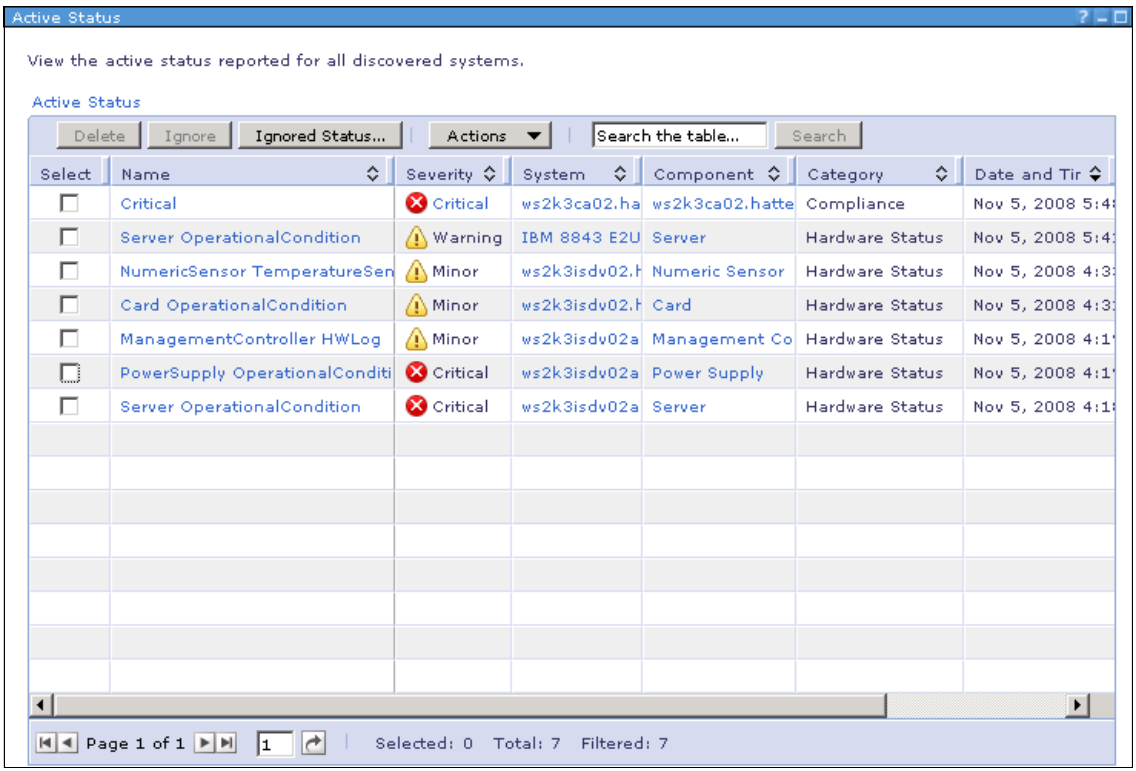


Figure 7-50 Active Status page

From this page you can see details about the entries including:

- Name
- Severity
- System
- Component
- Category
- Date and time
- Details (text of the entry)

If you select one or more entries you can delete them or ignore them. Ignoring an entry deactivates it, but leaves it in the set. You can view and reactivate any ignored entries by clicking the **Ignored Status** button.

Clicking the name of an entry shows you all the details, as shown in Figure 7-51.

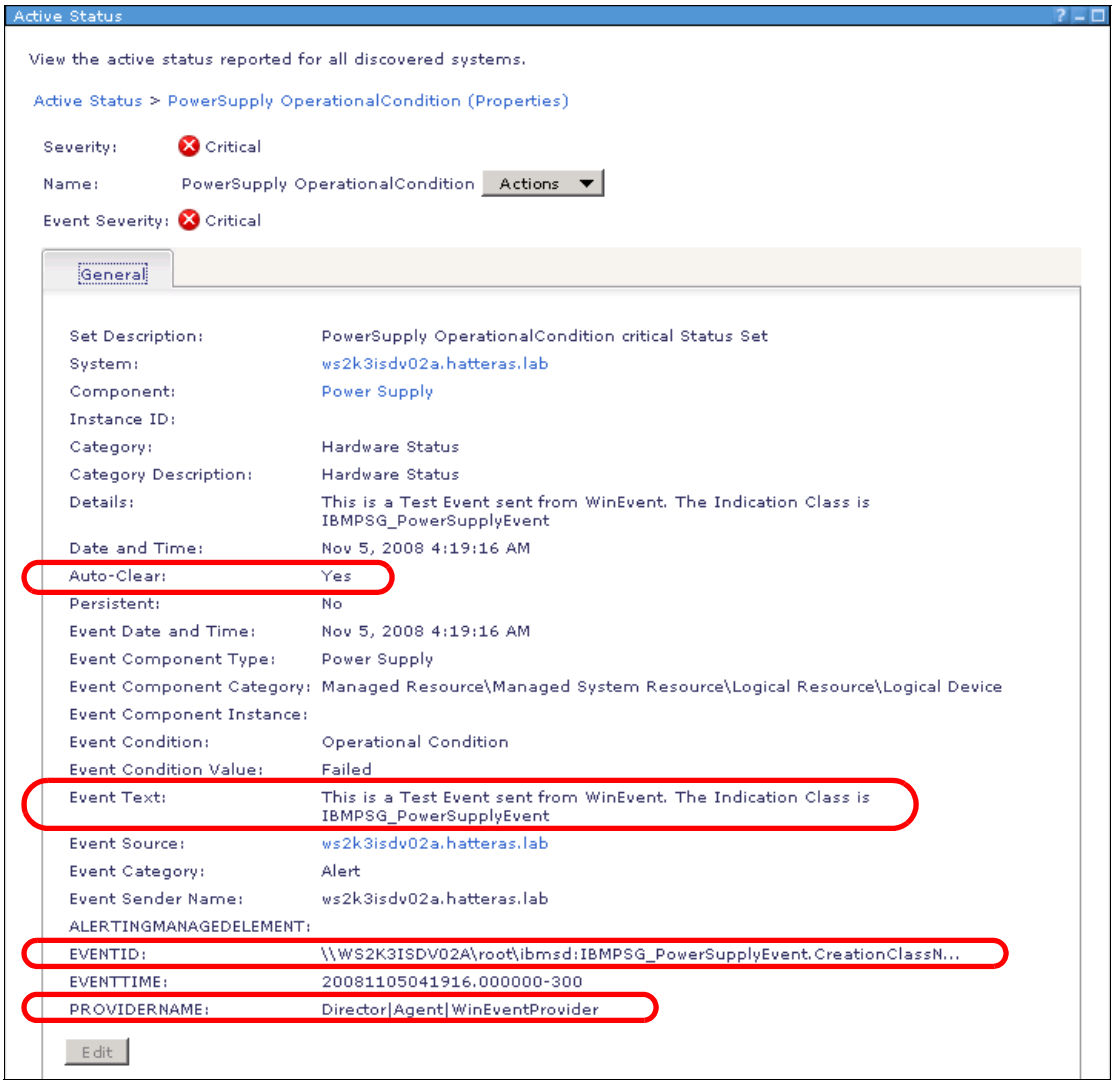


Figure 7-51 Active status sample details (useful entries circled in red)

These details can be very helpful when troubleshooting both hardware problems and issues within the IBM Systems Director management environment itself.

We found the following items particularly interesting (highlighted in Figure 7-51 on page 374):

- Auto-Clear: This identifies whether this event is automatically cleared if the proper resolution event is received.
- Event Text: This is the text of the event that created the entry.
- EVENTID: This is useful in determining which CIM subscription on the system forwarded the event.
- PROVIDERNAME: The name of the CIM provider that generated the event.

Problems

Problems are a subset of status set entries related only to problems on resources within the environment. These entries are events reported by the resource, such as hardware events, triggered threshold events, and process monitor events.

Compliance

Compliance entries identify software update or other issues found when a compliance policy is re-validated, either manually or as a scheduled job. See Chapter 10, “Update Manager” on page 449, for more information about compliance checking.

7.8 Event log

The IBM Systems Director event log includes all events sent to the server from all managed resources, as shown in Figure 7-52.

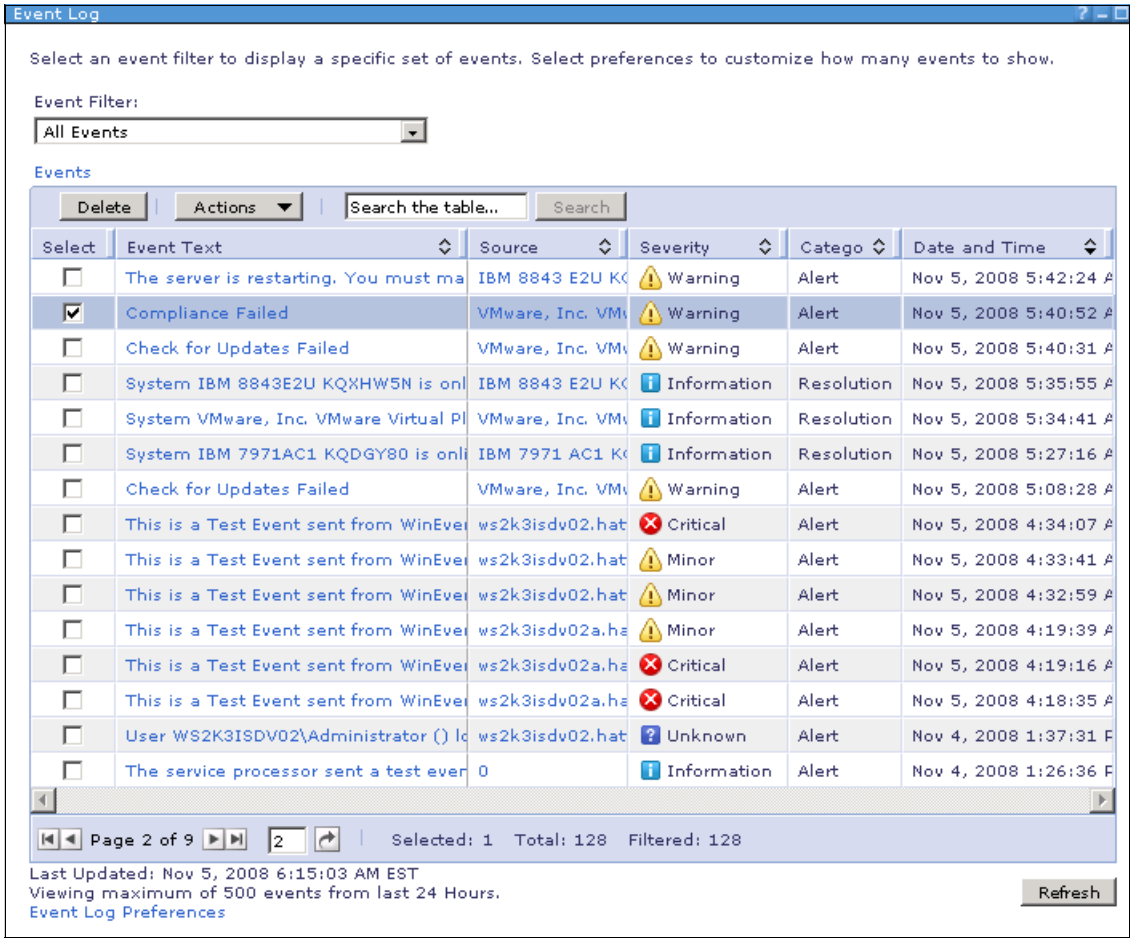


Figure 7-52 IBM Systems Director Event Log

By collecting all events from managed systems and storing them on the management server, you can easily get an overview of events that have occurred on systems that are currently unavailable. Figure 7-52 on page 376 shows the event log for all events on the server. You can also show events for a specific system or group by navigating to the resource or group, right-clicking, and selecting **System Status and Health** → **Event Log**.

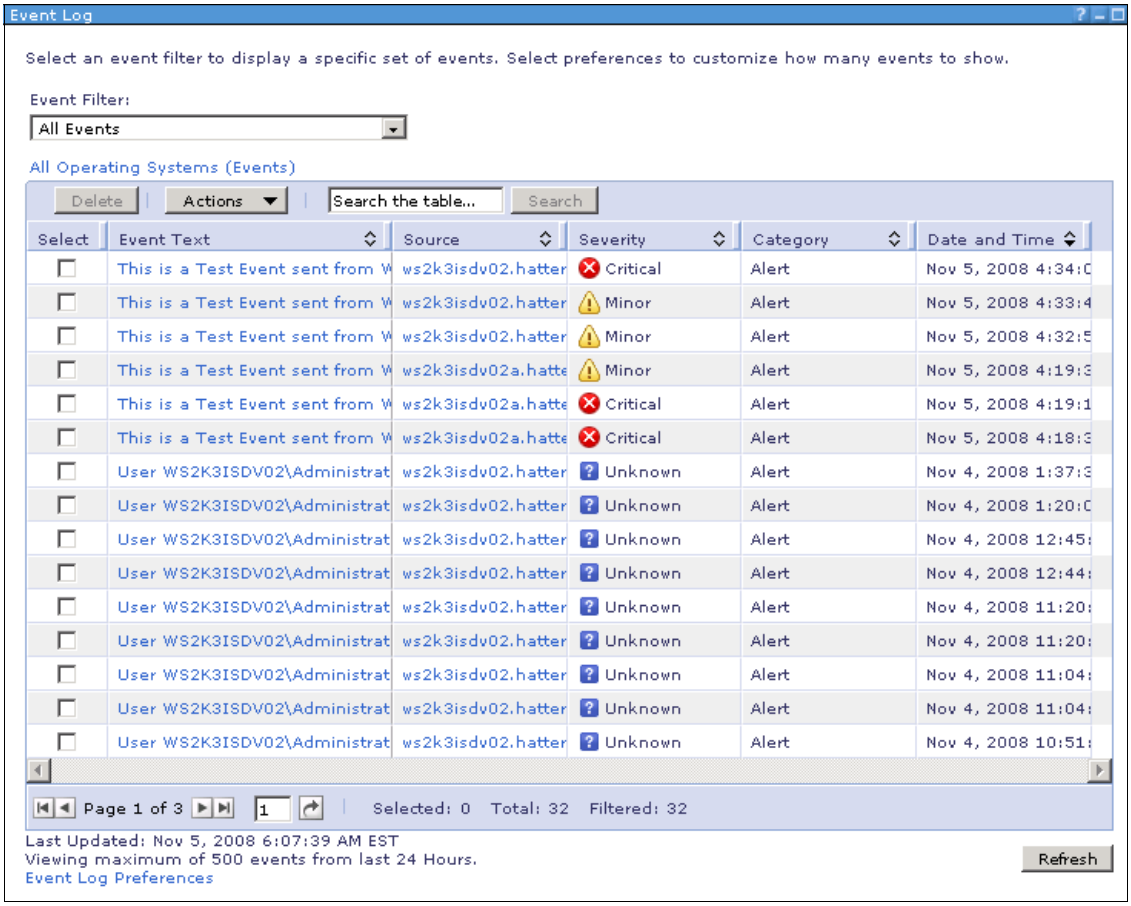


Figure 7-53 IBM Systems Director Event Log for the All Operating Systems group

You can also filter the events using any of the event filters that exist in the Automation Manager plug-in. See 9.2.2, “Event filters” on page 409, for more information about event filters. An event filter chooser is shown in Figure 7-54.

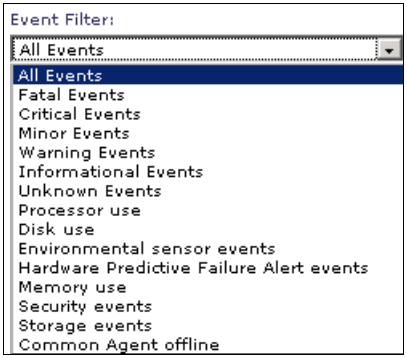


Figure 7-54 Event Log event filters

In the table of events (Figure 7-53 on page 377), for each event you will see:

- Event text
- Source
- Severity
- Category
- Date and time

Clicking the text of a specific event displays its details, as shown in Figure 7-55.

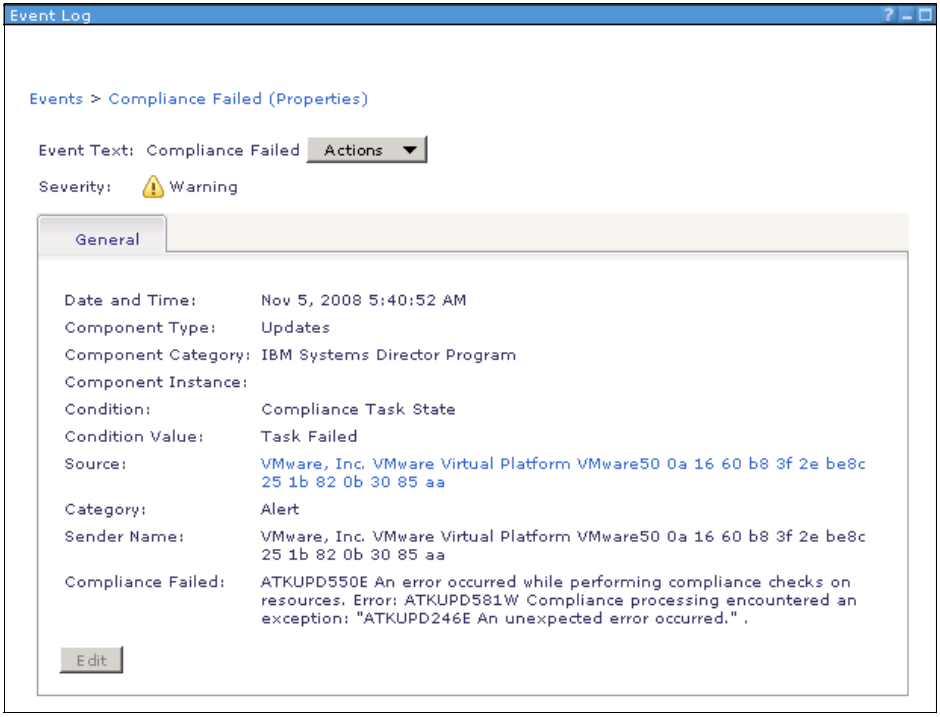


Figure 7-55 Event Log details

In addition to what you see in the table, the details include additional information based on the type of event that you are viewing.

At the bottom of the window is an Event Log Preferences link, which can also be found in the settings task group in the navigation area, as shown in Figure 7-56. If you click **Event Log Preferences** in either location, you see the window shown in Figure 7-57 on page 380.

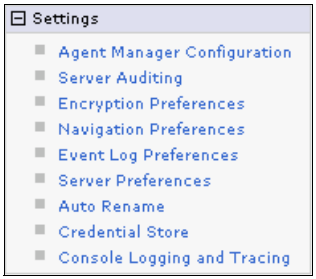


Figure 7-56 Settings task group in the navigation area

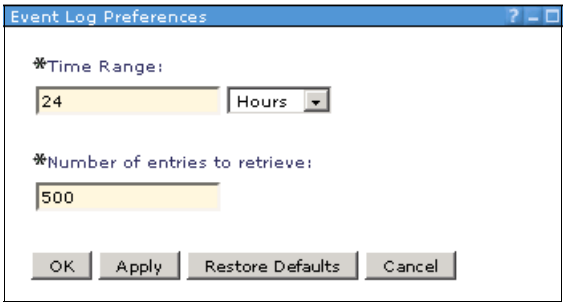


Figure 7-57 Event Log Preferences window

The Time Range and Number of entries to retrieve fields refer to the events that are displayed, not the number of events that IBM Systems Director Server retains. To change the number of events that IBM Systems Director Server retains, click the **Server Preferences** link in the settings task group of the navigation area, as shown in Figure 7-56 on page 379. Then change the event log entry at the bottom of the page, as shown in Figure 7-58.

Figure 7-58 Event log setting under server preferences

7.9 SNMP management

IBM Systems Director manages generic network devices via SNMP. Using either the SNMP Management task in the system status and health group of tasks in the navigation area, or by selecting the specific task in the context menu of a resource that supports SNMP, you can either browse a Management Information Base (MIB) file or manage the MIBs installed in IBM Systems Director. Taking either of these paths opens the SNMP management page shown in Figure 7-59 on page 381.

Note: To open any of the SNMP tools you must have Java Web Start installed. If you do not have Java Web Start installed you will see a warning and will be given a chance to install it.

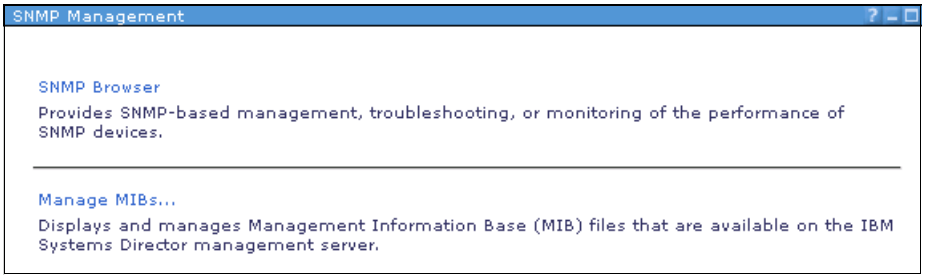


Figure 7-59 SNMP Management page

7.9.1 SNMP Browser

The SNMP Browser allows you to browse or *walk* a MIB. This means traversing down the object tree of the MIB to find the information needed. To open the SNMP Browser, click **SNMP Browser** on the SNMP Management page. This opens the Run - SNMP Browser window, which is used to select a target for the SNMP Browser. Once you have chosen a target and clicked **OK**, the SNMP Browser opens with the targeted device selected.

In the example shown in Figure 7-60 we have selected the sysDescr property, which displays the system description on the right side of the SNMP Browser window. We see the Value field, which provides the system description, as well as the Details area, which describes the sysDescr property itself.

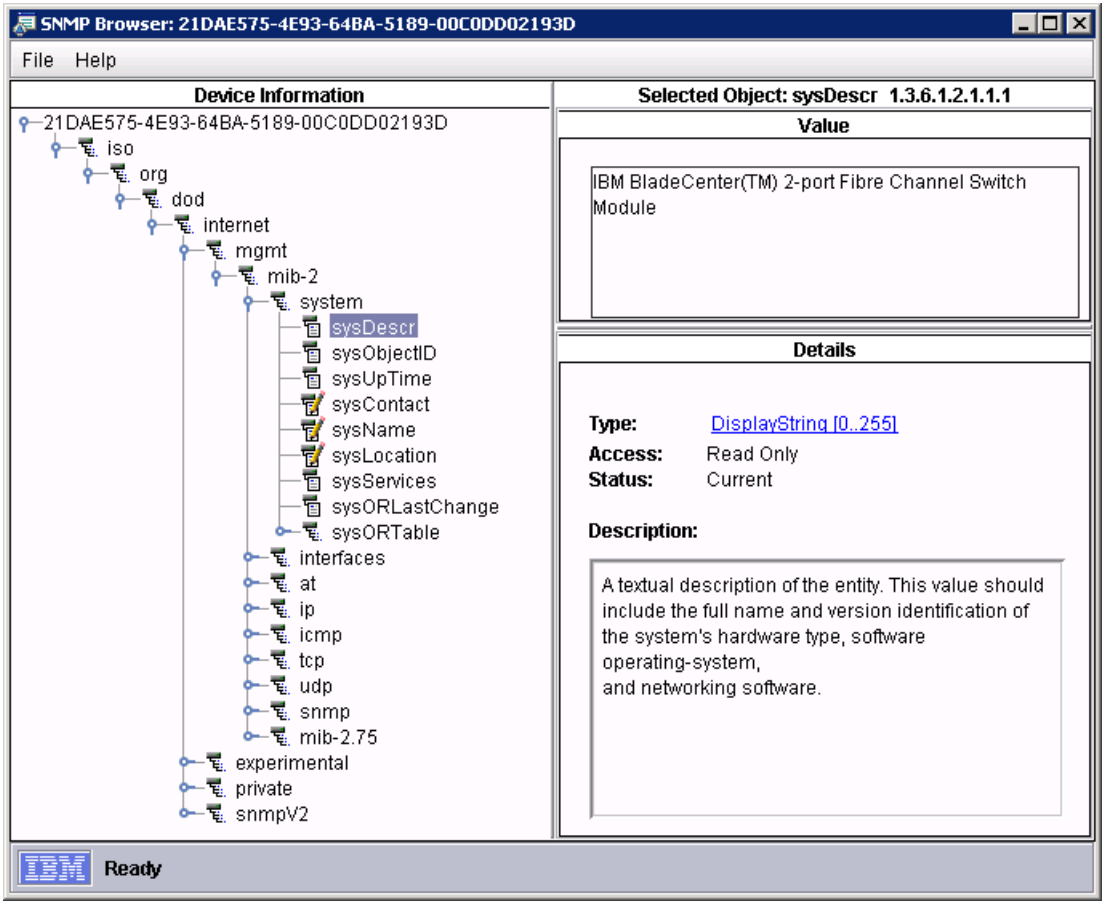


Figure 7-60 SNMP Browser showing an expanded portion of a MIB file

If we select a property field that is writable, we can set or change the property value. With the same device selected, we select the sysContact property, which is a writable property. This is shown in Figure 7-61. To change the value of this property, we simply enter the data that we want to set in the Value pane and click the **Set** button.

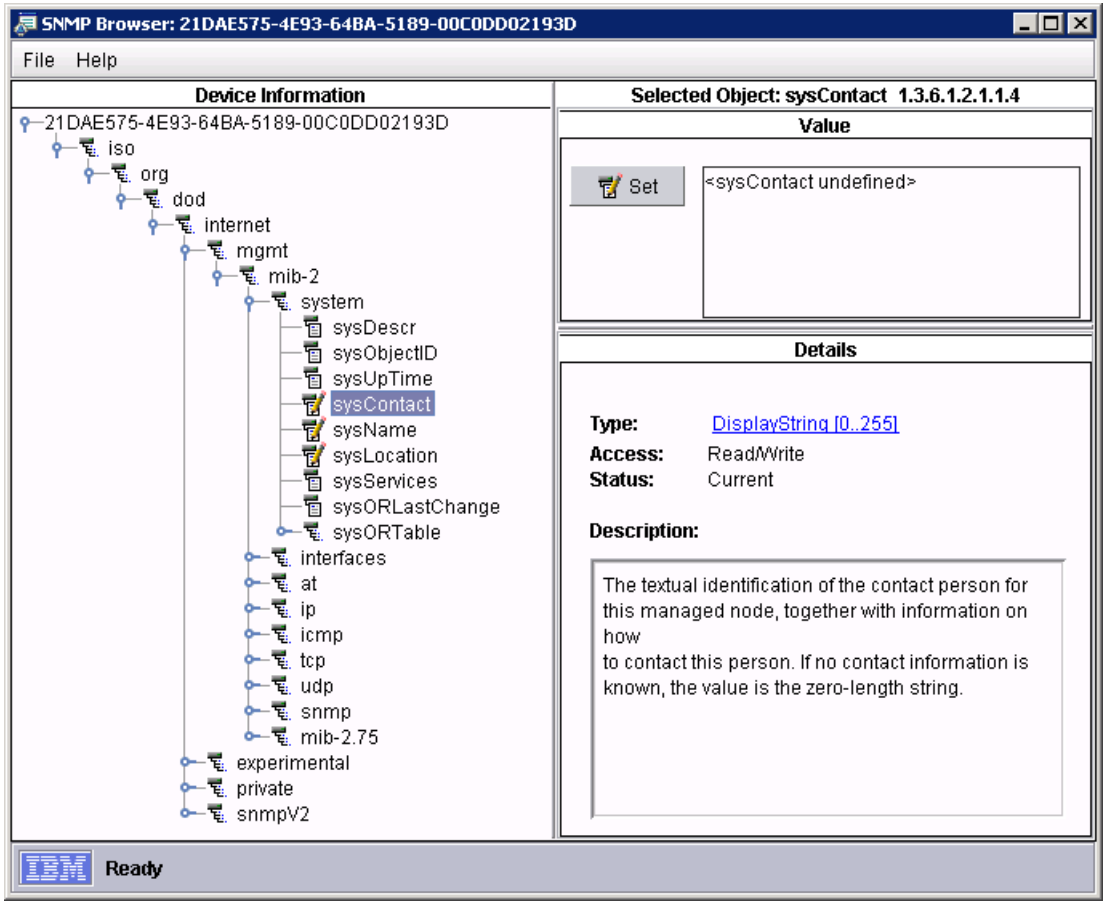


Figure 7-61 SNMP Browser: Setting a property

7.9.2 Manage MIBs

In order for IBM Systems Director Server to understand the data that it receives from an SNMP resource, it must have access to the MIB file for the resource. Gaining this access is a two-step process that involves *compiling* the MIB and then *loading* it, which is described below. See Figure 7-62.

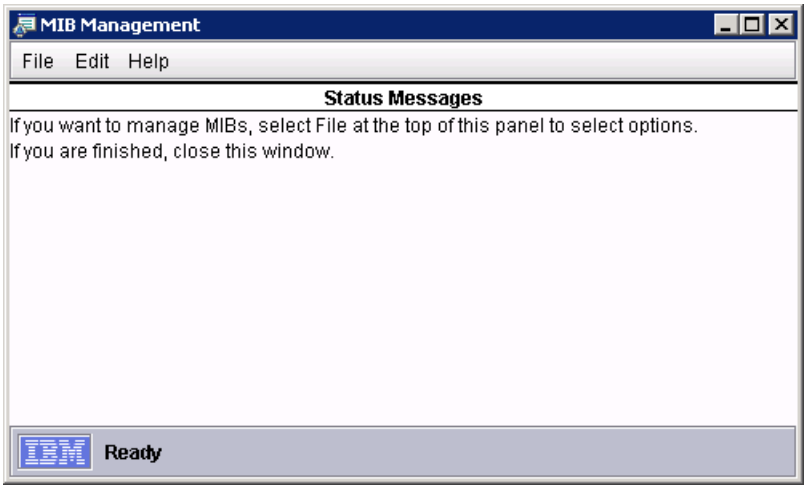


Figure 7-62 SNMP MIB Management page

Compiling MIBs

Compiling a MIB file is the process of parsing it for the MIB objects that it contains, confirming that all dependencies are met, then saving the objects. To do this, from the MIB Management window select **File** → **Select MIB to Compile**.

The Select MIB to Compile window opens, as shown in Figure 7-63. Use this window to select the MIB file that you want to compile.

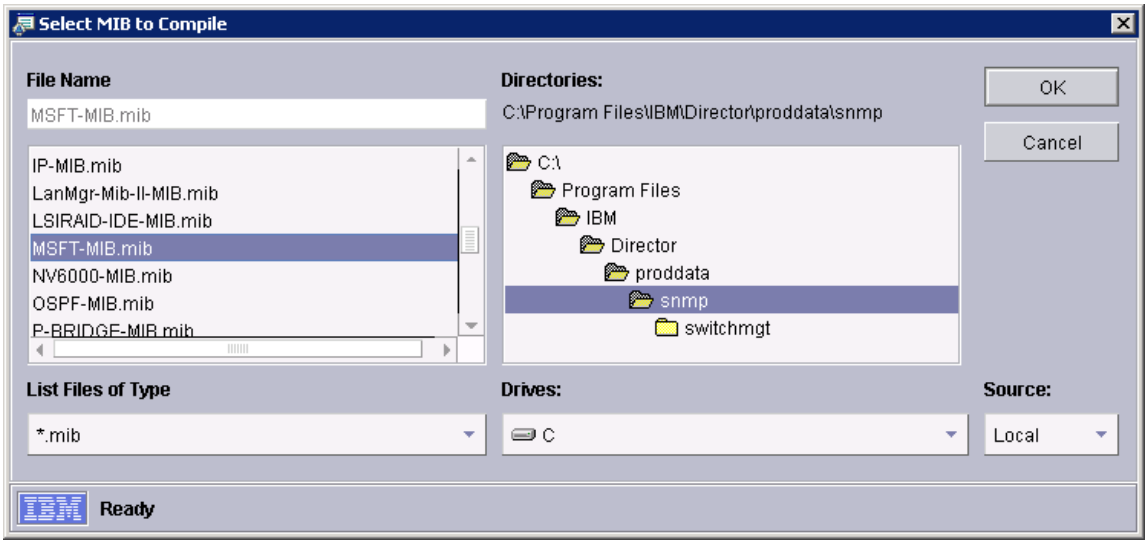


Figure 7-63 SNMP Compile a MIB

When you click **OK** IBM Systems Director compiles the MIB file. If there are errors, they will be displayed in the window. Otherwise, you will get a completed message like the one shown in Figure 7-64.

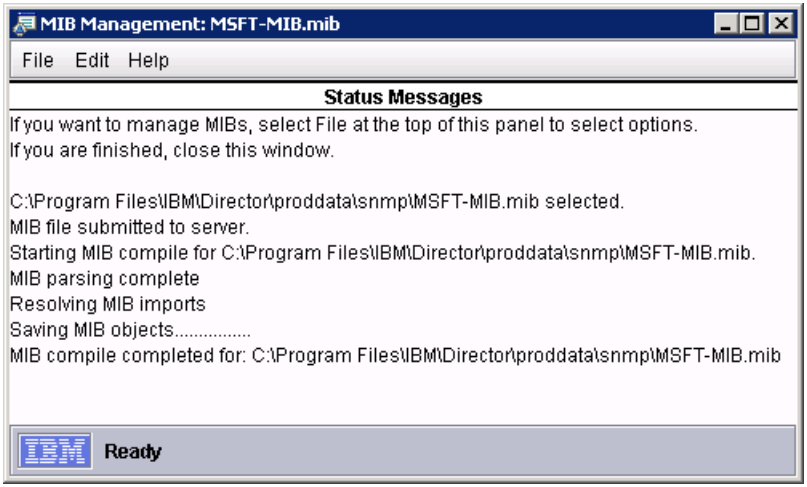


Figure 7-64 SNMP MIB compile: Compile complete message

Loading MIBs

While compiling a MIB saves the objects in a way that IBM Systems Director can understand, loading the MIB involves loading it into memory so that it is available both to the SNMP Browser and to Event Automation. When you select **File** → **Select MIB to Load** from the MIB Management page shown in Figure 7-62 on page 384, you can choose from the compiled MIBs that you want to load.

Figure 7-65 shows the Load MIBs page, in which you highlight the MIBs that you want to add from the Available MIBs pane and click the **Add** button, or select the MIBs the you wish to remove from the loaded MIBs and click the **Remove** button.

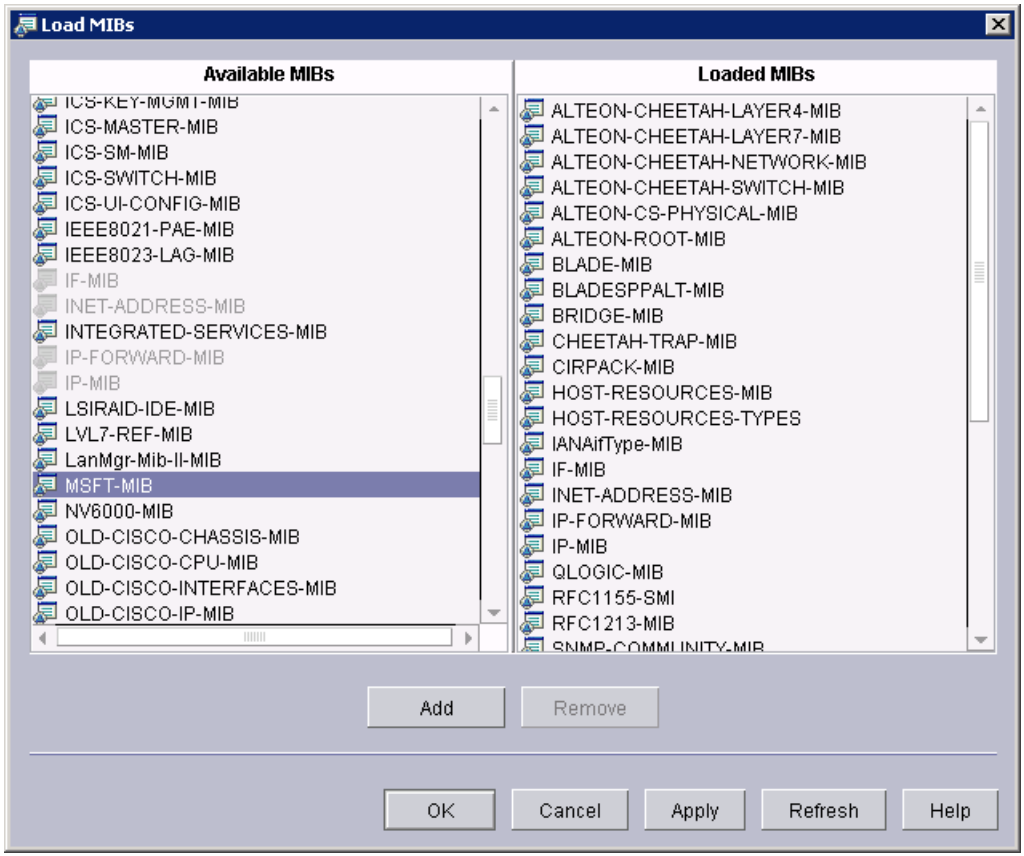


Figure 7-65 SNMP Load MIBs page

Removing a MIB from the Load MIBs page does not remove the compiled objects from the system. Removed MIBs still appear in the Available MIBs pane and can be loaded again at any time.

8

Configuration Manager

Setting the hardware configuration of new hardware is not the most popular or exciting job that an IT administrator must execute. The Configuration Manager plug-in included in IBM Systems Director may not make this task fun, but it can make maintaining your configurations much easier, less tedious, and more consistent.

This chapter describes the various capabilities of Configuration Manager, including the following:

8.1 Overview

The Configuration Manager plug-in included in IBM Systems Director helps make the task of configuration of hardware (both new and existing) easier by allowing you to automate the process. See Figure 8-1.

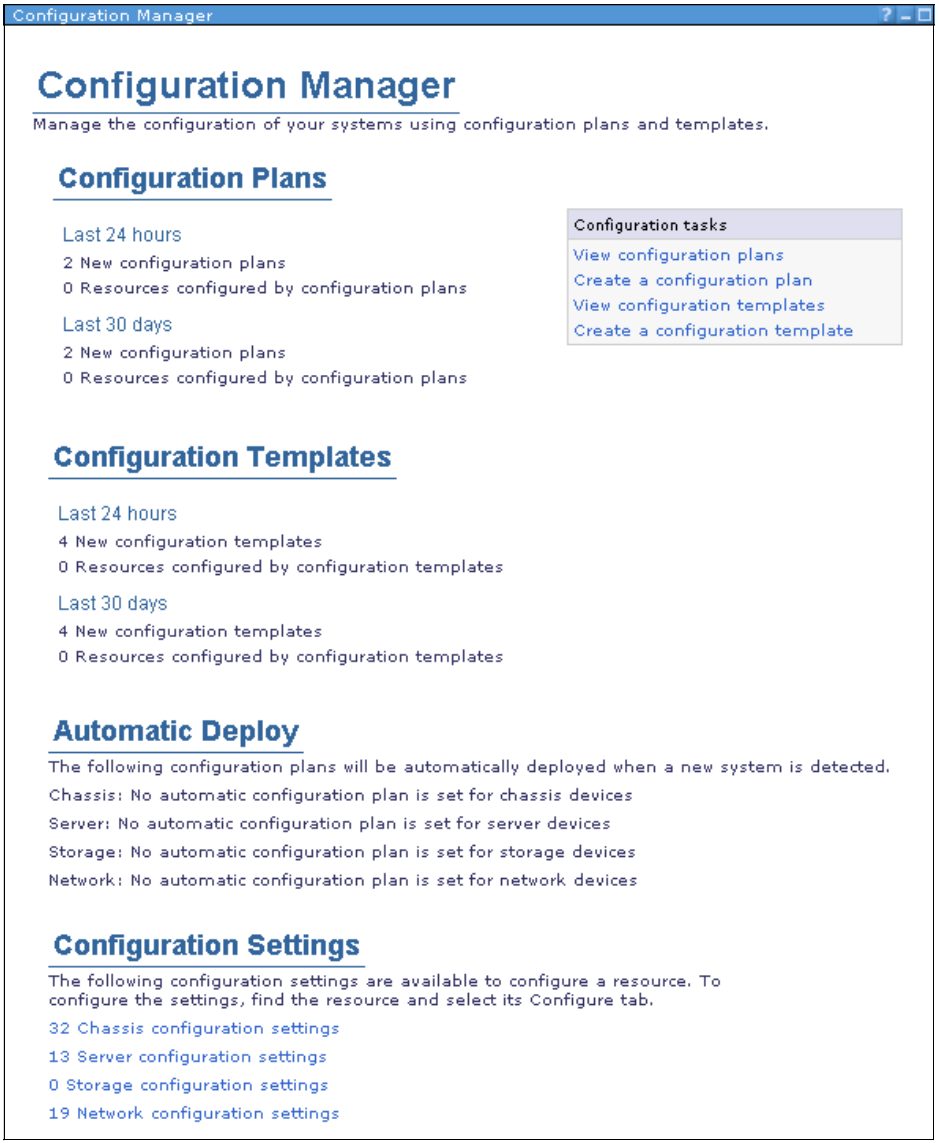


Figure 8-1 Configuration Manager summary page

Note: Configuration Manager allow you to manage hardware configuration for items such as IBM BladeCenter, servers, and network resources. This means that Configuration Manager works with IBM BladeCenter Advanced Management Modules, I/O modules and stand-alone servers. Configuration Manager does not manage configurations of operating systems or other resources.

8.2 Current configuration

Use the Current Configuration task to determine what the current configuration of a system is. This task is in the System Configuration task group in the navigation area, as shown in Figure 8-2.

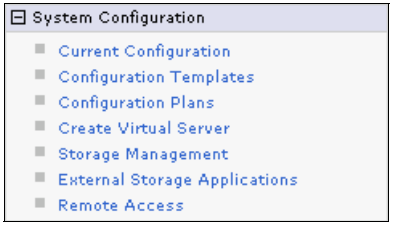


Figure 8-2 Systems Configuration tasks

You can also get the current configuration from a supported resource by clicking the **Configuration** tab on the resource properties page, as shown in Figure 8-3, or by clicking the **Current Configuration** link and targeting a configurable resource.

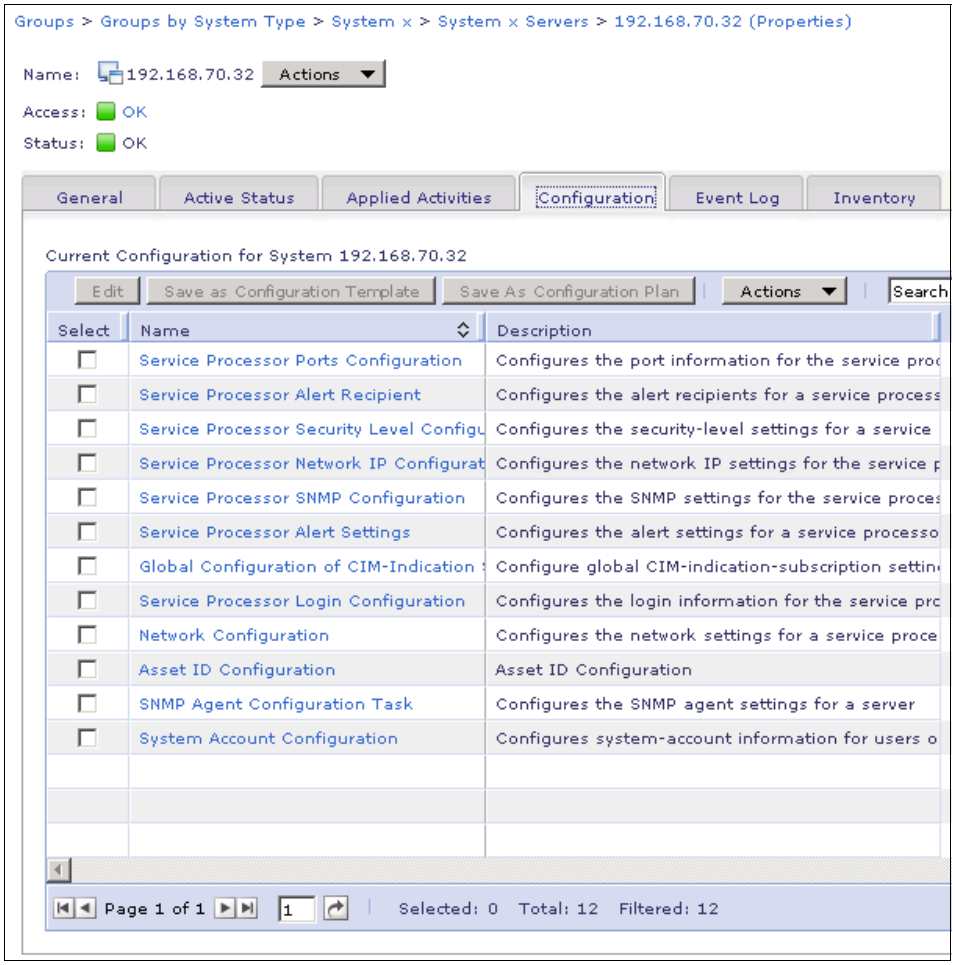


Figure 8-3 Resource properties Configuration tab

Note: Only resources that you can configure with IBM Systems Director Configuration Manager show a Configuration tab on their properties page.

The current configuration task allows you to save the current configuration from a discovered resource. Click the **Browse** button and use the context chooser to

select a single resource to target. Clicking the **View** button s you the templates that can be saved from the current configuration.

Once you view the configuration, you can save a specific configuration as a *configuration template* or a group of configurations as a *configuration plan*. If you select one item from the current configuration, you can save it as a configuration template by clicking **Save as Configuration Template**. The Save as Configuration Template page opens, as shown in Figure 8-4. For more information see 8.3, “Configuration templates” on page 392.

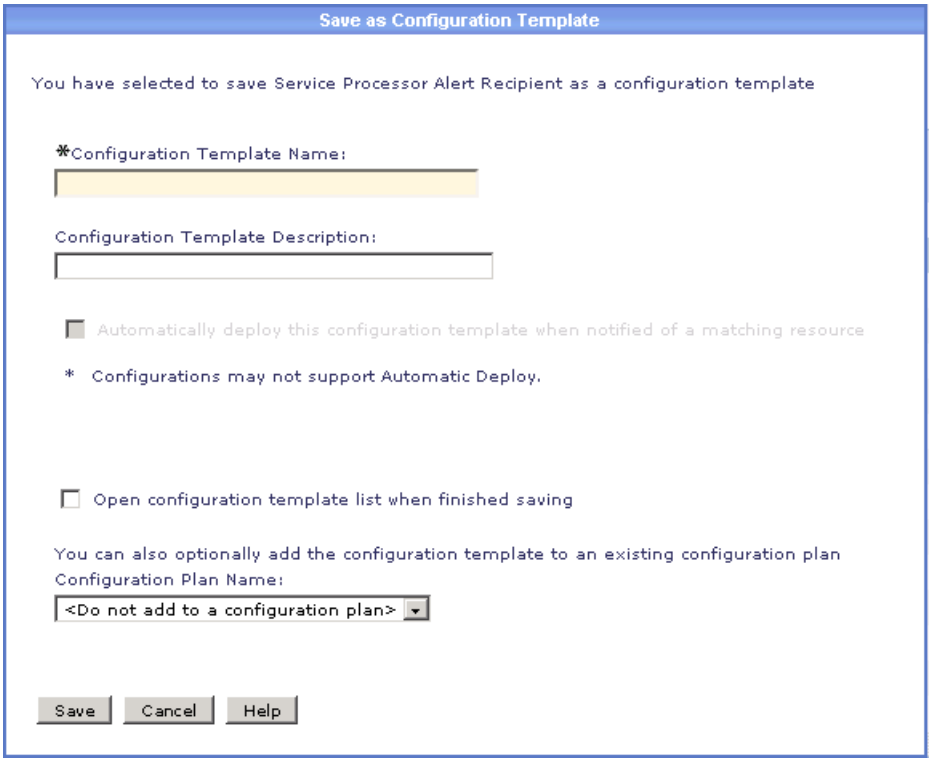


Figure 8-4 Save as Configuration Template

If you select one or more configuration options you can save them as a configuration plan by clicking **Save as Configuration Plan**. The Save as Configuration Plan page opens, as shown in Figure 8-5.

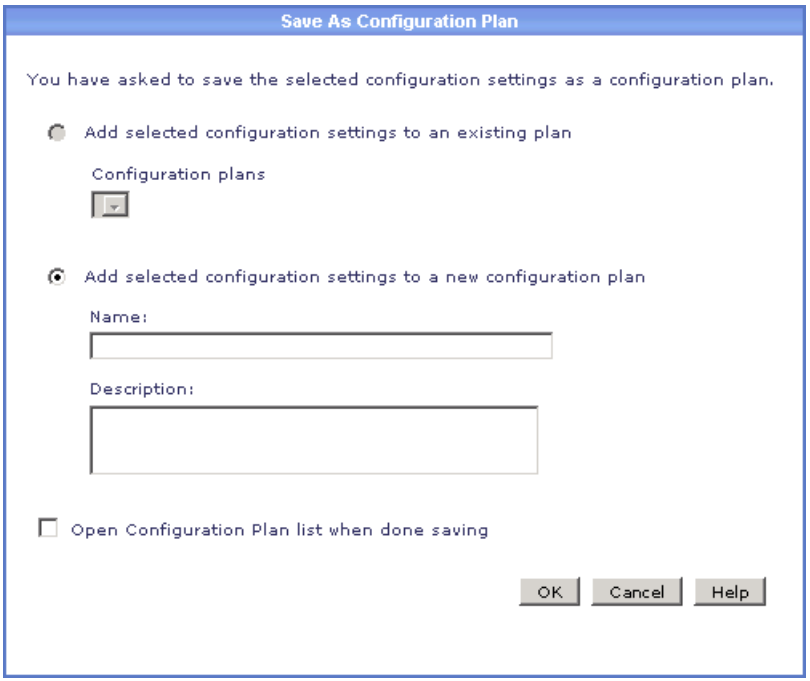


Figure 8-5 Save As Configuration Plan

Here you can add the templates that you selected to an existing configuration plan or to a new configuration plan. See 8.4, “Configuration plans” on page 399, for more information about configuration plans.

8.3 Configuration templates

A configuration template is a group of settings for a specific part of a specific type of resource. For example, three different templates might be:

- Management module login configuration for an IBM BladeCenter AMM
- Management module IP configuration
- Configuration for a specific I/O module within a BladeCenter chassis

The Configuration Templates window is shown in Figure 8-6.

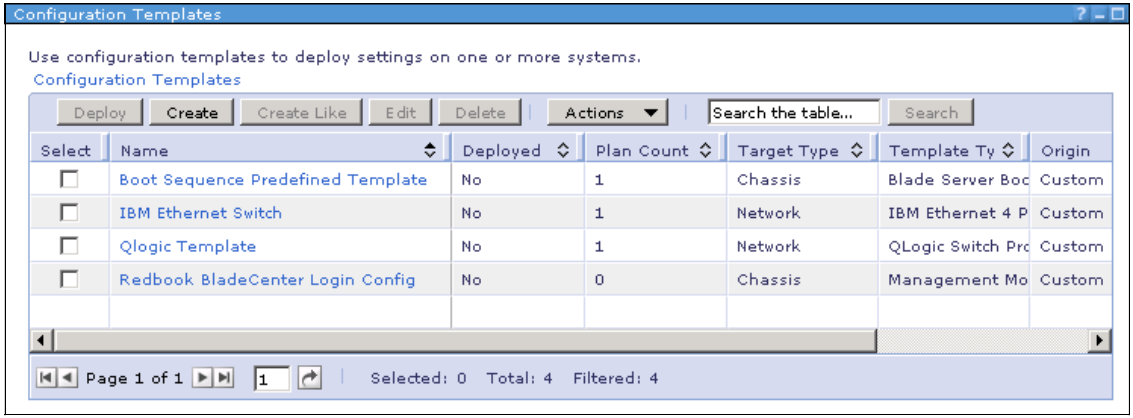


Figure 8-6 Configuration Templates page

8.3.1 Creating templates

To open the Configuration Templates page shown in Figure 8-6 on page 393, click **Configuration Templates** in the system configuration task group in the navigation area. Configuration Manager includes the boot sequence predefined template by default. When you click **Create** the context chooser opens, as shown in Figure 8-7. Select a target system and click **Add**, then click **OK**.

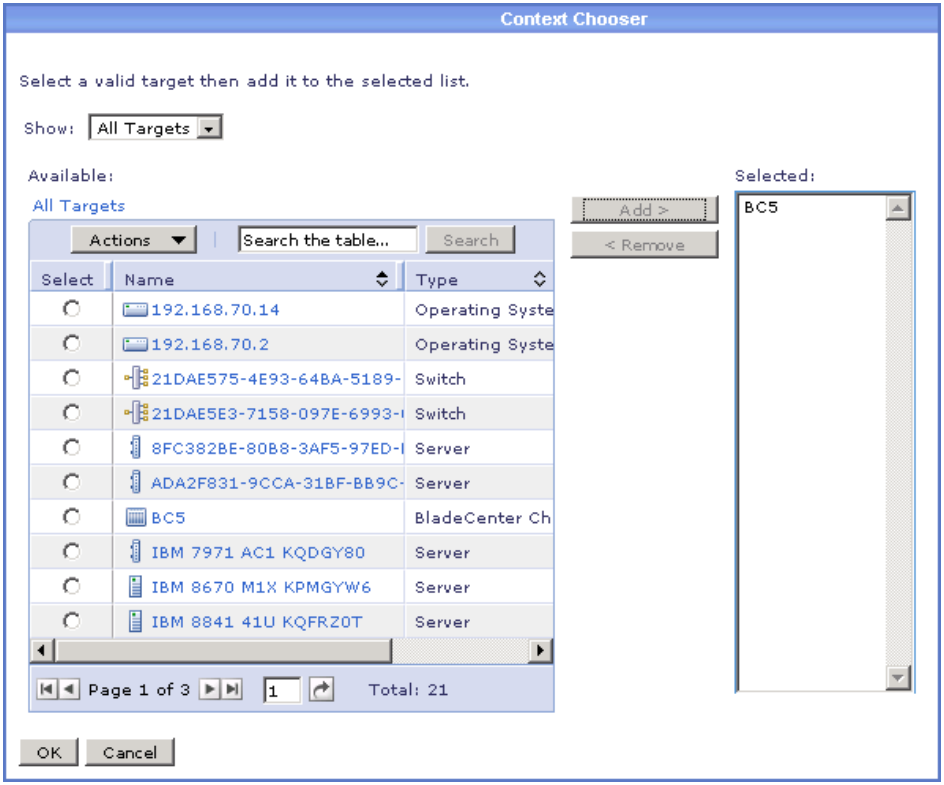


Figure 8-7 Context chooser

While each resource type has its own set templates, we chose the BladeCenter H (BC5 in Figure 8-7 on page 394) as our source. In Figure 8-8 we have chosen the BladeCenter H chassis as the target type and Management Module Login Configuration as the configuration from which we want to create the template. We name the template *Redbook BladeCenter Login Config*.

Tip: Even though some templates appear in multiple target types, remember that a template can only be targeted at a resource of the same type and can only be part of a plan of the same type. For example, the BladeCenter I/O Module template appears in both the BladeCenter Chassis types and the I/O module types (which are network types). If you create a template using the I/O module type you will not be able to deploy it to a BladeCenter chassis or include it in a BladeCenter chassis plan.

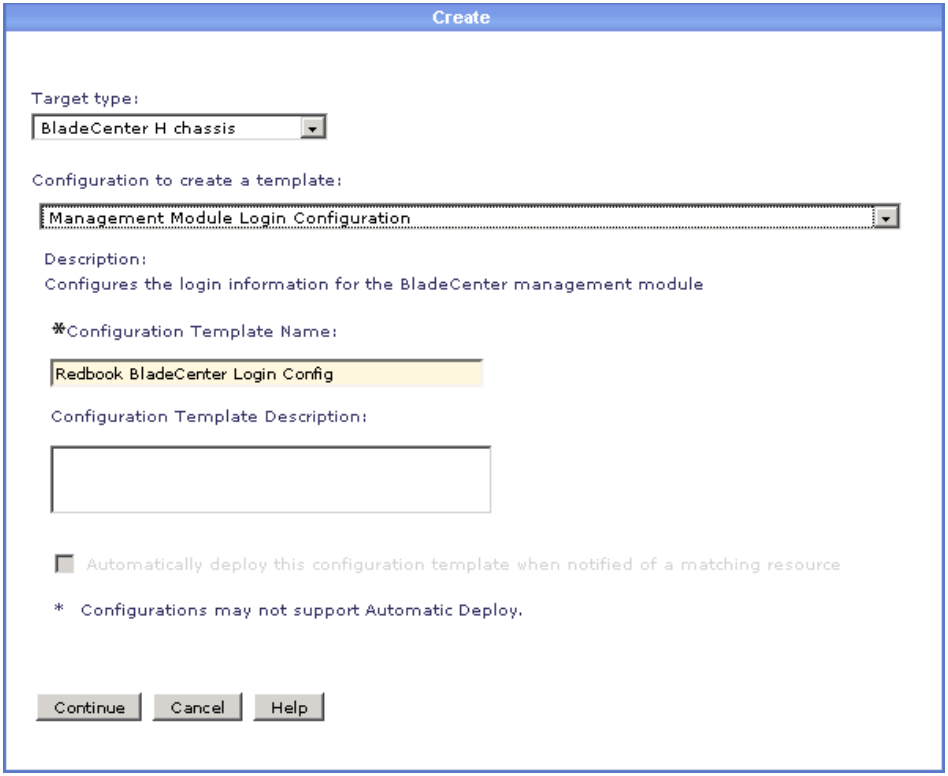


Figure 8-8 Create configuration template page

Several configuration templates can automatically be deployed when a resource of the template type is detected. To automatically deploy a configuration

template, check the **Automatically deploy this configuration template when notified of a matching resource** option.

Tip: Only one template per resource can be set to automatically deploy at a time. If you have two different management module network configuration templates, only one can be set to automatically deploy. If you set a template to automatically deploy and a conflicting template is already set to automatically deploy, the automatically deploy option will be deselected in the other template and you will get a warning message.

When you click **Continue** you get a blank configuration. While each template has its own settings, we decided to create a management module login configuration as an example, so we can create tasks related to logins. Clicking the **Create Task** button brings up the Create Management Module Login task window, as seen in Figure 8-9 on page 397. As you can see, we have already filled in the template with an Admin account.

Tip: The configuration template name and description cannot include the ampersand (&), apostrophe (‘), double quotation mark (“), greater than character (>), or less than characters (<).

We selected the **Create New Account** option from the Select task list and set the user access to **Administrator**, as shown in Figure 8-9 and Figure 8-10 on page 398.

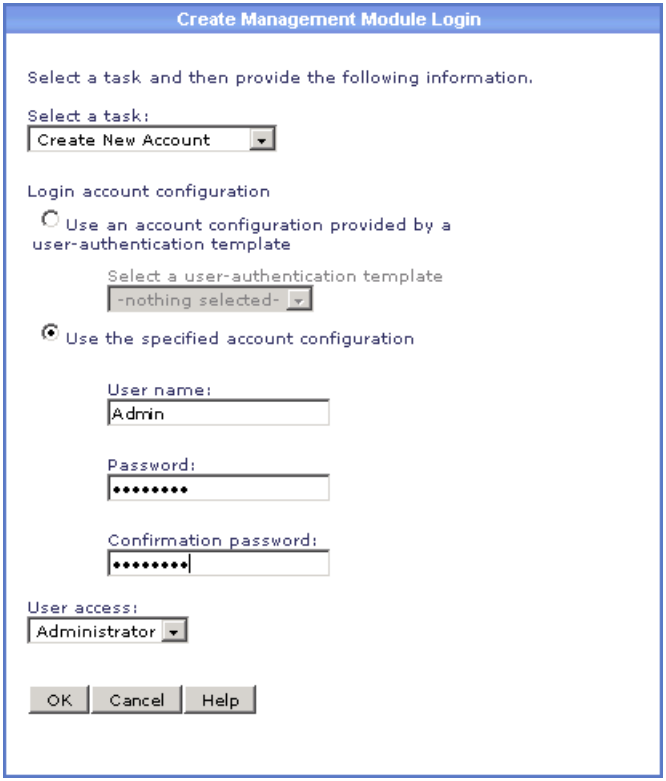


Figure 8-9 Create Management Module Login task

After we create several tasks we have the Management Module Login Configuration template shown in Figure 8-10.

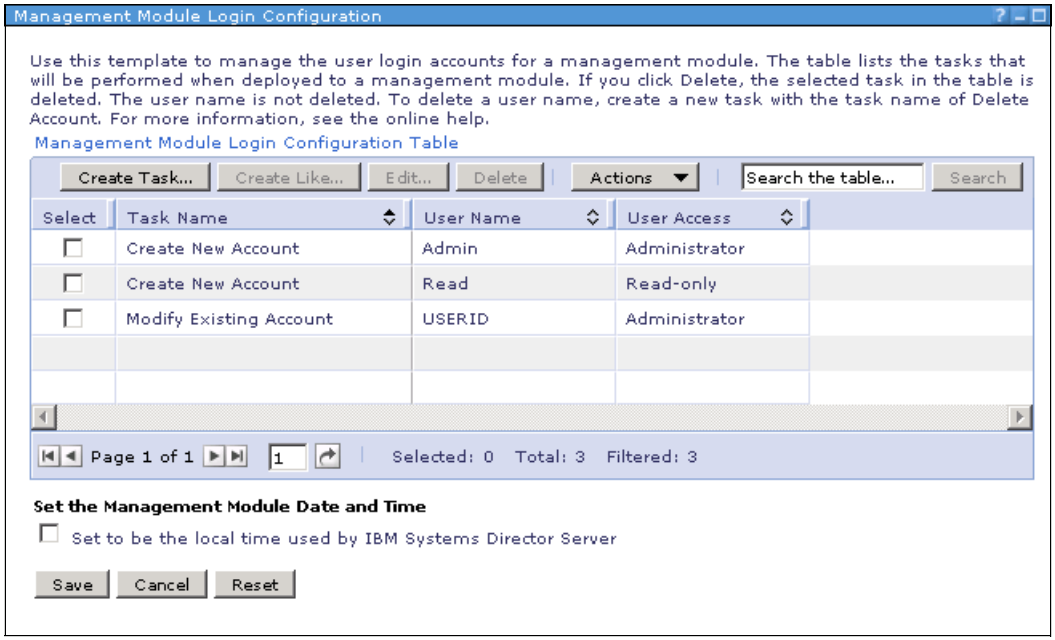


Figure 8-10 Management Module Login Configuration template tasks

At the bottom of the configuration page there is a Set the Management Module Date and Time check box. This allows you to set the date and time to the local time used by the IBM Systems Director Server. This is only be done when the template is deployed, not as an ongoing process.

8.3.2 Deploying templates

Once you have created templates, they must be deployed. Templates can be deployed individually or as part of a configuration plan. See 8.4, “Configuration plans” on page 399, for more information about using configuration plans. To deploy a template individually select the template and click the **Deploy** button.

Figure 8-11 shows the job created when we deployed the BladeCenter QLogic Config that we created previously. From this window select the resources that you want to target with this template.

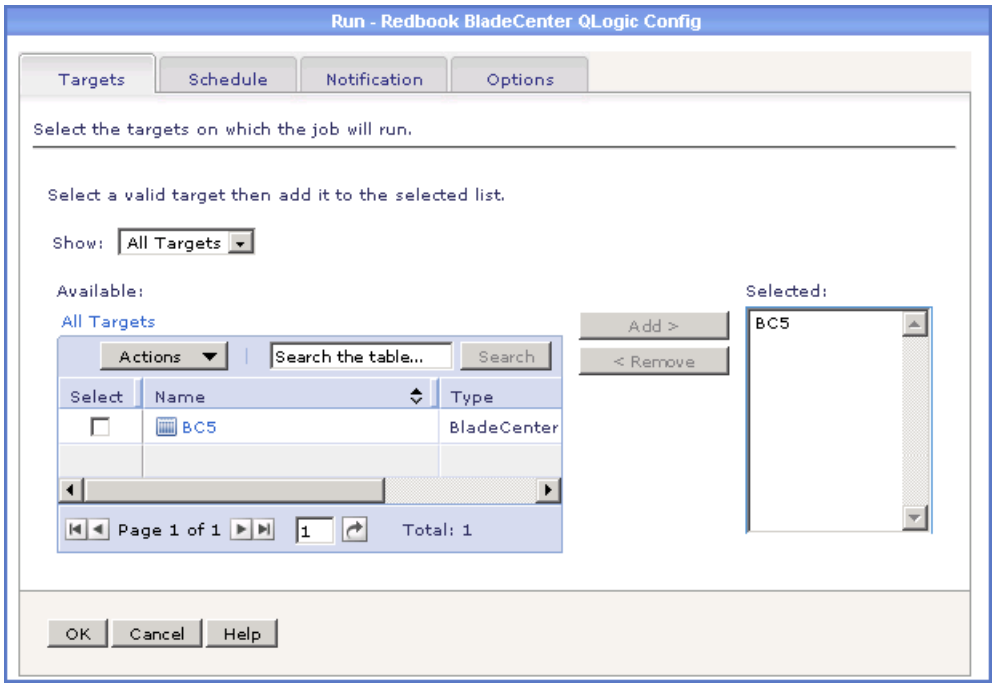


Figure 8-11 Deploy template job

See Chapter 9, “Automation Manager” on page 405, for more information about Command Automation.

8.4 Configuration plans

Configuration plans allow you to group one or more configuration templates together and apply them to a resource in a specific order.

8.4.1 Creating configuration plans

Clicking the **Create** button starts the Configuration Plan Wizard. After passing the Welcome page you must set a name and a target type (that is, chassis, server, or network) for which the configuration plan will be used. Optionally, you can enter a description and check the **Automatic deploy** check box, as shown in Figure 8-12.

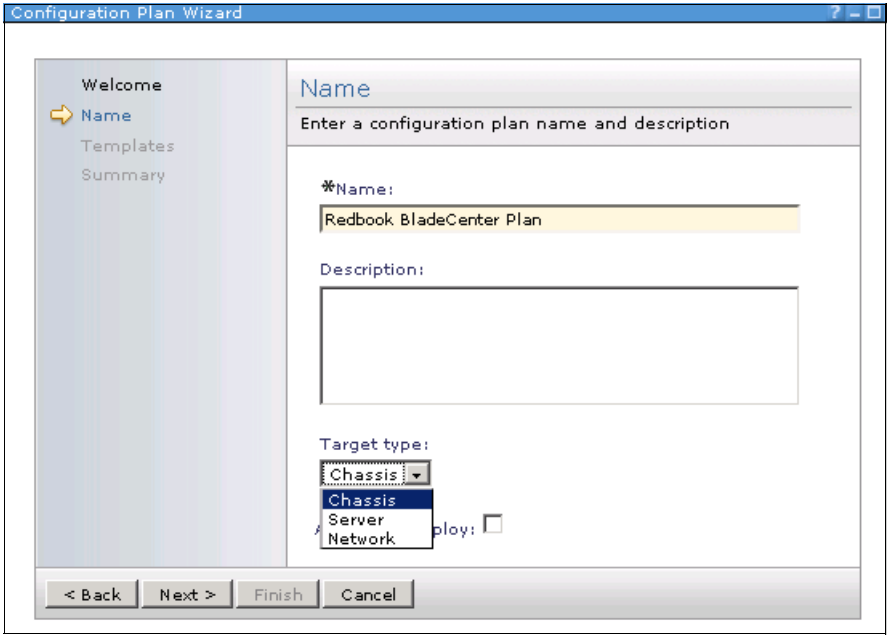


Figure 8-12 Configuration Plan Wizard Name page

Next select which templates you want included in the configuration plan and what order you want the templates applied, as shown in Figure 8-13.

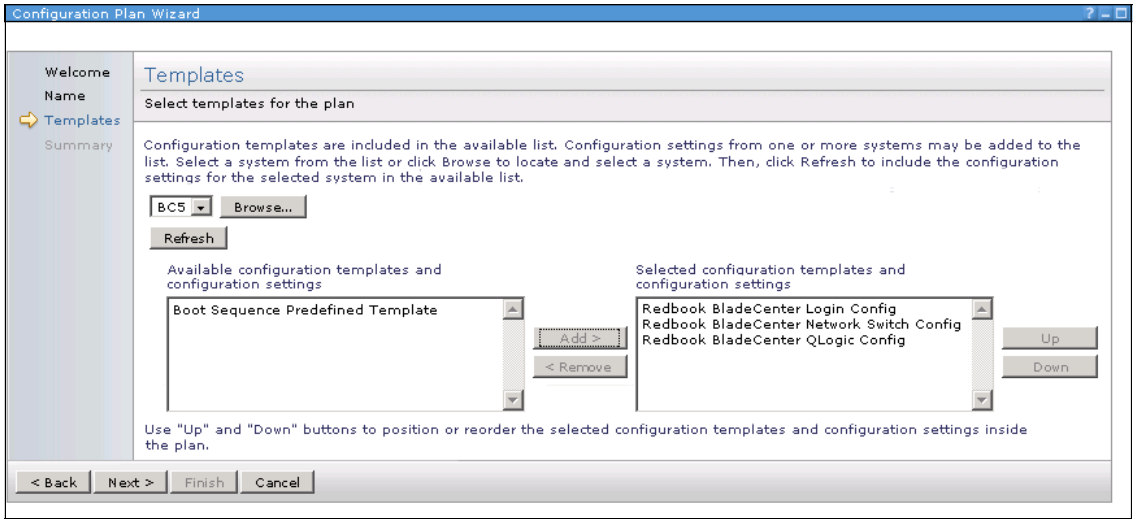


Figure 8-13 Configuration Plan Wizard Templates page

Lastly, a summary of your configuration plan is displayed so that you can confirm the configuration plan's actions before saving it, as shown in Figure 8-14.

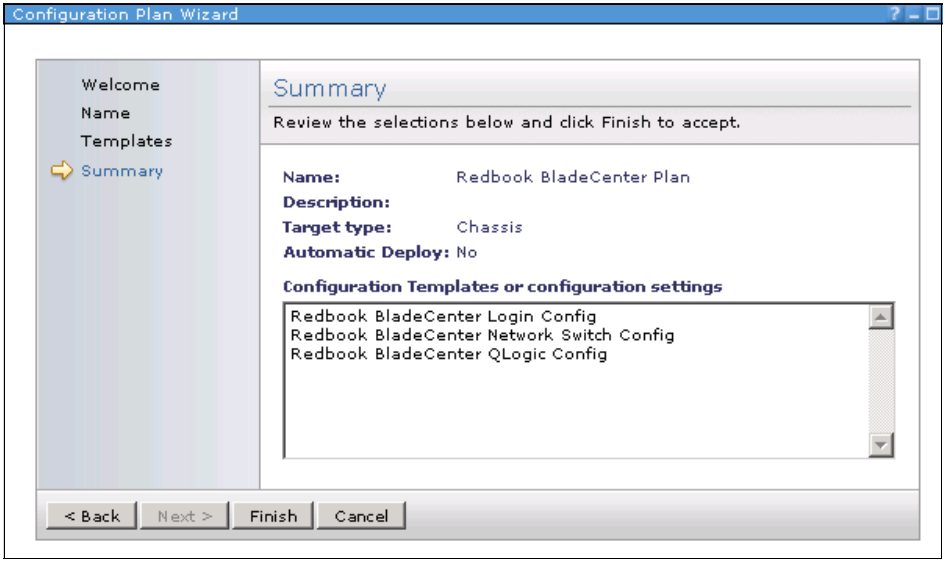


Figure 8-14 Configuration Plan Wizard Summary page

8.4.2 Deploying configuration plans

Figure 8-15 shows the list of configuration plans currently defined on our management server. To deploy one of these configuration plans, we simply select it and click **Deploy**.

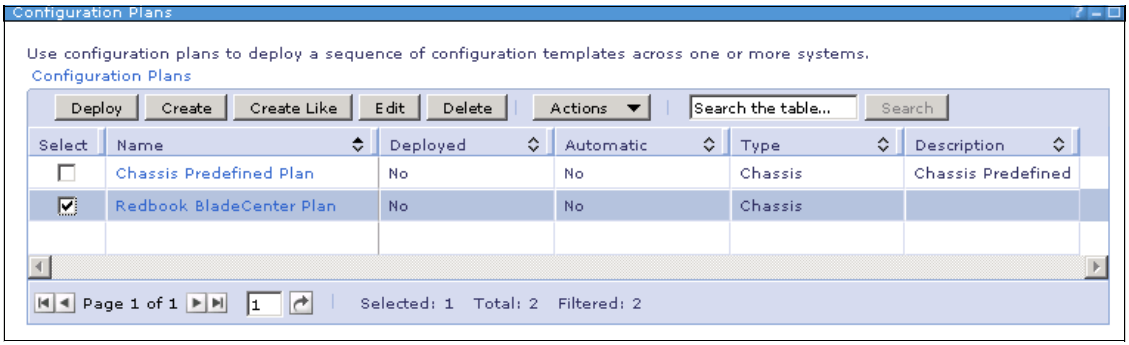


Figure 8-15 Configuration Plans page

As with deploying a configuration template, clicking **Deploy** creates a job to deploy the configuration plan (Figure 8-16).

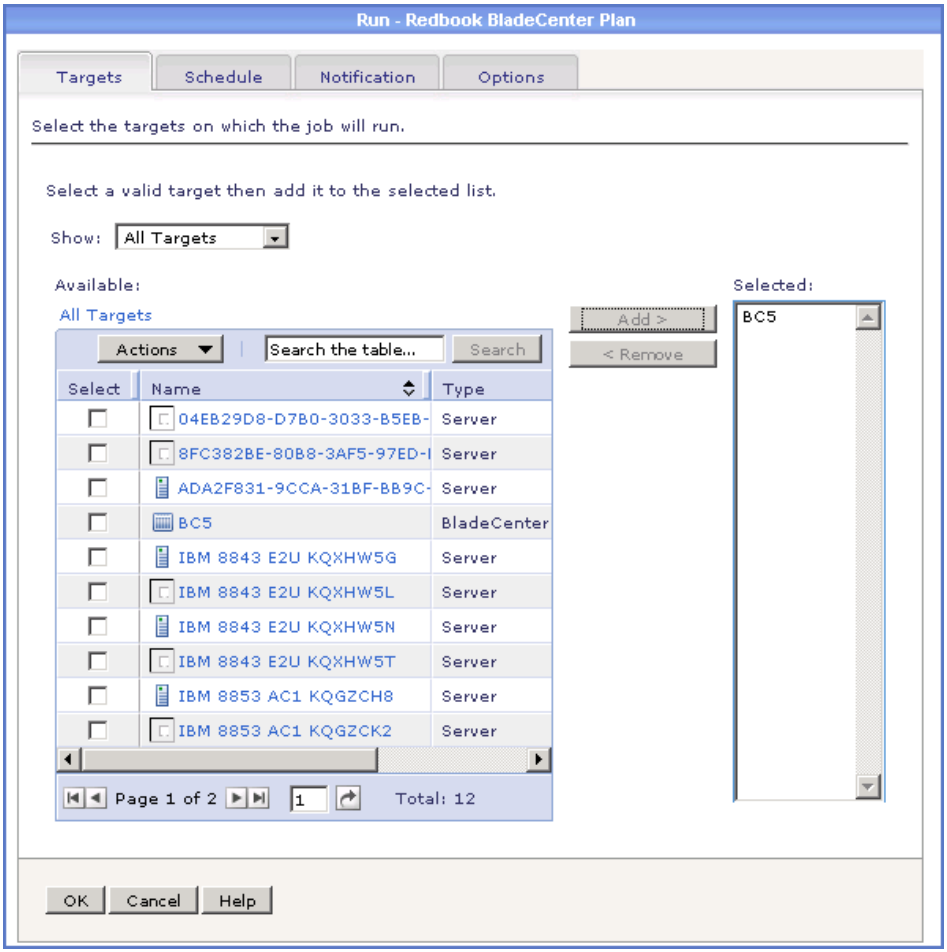


Figure 8-16 Configuration Plan automation job target chooser page

In the target chooser page that opens, select a system and click **Add**, then **OK**. The configuration plan will be deployed to the target systems. See Chapter 9, “Automation Manager” on page 405, for more information about Command Automation.

9

Automation Manager

Automation Manager provides tools to notify an administrator or run a predefined task automatically when a certain event occurs. You can use the Automation Manager plug-in to:

- Create custom Event Automation Plans (formerly called Event Action Plans in previous IBM Director versions) used to automate tasks and other responses to situations that occur in your environment.
- Create and manage event filters that allow the Event Automation Plans to target specific events.
- Create and manage event actions that identify tasks or commands to run, or notifications to send. Valid actions include starting a noninteractive task or program on the management server or the system on which the event was generated, or sending an e-mail notification.
- View the Automation Manager Summary page, which shows the status of jobs and automation plans and a summary of tasks that will help you automate tasks.

In this section we explore the following topics:

9.1 Event Automation Plan wizard

To assist the system administrator, IBM Systems Director provides the Event Automation Plan wizard as a quick and simple way to create Event Automation Plans that meet most systems' management needs.

Using the Event Automation Plan wizard, you can create plans that monitor for the most typical situations in systems management environments, including, but not limited to, the following examples:

- Critical hardware events from all systems in your environment
- Processor (CPU) utilization in a specific group of systems, such as all servers running Linux
- All Common Agent managed systems to determine whether Common Agent goes offline
- The status of updates that are underway
- Disk space use in systems, such as those that store database data

You can then configure actions to be performed based on the situation. For example, actions could send a page or e-mail message, or could start a program on a system. For more information about creating Event Automation Plans and using the Event Automation Plan wizard, see 9.3, "Creating Event Automation Plans" on page 426.

The Event Automation Plan wizard also provides advanced event actions and event filter options that you can use to create Event Automation Plans that can meet very specific needs in your systems management environment.

Successful implementation of Event Automation Plans requires planning and consideration of how you will implement them. Providing thoughtful descriptions for your Event Automation Plans can be particularly helpful. For more information see "Planning for Event Automation Plans" on page 80.

By default, IBM Systems Director creates one Event Automation Plan. This default plan is called *log all events*. This Event Automation Plan logs every event received from every managed system/resource to the IBM Systems Director event log. This Event Automation Plan is activated on all systems/resources.

Note: The Log All Events Event Automation Plan does not log Windows-specific or IBM i-specific events. For more information about how to monitor these operating-system-specific events, see "Monitoring operating-system-specific events" on page 415.

To view the default plan, click **Automation** → **Automation Plans** in the navigation area. The Automation Plans page opens in the contents view, as seen in Figure 9-1.

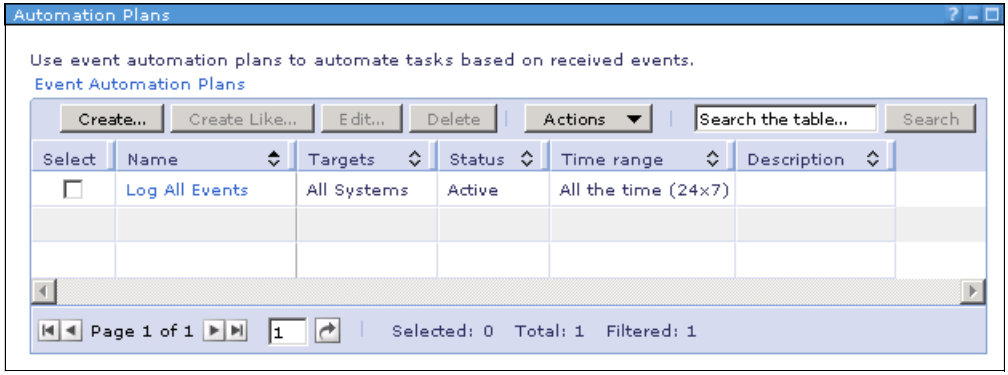


Figure 9-1 Default Automation Plans page

You will see listed in the table shown in Figure 9-1 the default automation plan Log All Events, with the Targets setting set to *All Systems*, status *Active*, and time range *All the time (24x7)*.

Note: This default Event Automation Plan can be deleted. However, we do not recommend deleting it until you have created other Event Automation Plans for your specific environment.

9.2 Events, filters, and actions

To create an Event Automation Plan there are a few aspects to consider (see also 2.5.9, “Event automation” on page 80):

- You must decide which events will generate a notification.
- You must decide which actions to perform when event notification is received.
- You must decide which Event Automation Plan should be applied to which systems or groups of systems.

Note: If you want to create sophisticated Event Automation Plans, it is important to understand the events that are generated in a systems management environment, the event filters that specify the triggering events, and the event actions that can automate a response to the triggering event. For examples see “Event Automation Plan examples” on page 81.

9.2.1 Events

An event is an occurrence of significance to a task or system, such as the completion or failure of an operation.

IBM Systems Director Server receives events from many sources. These sources include, but are not limited to, the following programs and protocols:

- IBM Systems Director native events generated by Common Agent (such as a fan failure or a power supply failure)
- Common Information Model (CIM) indications from the Common Information Model Object Manager (CIMOM) that is installed as part of Common Agent and Platform Agent
- Microsoft Windows event log events
- Windows Management Instrumentation (WMI) events
- SNMP traps through out-of-band communication (communication that is not through Common Agent or Platform Agent)
- Platform Event Traps (PET) through out-of-band communication with systems that support Alert Standard Format (ASF) and Intelligent Platform Management Interface (IPMI) such as the Baseboard Management Controller on IBM System x and BladeCenter Servers
- IBM service processor notifications through out-of-band communication, such as from the Remote Supervisor Adapter (RSA) on IBM System x servers

When IBM Systems Director Server receives these events or notifications, it converts them into IBM Systems Director events. For example, when the Systems Director Server receives a CIM indication, it converts the CIM indication into an IBM Systems Director event of the type CIM.

IBM Systems Director can convert CIM indications into other event types, including event types that are used by enterprise-level systems management programs, such as SNMP events. Using these event types, Systems Director can provide system data to the enterprise-level systems management programs

through the IBM Systems Director Upward Integration Modules. Systems Director converts CIM indications for use by the following consumers:

- IBM Systems Director events
- Microsoft System Center Operations Manager 2007 (alerts)
- Microsoft Operations Manager 2005 (alerts)
- Microsoft Systems Management Server (SMS) (native events)
- Microsoft Windows (event log event ID)
- Simple Network Management Protocol (SNMP)
- Tivoli Enterprise Console® (native events)
- Tivoli Enterprise Console (SNMP events)

Note: The CA Unicenter, HP OpenView, and Tivoli NetView Upward Integration Modules (UIMs) use SNMP traps. However, these SNMP events are not the same as SNMP traps that IBM Systems Director Server receives out-of-band (that is, not through Common Agent or Platform Agent).

Out-of-band SNMP traps are generated by hardware products and other software programs. They are displayed under the SNMP node in the event filter builder tree, but beneath a different subnode.

For a full list of CIM indications refer to the IBM Systems Director Information Center at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.events_6.1/fqm0_r_events_cim_indicators.html

Alerts and resolutions

In IBM Systems Director an event can be classified in one of the following categories:

- Alert: Typically, an alert is the occurrence of a problem relating to a system (for example, a power supply failure).
- Resolution: A resolution is the occurrence of a correction or solution to a problem. For example, the power supply has been replaced.

9.2.2 Event filters

A filter specifies one or more events that you want your Event Automation Plan to process. The Event Automation Plan ignores any event instances that do not meet the specifications of the filter.

In IBM Systems Director Server there are a number of default filters already created. These default filters are shown in Figure 9-2.

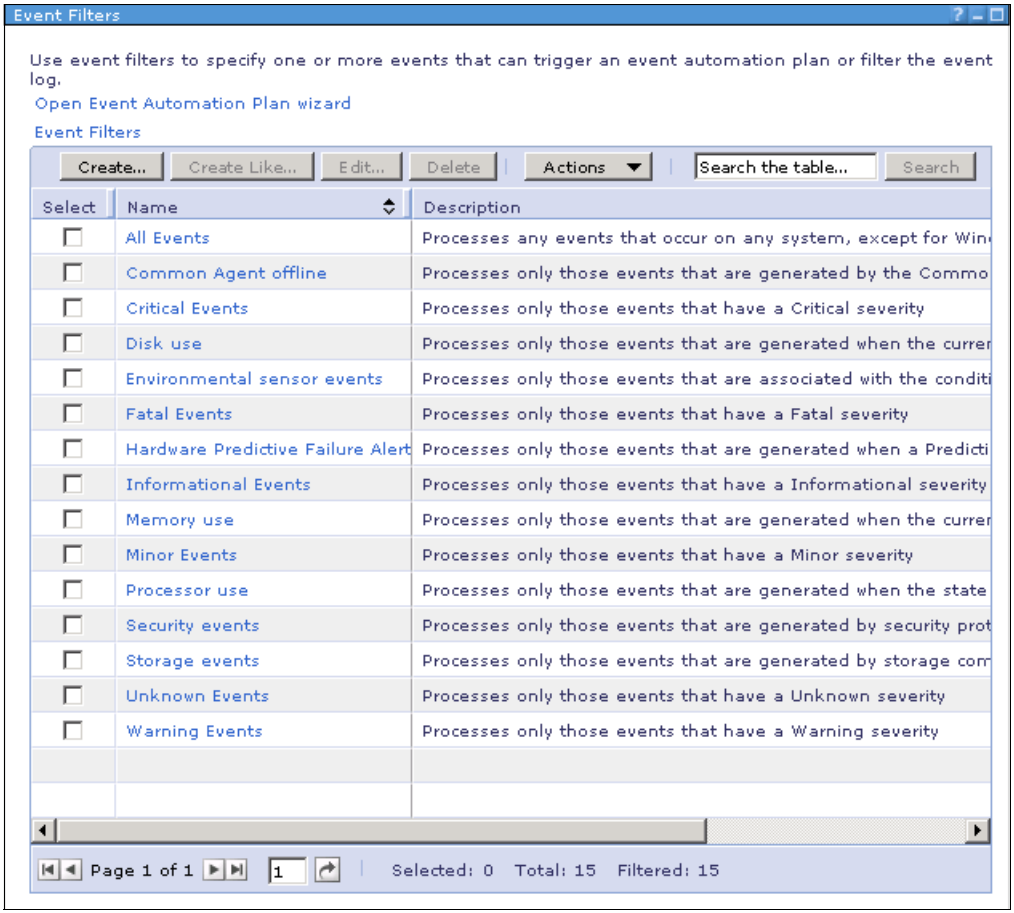


Figure 9-2 Default event filters

Occasionally, there are situations in which you will want to create a sophisticated event filter. Using these filters, you can specify details for an event such that it covers very specific problems or occurrences. To create filters quickly, default values are provided. However, you can customize the settings.

You can use a filter to capture a single event or multiple events. When designing an event filter, first determine whether the following criteria are met:

- Can all the target systems generate all the events that you want to filter?

  If a system cannot generate the event that you want to filter, the filter will not be effective on that system. In such instances, you can apply the Event Automation Plan to those systems, but it will have no effect. For example, If an event filter is based on an event for IBM BladeCenter products and that Event Automation Plan is applied to systems that do not include BladeCenter products, the event filter has no events to filter, and therefore, no actions are performed.

  If you understand this concept you can create more complex Event Automation Plans and you can reduce the number of Event Automation Plans that you must build and maintain.
- Can you use the same event actions for all targeted systems to respond to the event?
- Are the other filter options besides the event type common for all targeted systems? These settings include the number of times that the filter is active, the severity of the event, and other attributes.

In addition to selecting the event types to filter, you also can select from four types of event filters. Each filter type offers different options for processing selected events:

- Simple event filter: Simple event filters are general-purpose filters. Most Event Automation Plans use simple event filters.
- Duplication event filter: Duplication event filters ignore duplicate events.
- Exclusion event filter: Exclusion event filters exclude certain event types.
- Threshold event filter: Threshold event filters process an event after it has occurred a specified number of times within a specified time period.

We now look at each event filter type in more detail.

Simple event filter

In addition to any simple event filters that you create, IBM Systems Director provides the following predefined, read-only simple event filters in the Event Filters page.

Note: You cannot change predefined event filters. They are read only. However, you can copy a predefined filter and change the copy.

- All events: Processes any events that occur on a system, except for Windows-specific and IBM i-specific events
- Common Agent offline: Processes only those events that are generated by the Common Agent when it goes offline
- Critical events: Processes only those events that have a critical severity
- Disk use: Processes only those events that are generated when the currently available hard disk space in a system changes with respect to availability
- Environmental sensor events: Processes only those events that are associated with the condition of a system environment, such as voltage and temperature
- Fatal events: Processes only those events that have a fatal severity
- Hardware Predictive Failure Alert (PFA) events: Processes only those events that are generated when a PFA is detected for a hardware component
- Informational events: Processes only those events that have an informational severity
- Memory use: Processes only those events that are generated when the currently available memory in a system changes with respect to availability
- Minor events: Processes only those events that have a minor severity
- Processor use: Processes only those events that are generated when the state of a processor (CPU) has changed
- Security events: Processes only those events that are generated by specific security protocols, for example, logon failed due to an undefined user ID or incorrect or expired password
- Storage events: Processes only those events that are generated by storage components, such as Redundant Array of Independent Disks (RAID) configurations (for example, when creating, modifying, or destroying a storage volume or storage pool)
- Unknown events: Processes only those events that have an unknown severity
- Warning events: Processes only those events that have a warning severity

Some of these predefined filters use the severity of events to determine which events can pass through. Other filters target a specific type of event. Using one of these predefined event filters ensures that the correct event type or event severity is selected.

Duplication event filter

Duplication event filters ignore duplicate events. You can use this type of filter two ways. First, you can specify a simple time range threshold. Second, you can specify the number of times to ignore an event (count).

Interval only

To specify only a time range (interval), the count setting must be set to zero (count = 0). The first occurrence of an event that meets the filter criteria triggers associated actions and starts a countdown of the interval. For example, if you specify a 10-second interval, a 10-second timer starts when an event meets the filtering criteria. Because the count is set to 0, all other instances of an event that meet the criteria do not trigger associated actions during the interval.

Event count

If you also specify a number of times to ignore an event (count), it applies within the specified time range (interval). After the first occurrence of an event that meets the filtering criteria, the count setting specifies the number of times that an event must meet the criteria again, within the specified interval, before associated actions are triggered. For example, if you set the count to 9, an event meeting the criteria is allowed to occur nine times within the interval. When an event meets the criteria for a tenth time within the interval, the associated actions are triggered, the count is reset, and the interval is reset.

For the duplication filter to trigger the associated event actions a second time, the count must be exceeded within the reset interval.

If count = 3 and interval = 5 minutes, the event action is invoked for the fourth occurrence of the event that occurs within 5 minutes. Then the count and interval are reset. Four more occurrences of the event must occur within another 5-minute interval before actions are triggered again.

Frequently generated events

Duplication event filters are particularly useful in managing the processing of frequently generated events. For example, you can define a duplication event filter-to-filter on the occurrence of an offline event and define a corresponding event action to send an e-mail notification to a particular server administrator. Depending on the criteria that you define, only the first event announcing that the system is offline is processed, and all other instances in which an event meets

the filtering criteria are discarded until the count value is exceeded during the specified interval.

Exclusion event filter

Exclusion event filters exclude certain event types. Using this type of filter, you can define the criteria of the events to exclude. You can use this filter type to activate a group of events and then exclude some of the events in that group.

This filter type is useful when you want to create a filter based on a severity or a category of events, but you want to exclude specific event types. Instead of creating event filters for each event that you want to include, you can specify the event types that you want to exclude. By using exclusion event filters, it is easier to remove events that you do not want to monitor. For example, using this filter type you can monitor the Windows Security event log events, but exclude security alerts 528, 551, and 552.

Threshold event filter

The threshold event filter processes an event after it has occurred a specified number of times within a specified interval. An event triggers associated actions if, within the specified interval, the event occurs the number of times specified in the Count field. For example, you can define a threshold filter to monitor failed login attempt events and execute an event action only when the event is received for the fifth time during a specified interval. If the count is set to 5 and interval is set to 3 minutes, the specified event will be received up to four times in a 3-minute period and no action will be taken. However, if a user fails to lo gin for a fifth time within any 3-minute window, the event actions are invoked and the count and interval are reset.

To invoke the event actions a second time, the specified event must be received five times within an interval of 3 minutes again. If only four events are received within the 3 minutes, the count and interval are reset.

Monitoring operating-system-specific events

If you want to monitor Windows-specific or IBM i-specific events in the IBM Systems Director environment, you must create an Event Automation Plan in order for IBM Systems Director to process these events. The predefined active Event Automation Plan in IBM Systems Director, *log all events*, does not monitor these operating-system-specific events. Systems running Windows or IBM i can generate operating-specific events, as detailed in Table 9-1.

Table 9-1 Windows or IBM i operating-system-specific event types

Operating system	Specific event type
Windows	► Windows event log ► Windows services ► Windows registry
IBM i	Msgq

Even though these events are generated by their respective operating systems (or an optional layer that is installed on the operating system), IBM Systems Director does not process these events unless you create an Event Automation Plan to do so.

You must create an Event Automation Plan with a simple event filter that contains the event types for one or more of these events. Then you must apply this Event Automation Plan to systems running Windows or IBM i.

Note: When Common Agent starts on a system running Windows, the twgescli.exe program starts, too. This program listens for IBM Systems Director Server to send a message to Common Agent that says that an Event Automation Plan has been applied to that system.

If the Event Automation Plan includes a simple event filter that contains the event types for any of the Windows-specific events, IBM Systems Director appropriates these events for its own use. This is called event subscription.

The twgescli.exe program subscribes to the event types that are specified in the Event Automation Plan and translates the Windows-specific events into an IBM Systems Director event type. Then the program forwards the events to the management server from which the Event Automation Plan was applied.

When IBM Systems Director starts on a system running IBM i, the process is the same with comparable code to twgescli.exe that is included in IBM Systems Director for IBM i.

9.2.3 Event actions

Event actions specify the action that IBM Systems Director takes in response to specific events. For example, using the Event Automation Plan wizard, you can easily create an Event Automation Plan that will send an e-mail or pager notification in response to an event. Additionally, the Event Automation Plan wizard provides other advanced event actions that you can use in response to an event.

Predefined event actions

IBM Systems Director has several predefined types of event actions. With the exception of *Add to the event log*, you must customize each action that you want to use.

Note: In IBM Systems Director 6.1 and later, the following Director 5 event actions are no longer be supported:

- Add a message to the console ticker tape.
- Send a message to a management console user.

At the time of writing, the migration tool to enable migration from IBM Director 5.20.x Server to IBM Systems Director 6.1 was not available. However, note that if you are using the migration tool to migrate IBM Director 5.20 Server to IBM Systems Director 6.1 Server, these actions will be removed from the Event Automation Plan.

If the resulting Event Automation Plan has no event actions remaining, the plan will be in a deactivated state, and you must create another action before you can activate these plans. At the time of writing the migration tool was not available for testing.

The default predefined customizable actions available are shown in Figure 9-3.

Name	Type
Start a program on a system	Common
Start a program on the system that generated the event	Common
Send an e-mail to a mobile phone	Common
Start a program on the management server	Common
Send an e-mail (Internet SMTP)	Common
Send an alphanumeric page (using TAP)	Common
Static group: add or remove group members	Advanced
Post to a newsgroup (NNTP)	Advanced
Send an SNMP trap reliably to a NetView host	Advanced
Send a Tivoli Enterprise Console event	Advanced
Static group: add or remove the event-generating system	Advanced
Send an SNMP inform request to an IP host	Advanced
Send an SNMP trap to an IP host	Advanced
Modify an event and send it	Advanced
Timed alarm that starts a program	Advanced
Set an event system variable	Advanced
Start a task on a specified system	Advanced
Timed alarm that generates an event	Advanced
Start a task on the system that generated the event	Advanced
Log to a log file	Advanced
Send a numeric page	Advanced

Figure 9-3 Default predefined customizable actions

The available actions are:

- Start a program on a system: Starts a program on a specified system. Programs can include command-line commands that can start or stop programs on the system.
- Start a program on the system that generated the event: Starts a program on the system that generated the event that triggered the Event Automation Plan. Programs can include command-line commands that can start or stop programs on the system.
- Send an e-mail to a mobile phone: Sends an e-mail message to a mobile phone. The e-mail message is shortened to accommodate the limited display window of a mobile phone. Using this action, you can send less text than when using *Send an e-mail* (Internet SMTP).
- Start a program on the management server: In response to an event, starts a program on the management server that received the event. Programs can

include command-line commands that can start or stop programs on the system.

- Send an e-mail (Internet SMTP): Sends a Simple Mail Transfer Protocol (SMTP) e-mail message. You also can send a message to an e-mail enabled phone. Using this action, you can send more text than when using Send an e-mail to a mobile phone.
- Send an alphanumeric page (using TAP): (Windows only) Sends a message to a pager using the Telocator Alphanumeric Protocol (TAP).
- Static group: Add or remove group members: Adds a defined set of systems to a specified static group or removes a defined set of systems from the specified static group. Use this event action to initialize a set of systems to process. Then the processing is triggered by an event that you specify in your event filter.
- Post to a newsgroup (NNTP): Posts a message to a newsgroup used by your organization. The newsgroup must use Network News Transfer Protocol (NNTP) to send and receive information.
- Send an SNMP trap reliably to a NetView host: Generates an SNMP trap and sends it to a specified NetView host using a TCP/IP connection to the host. If delivery of the SNMP trap fails, a message is posted in the history log of the system.
- Send a Tivoli Enterprise Console event: If IBM Systems Director Server receives an event, you can forward that event to a specified Tivoli Enterprise Console event server.
- Static group: Add or remove the event-generating system: Adds the system that generated the event to a specified static group or removes the system that generated the event from a specified static group, as applicable.
- Send an SNMP INFORM request to an IP host: Sends an SNMP INFORM request to a specified IP address or host name. SNMP INFORM is a special version of an SNMP trap with a response from a destination.
- Send an SNMP trap to an IP host: Generates an SNMPv1 or SNMPv2c trap and sends it to a specified IP address or host name.
- Modify an event and send it: Resends the event that originally triggered the Event Automation Plan. Before resending the event, the action modifies the event data, such as its text and severity, to your specification.
- Timed alarm that starts a program: Starts a specified program only if IBM Systems Director does not receive a specified event within a specified time range. This event action is useful for monitoring for a loss of function, much like a heartbeat monitor.
- Set an event system variable: Sets a user-defined system variable to a new value or resets the value of an existing system variable. IBM Systems

Director provides user-defined system variables to help you test and track the status of network resources according to the needs of your organization. System variable names and values can be referenced wherever event data substitution is allowed.

- Start a task on a specified system: Starts a noninteractive IBM Systems Director task on a specified system. Noninteractive tasks are tasks that do not require user input.
- Timed alarm that generates an event: Generates a defined alarm event only if IBM Systems Director does not receive a specified event within a specified time range. This event action is useful for monitoring for a loss of function, much like a heartbeat monitor.
- Start a task on the system that generated the event: Starts a noninteractive IBM Systems Director task on the system that generated the event. Noninteractive tasks are tasks that do not require user input.
- Log to a log file: Logs information about the triggering event to a specified text file.
- Send a numeric page: (Windows only) Sends a numeric-only message to the specified pager.

For more detailed information about each of the default actions refer to the IBM Systems Director Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.automate_6.1/fqm0_c_ea_actions.html

9.2.4 Command Automation

Use the Command Definitions page to create a command definition that is saved to the Command Automation page in the IBM Systems Director Web interface. When you create and save a command definition, you can then apply it to a system and run the command. This page is also used to edit an existing command definition.

Note: This task requires the IBM Systems Director Launched Tasks program. This program is installed automatically the first time that you use a task that requires it. For information about the IBM Systems Director Launched Tasks program see 5.7, “Launched tasks” on page 290.

To create a Command Automation definition:

1. Expand **Automation** from the navigation area and click **Command Automation**.
2. Click **Create** from the Command Automation page.
3. The Launch task program begins and opens the Command Definition window, as shown in Figure 9-4.

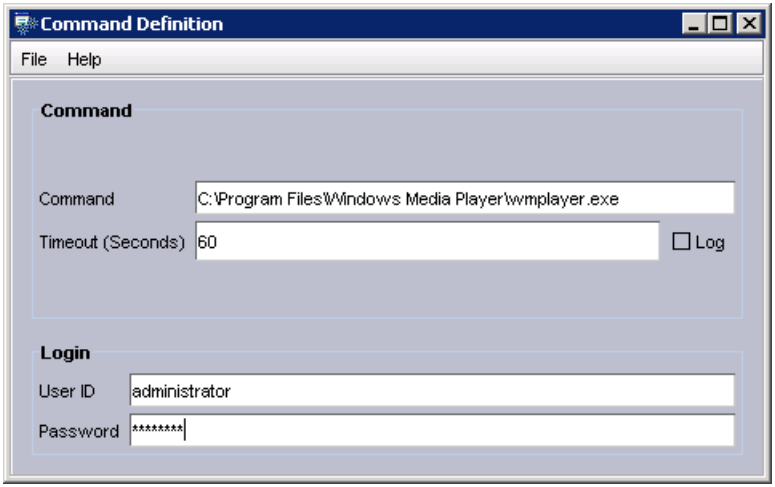


Figure 9-4 Command Definition window

Enter the command that you want to run and specify the login credentials for the system on which the command will be run.

In Figure 9-4 we entered the command to start the Windows Media® Player application using the login credentials of administrator and password for one of our Windows Common Agents.

4. Once you are satisfied with the command definition click **File** → **Save As**, enter an appropriate name for the command definition, and click **OK**.
5. You can then create more command definitions by changing the information and selecting to **Save as** a different name. Once you are finished creating command definitions click **File** → **Close** to close the Command Definition window.

Your created command definition will now appear in the Command Definitions table, as shown in Figure 9-5.

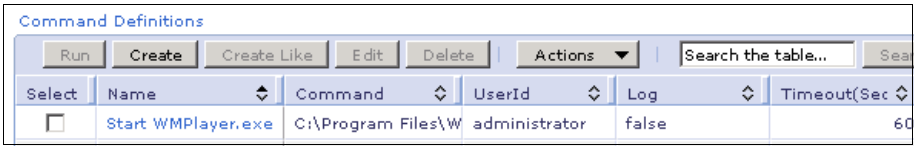


Figure 9-5 Command definition created

Note: This new command definition will also appear as a task when customizing event actions, as shown in Figure 9-6, and as detailed further in 9.2.3, “Event actions” on page 416.

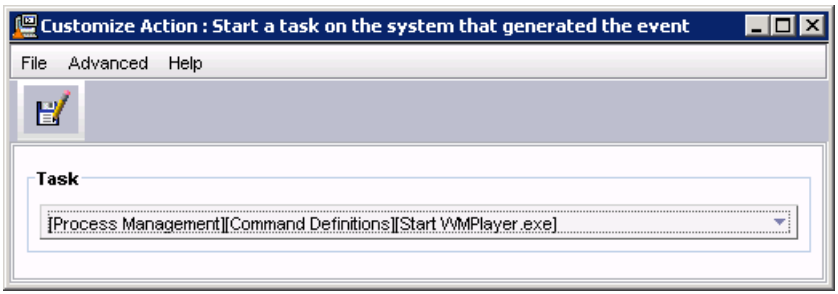


Figure 9-6 Customized Action: Start a task on the system that generated the event

9.2.5 Automation Manager summary page

You can view a summary of activity within the past 30 days that is associated with automation in the Automation Manager summary page. Activities listed here include Event Automation Plans, scheduled and run jobs, event management and event log, a list of systems with the most critical and warning events, and a list of the most frequently received critical and warning events. Note that information about this page is refreshed automatically when there are any changes.

To view the Automation Manager summary page:

1. In the IBM Systems Director navigation area, click **Welcome**.
2. From the available tabs in the Welcome page, click the **Manage** tab.

3. On the Manage page, click the **Automation Manager** section heading. The Automation Manager summary page opens, showing a summary for the past 30 days, as shown in Figure 9-7.

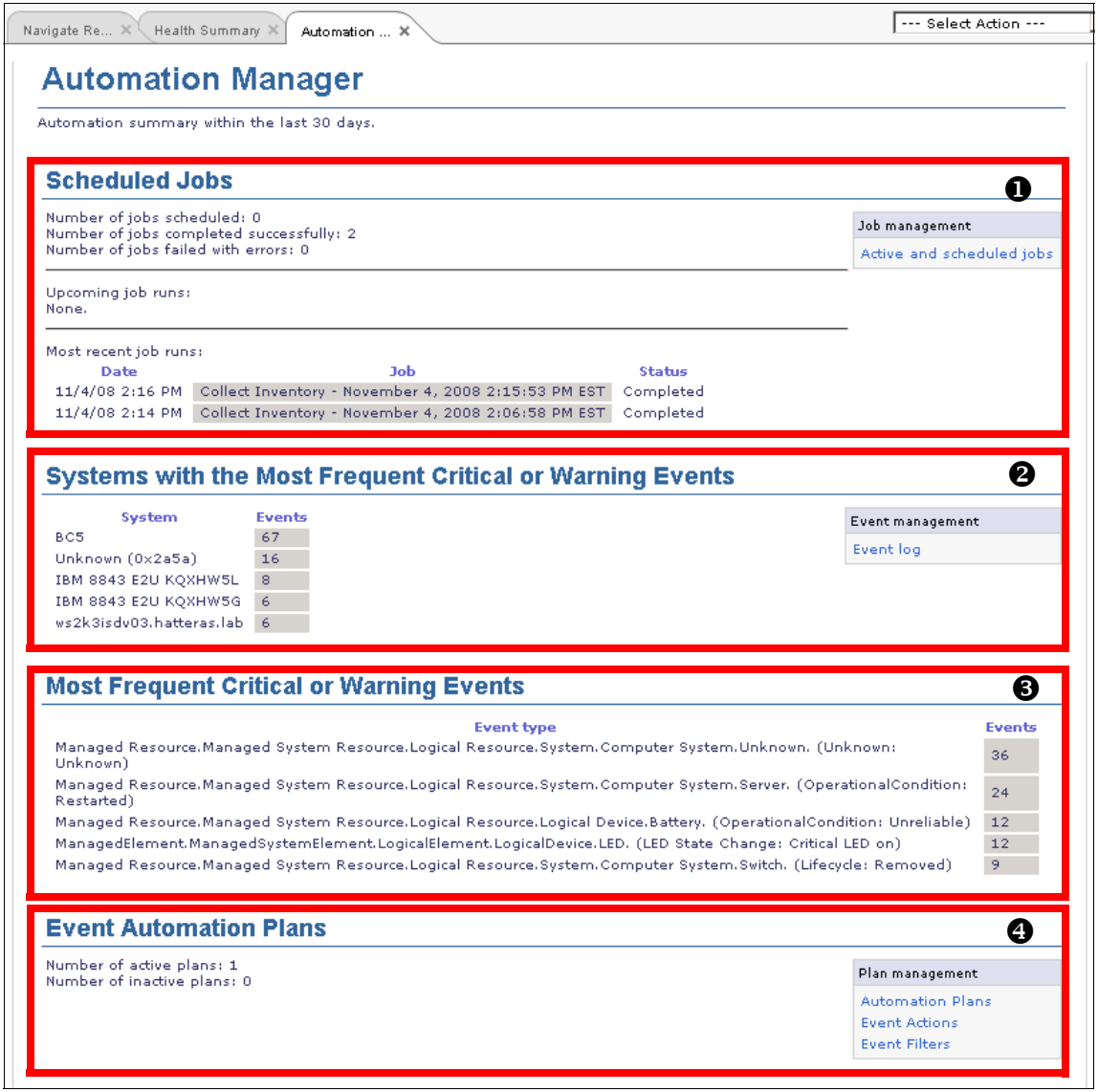


Figure 9-7 Automation Manager Summary page

The sections shown on the summary page in Figure 9-7 are as described in the following subsections.

Scheduled jobs

This section, shown in Figure 9-7 on page 422 by the number ❶, provides the following information:

- The number of active scheduled jobs.
- The number of job activations that have completed successfully.
- The number of job activations that have failed.
- Up to three upcoming jobs that will run next. If more than one job will run at the same time, all affected jobs are displayed.
- Up to three of the most recently run jobs. If more than one job ran at the same time, all affected jobs are displayed.
- In the Job management area, a link to the Scheduler task page. Using scheduler you can create or edit jobs, view job information, view job instance information, suspend and resume jobs, and more.

From the Job Management box you have the option to click **Active and Scheduled Jobs**. Clicking this opens the Active and Scheduled Jobs page, as shown in Figure 9-8. Here you can see which jobs are scheduled and when the jobs are due to run next. You also see the progress of active jobs.

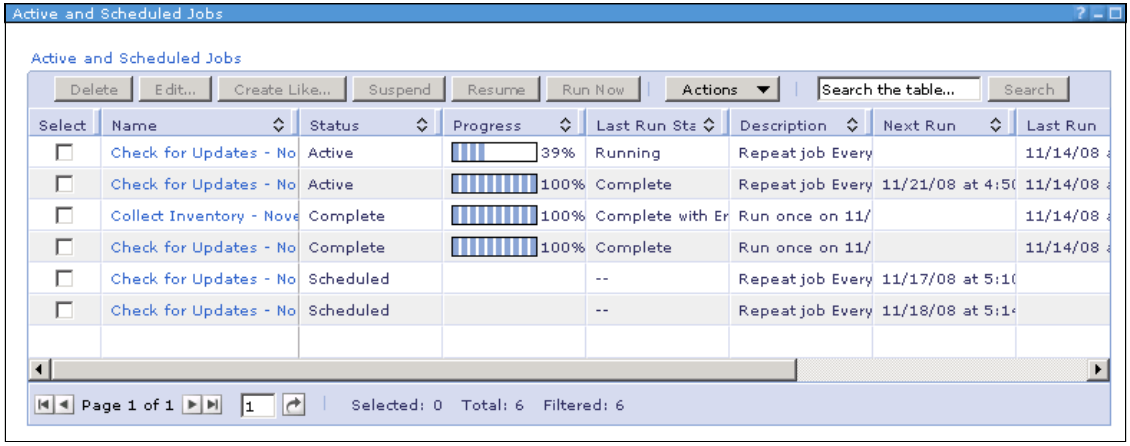


Figure 9-8 Active and Scheduled Jobs page

Systems with the most frequent critical or warning events

The section with the number 2 in Figure 9-7 on page 422 lists the five systems with the most events of type fatal, critical, or warning. If there are more than five systems that have generated the same number of events, an ellipsis (...) indicates that there are more systems.

In the Event management box, you have an option to click **Event log**. This opens the Event Log page, as shown in Figure 9-9.

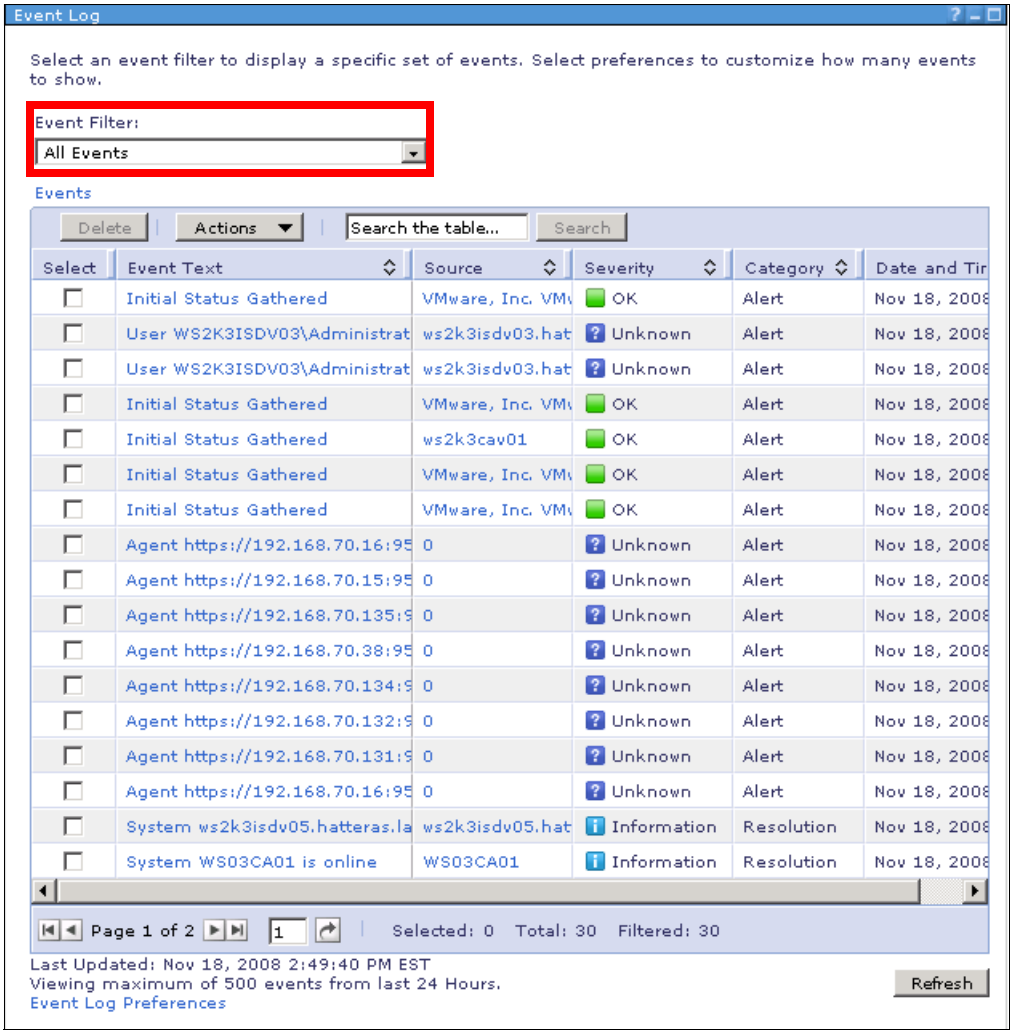


Figure 9-9 IBM Systems Director event log

On this page you can view events that IBM Systems Director Server has received along with event information that can help you troubleshoot problems in your systems management environment. You can filter this view further to show only specific events within the event log. This is achieved by clicking the **Event filter** drop-down menu, as shown in Figure 9-10.

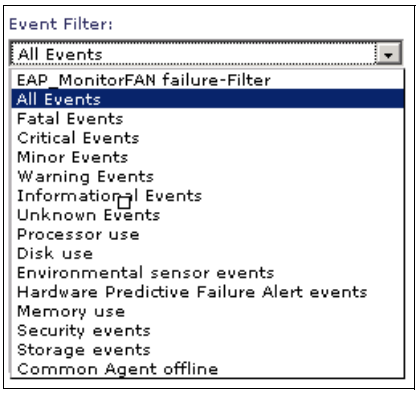


Figure 9-10 Event log filter options

View the most frequent critical or warning events

This section, shown in Figure 9-7 on page 422 with the number ❸, lists the five event types that have been generated the most with the event severity of fatal, critical, and warning. If there are more than five event types that have been generated in the same number of severities, an ellipsis (...) indicates that there are more event types.

View the automation plans

This section, shown in Figure 9-7 on page 422 with the number ❹, provides the following information:

- The number of active Event Automation Plans
- The number of inactive Event Automation Plans

In the Plan management box, the following links are provided:

- Automation plans: Takes you to the Event Automation Plans page, as described in 9.3, “Creating Event Automation Plans” on page 426. Use the Automation Plans page to create and work with Event Automation Plans.
- Event actions: Takes you to the Event Actions page, as described in 9.2.3, “Event actions” on page 416. Use the Event Actions page to create and work with event actions that specify the action to automate when an Event Automation Plan is triggered.
- Event filters: Takes you to the Event Filters page, as described in 9.2.2, “Event filters” on page 409. Use the Event Filters page to create and work with event filters that determine which events trigger an Event Automation Plan.

9.3 Creating Event Automation Plans

In order to create an Event Automation Plan there are various stages involved. In this section we look at the following:

- Building an automation plan
- Selecting and creating filters
- Selecting and creating actions

9.3.1 Building an automation plan

To begin creating your Event Automation Plan you must start the Automation Plan Wizard. To start the wizard:

1. Expand **Automation** in the Navigation area, as shown in Figure 9-11.

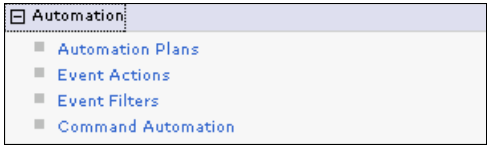


Figure 9-11 Automation menu in navigation section

2. Click **Automation plans**. The Automation Plans view opens, as shown in Figure 9-12.

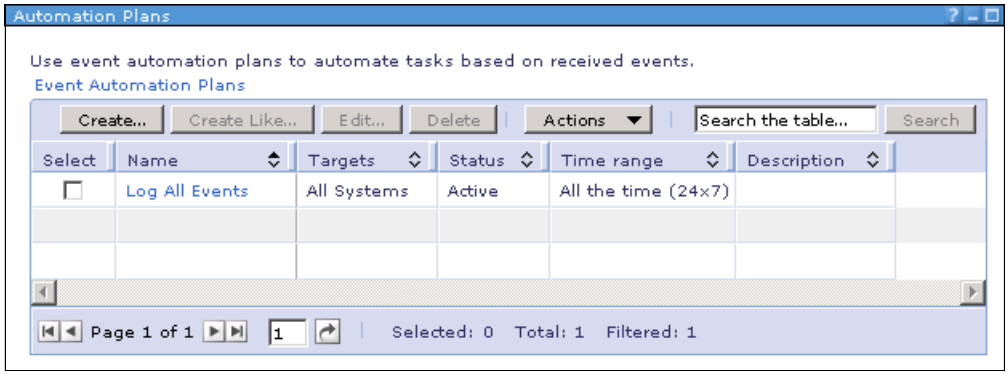


Figure 9-12 Automation Plans view

3. Click **Create** to open the Event Automation Plan wizard. The wizard is used to create Event Automation Plans. Use these plans to designate events within your systems management environment for which one or more actions are executed.
4. If presented with the Welcome page, click **Next** to continue.

   To avoid showing the welcome page next time you enter the Event Automation Plan wizard deselect the option **Show this Welcome page next time**.
5. Begin the Event Automation Plan by giving it a name and, optionally, a description. Click **Next** to continue.
6. Identify the systems that you want the plan to monitor for specific events.
7. In the Available pane, select one or more systems or groups of systems. Then click **Add** to move your selections to the Selected pane. If you want to select specific systems from a group, click the group to view the group members. Make your selections and then click **Add**. Click **Next** to continue.
8. Select or create a filter for the automation plan. See 9.3.2, “Selecting and creating filters” on page 429.
9. Now you must select the events that trigger an event action. Specify one or more events from the list of common events. The selected events trigger this Event Automation Plan.

   Alternatively, select **Advanced Event Filters** in the Events list to use one advanced event filter. Use advanced event filters to monitor for specific events that are not included in the common event filters or to monitor for only one event.

For more information about which filters to use see 9.3.2, “Selecting and creating filters” on page 429.

For example, instead of monitoring for all fan event types, you can monitor for only the Fan Predictive Failure Alert (PFA) event. Also, you can create more sophisticated event filters that are triggered when duplicates of an event are received, when a specific number of instances of an event is received within an interval of time, or when a specific event is received but you want to exclude another event.

Once you are satisfied with your selection, click **Next** to continue.

10. The Actions view appears next, enabling you to pick the action that you want to invoke on receiving the event. You can either pick one of the event actions listed or create your own action. For more information about creating actions see 9.3.3, “Selecting and creating actions” on page 437.

    Once you have selected an action, click **Next** to continue.

11. Specify the time range for Event Automation Plan activation. When creating an Event Automation Plan, you can specify the time range for the plan to be active. You will want many plans to be active all the time, in which case select **All the time (24x7)**. However, you might need other plans to be active at only certain times, such as weekends or overnight, and in this case you should click **Custom** and specify the time that you want to monitor the event. Click **Next** to continue.

12. You are then presented with a summary of the proposed Event Automation Plan, as shown in Figure 9-13. If you are satisfied with the plan, click **Finish**.

> **Tip:** Within the summary view, as shown in Figure 9-13, there is a check box selected by default to **Apply this Event Automation Plan when I click Finish**. If you do not want to apply the Event Automation Plan at this time, deselect this option.

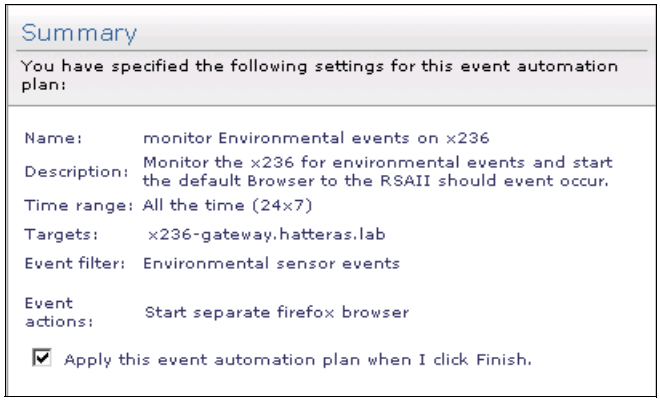


Figure 9-13 Event Automation Plan summary

The plan now shows up in the Automation Plans view, Figure 9-14. Note that the Log All Events automation plan is created by default.

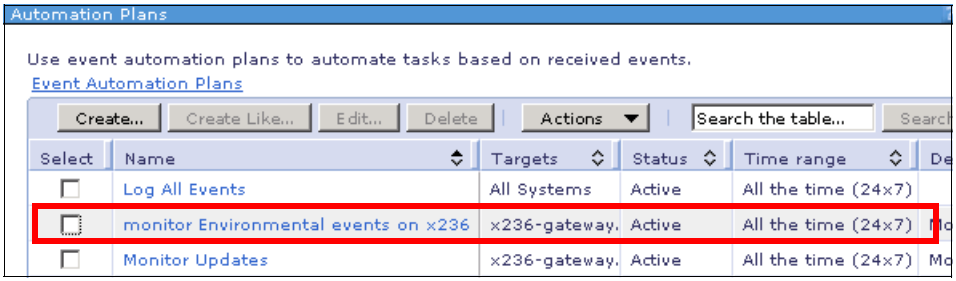


Figure 9-14 Automation plans view with created automation plan

9.3.2 Selecting and creating filters

The Event Automation Plan uses event filters to monitor for the occurrence of one or more specified events. When these events occur, your Event Automation Plan responds with one or more customized event actions.

The types of events from which you can select and the ways that you can filter the events are broadly divided between the following categories:

- Common event filters

  These are predefined simple filters that monitor for events of common interest. For example, the disks event filter is triggered by any hard disk event and the fans event filter is triggered by any fan event.

  The Event Automation Plan wizard provides several common event filters so you can create typically required Event Automation Plans quickly and easily. Common filters available are:

  - General
    - Event severity
    - Updates
    - Common Agent
    - User login security
  - Thresholds
    - CPU utilization
    - Memory usage
    - Disk % space used
  - Hardware
    - Processors (CPU)
    - Disks
    - Fans
    - Memory
    - Network and switches
    - Power
    - Servers
    - RAID or storage arrays
    - Blade servers

- Advanced event filters

  If you want to monitor specific events that are not included in the common event filters you must select advanced event filters. Not only can you specify additional events, but you also can create more sophisticated event filters that are triggered:

  - When duplicates of an event are received
  - When a specific number of instances of an event is received within and interval of time
  - When a specific event is received but you want to exclude another event

For more information about Advanced Event filters see 9.2.2, “Event filters” on page 409.

Selecting default advanced event filters

When you select Advanced Event Filters within an Event Automation Plan you are provided with a list of default event filters, as shown in Figure 9-15.

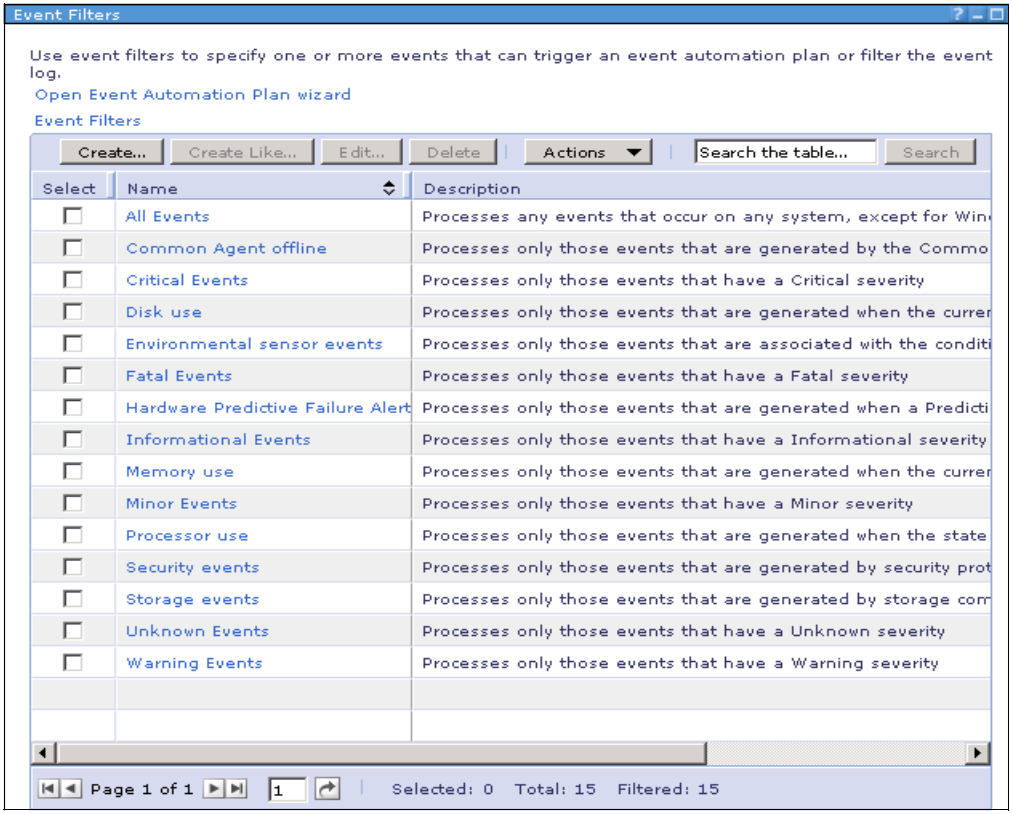


Figure 9-15 Default advanced event filters

To see more information about any of the event filters listed, you can either click the filter name (for example, click **Common Agent offline**) or select a filter and click **Actions** → **Properties**. This opens the properties page for the specific filter, as shown in Figure 9-16.

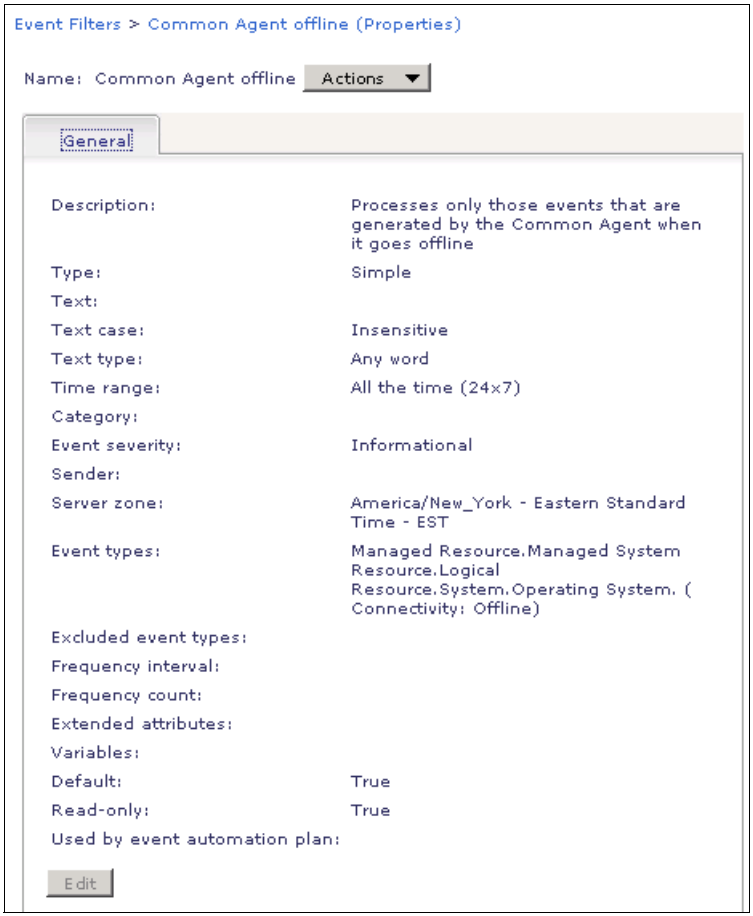


Figure 9-16 Event filter Common Agent offline properties page

If you decide not to use any of the filters listed you can create your own specific filters, as described in the next section.

Creating customized advanced event filters

You can open the event filter builder in two ways:

- From within the Event Automation Plan wizard you can choose to **Create** a new event filter.
- Expand the **Automation** task in the navigation area and click **Event Filters**, then click **Create**.

Once the Create Filter page is open, select the filter type from the available options (simple event filter, threshold filter, duplication filter, exclusion filter). For more information about each filter type see 9.2.2, “Event filters” on page 409. This starts the Launch Task program and opens the appropriate event filter builder, where you can create a customized filter.

Each filter type that you select displays a different window:

- Selecting **Simple event filter** launches the window shown in Figure 9-17.

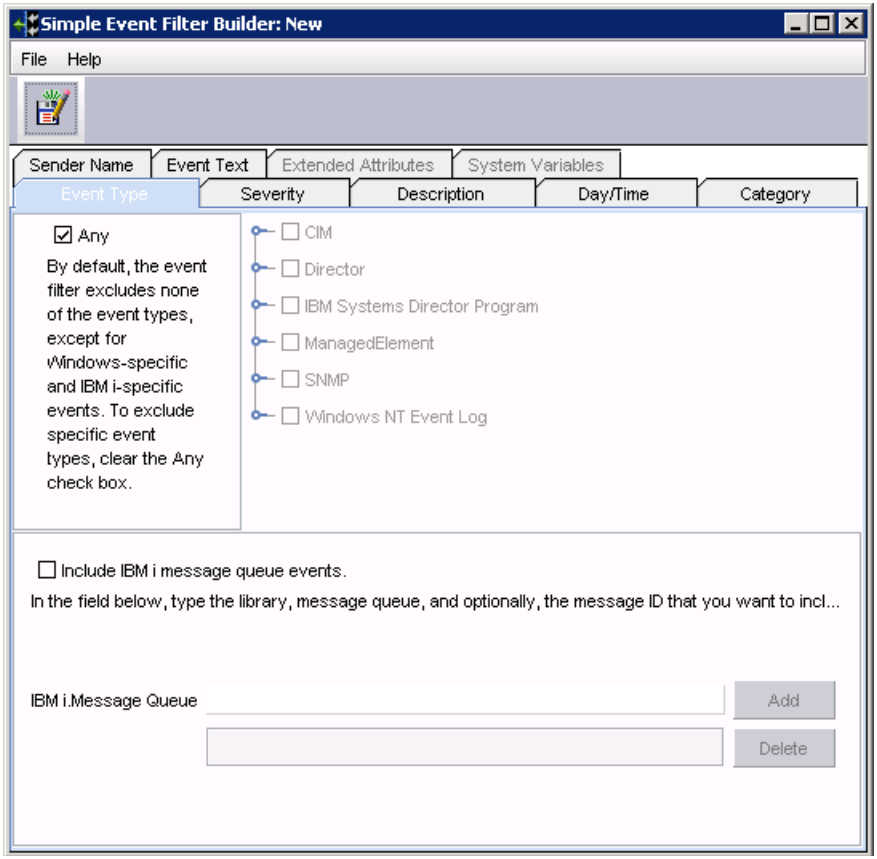


Figure 9-17 Simple Event Filter Builder

Make your filter selection, then save this filter with an appropriate name. This saved filter will be added to the list of available advanced filters, as shown in Figure 9-21 on page 437.

- Selecting **Threshold event filter** launches a window similar to the one shown in Figure 9-17 on page 433. However, you will have a Frequency tab available to configure, as shown in Figure 9-18.

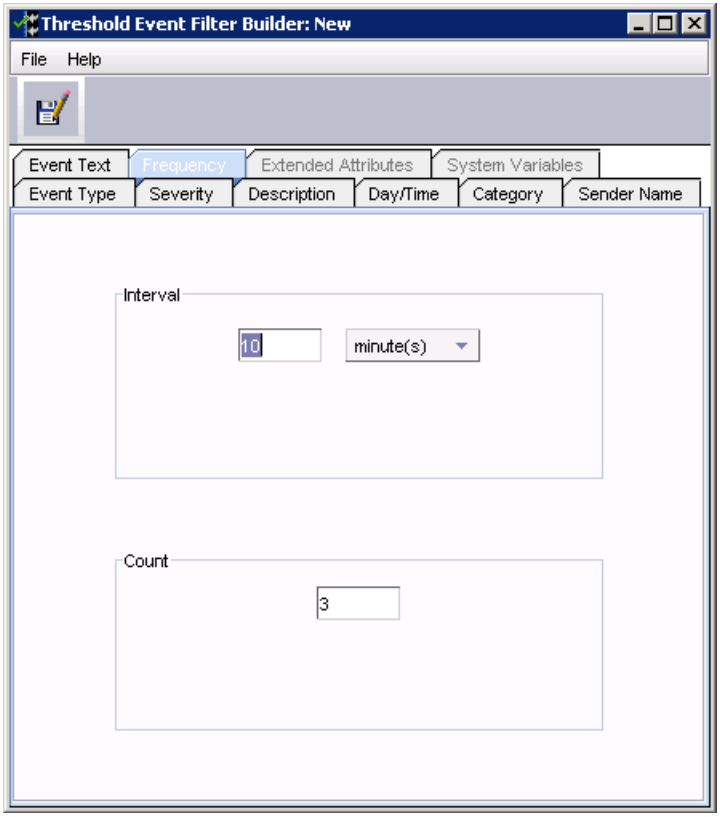


Figure 9-18 Threshold event filter builder tab option

Configure your specific threshold event and specify the frequency information. Then save this filter with an appropriate name. This saved filter will be added to the list of available advanced filters, as shown in Figure 9-21 on page 437.

- Selecting **Duplication filter** launches a window similar to the one shown in Figure 9-17 on page 433. However, you will have a Frequency tab available to configure, as shown in Figure 9-19.

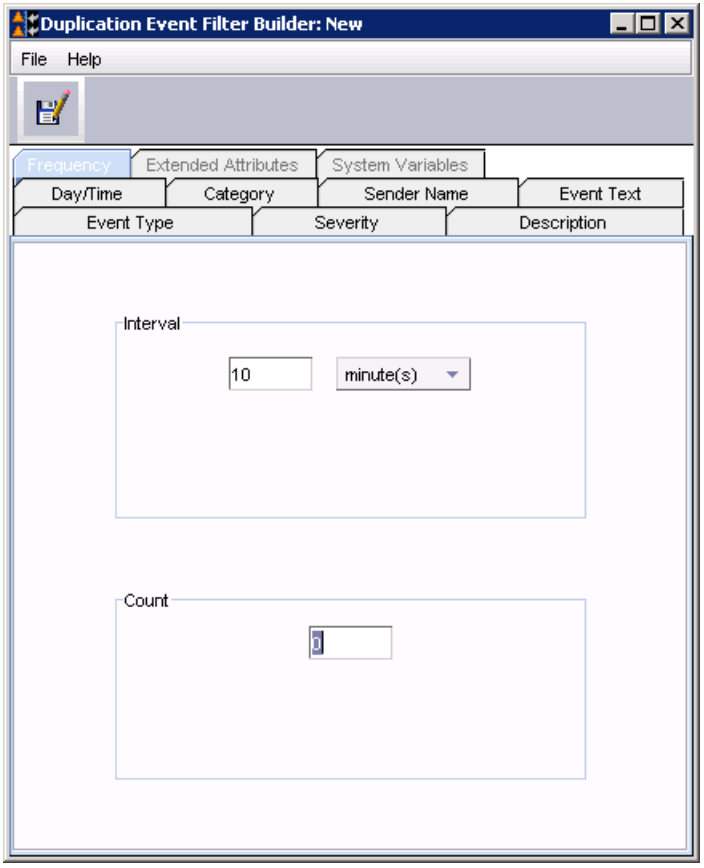


Figure 9-19 Duplicate event filter builder

Configure your specific duplicate event and specify the frequency information. Then save this filter with an appropriate name. This saved filter will be added to the list of available advanced filters, as shown in Figure 9-21 on page 437.

- Selecting **Exclusion filter** launches a window similar to the one shown in Figure 9-17 on page 433. However, you will have a Frequency tab available to configure, as shown in Figure 9-19 on page 435.

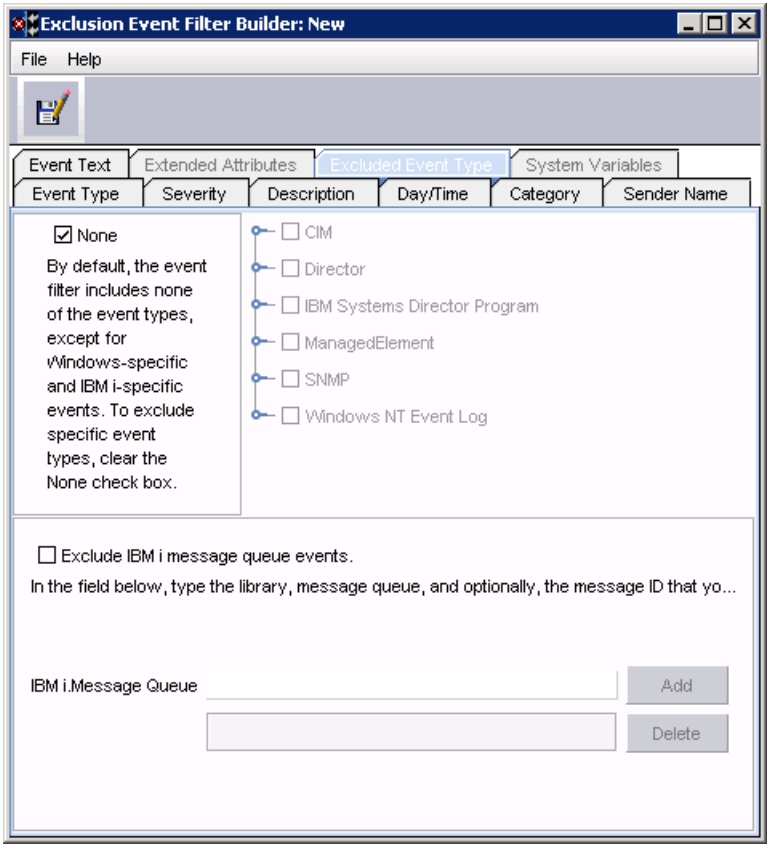


Figure 9-20 Exclusion event filter

Configure your specific exclusion event. Then save this filter with an appropriate name. This saved filter will be added to the list of available advanced filters, as shown in Figure 9-21.

13. Once the event filters are created and saved the new event filters are listed in the available filters list, as seen in Figure 9-21.

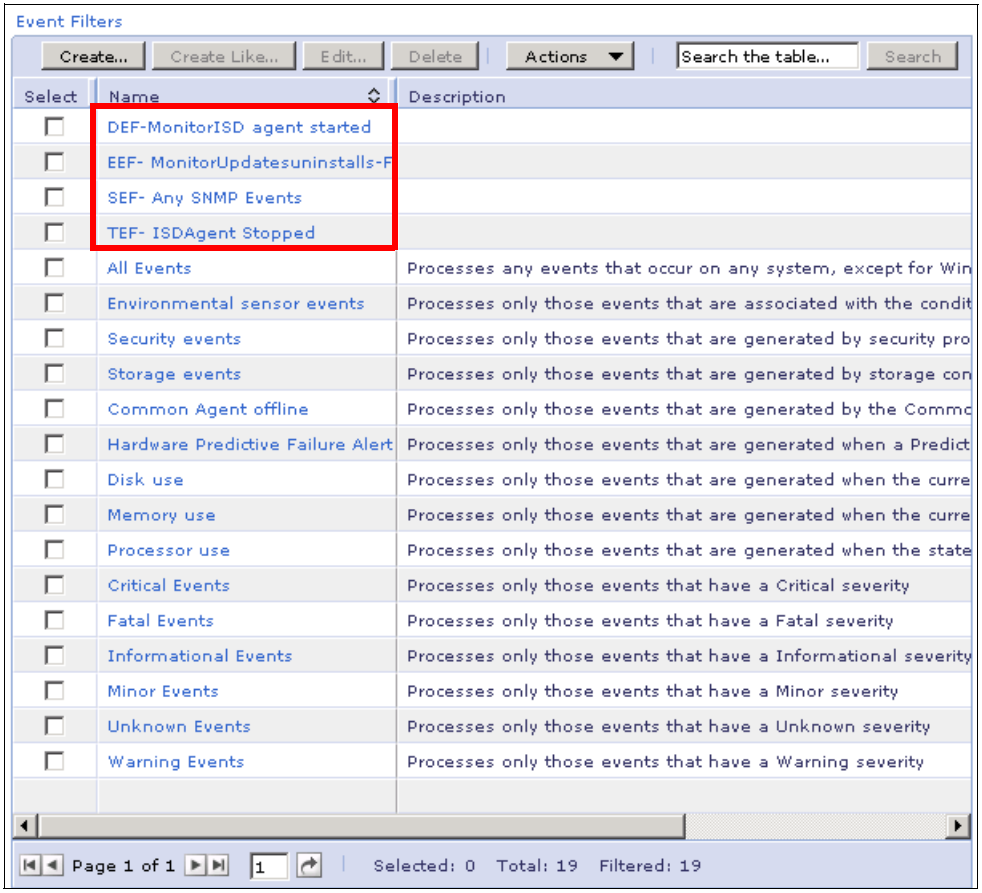


Figure 9-21 New event filters added

9.3.3 Selecting and creating actions

When it comes time to choose an action for an Event Automation Plan, you can either select the default action or customize one of the available predefined actions. In this section we describe both options.

Selecting the default action

The only default action available is the **Add to the event log** action, which logs the event received and adds it to the IBM Systems Director event log. To view the event log, expand the **System Status and Health** task in the navigation area and select **Event Log**.

Creating customized actions

You can customize any of the predefined actions, as detailed in “Predefined event actions” on page 416. To customize an action:

1. From the Select Actions page within the Event Automation Plan, click **Create**.
2. Select the action that you want to customize, then click **OK**. In our example, we select **Start a program on the Management Server**.
3. Enter the settings required to customize the action, as shown in Figure 9-22.

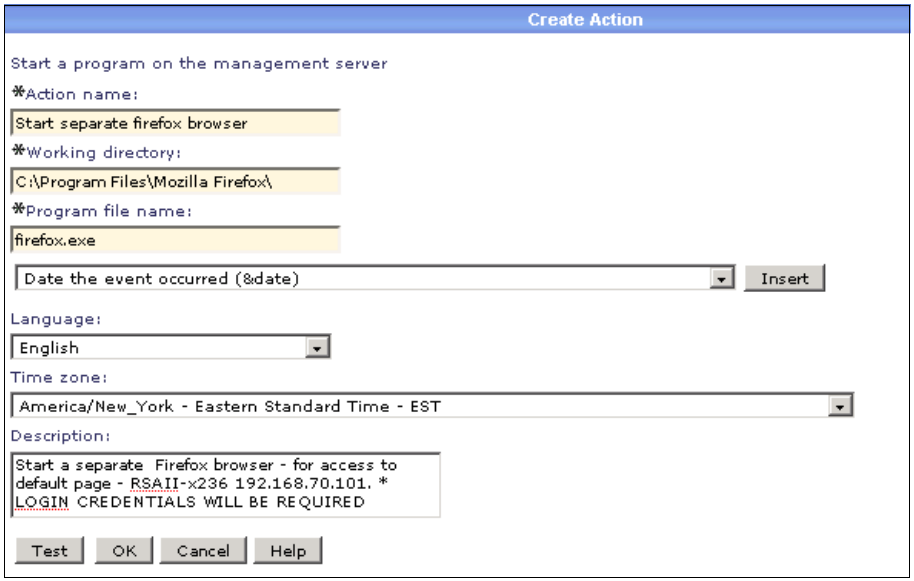


Figure 9-22 Create Action: Customized start program on management server

4. If you have the option to test your action, click **Test**. In our example, we want to start the Firefox browser and open the default home page, which connects to an RSA II card installed in an IBM xSeries® 236 server. If the action is configured correctly, the program will start and you will receive a message stating that the action was successful, as shown in Figure 9-23.

Figure 9-23 Testing action to open Firefox browser against RSA II adapter

5. Click **OK** to save the action and add it to the actions table, as shown in Figure 9-24.

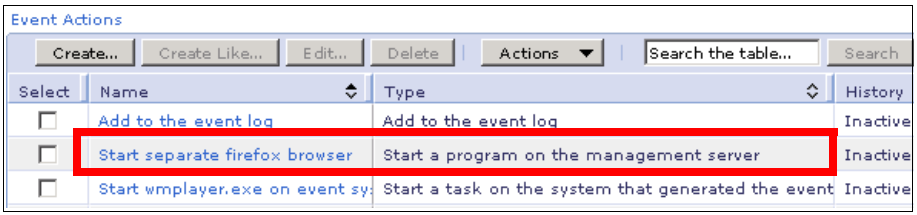


Figure 9-24 New action created

9.4 Example of an Event Automation Plan

In this section we show how to create a process-management-initiated Event Automation Plan and include a link to the scenario in 17.1, “Hardware alerting” on page 742.

9.4.1 Monitoring application failure

You can create an Event Automation Plan that monitors a process or application and restarts the process or application if it fails. In our example we monitor the Windows Media Player application. On failure, the Event Automation Plan automatically restarts this application using a customized action. This example can be applied to virtually any process or application.

There are two prerequisites for this Event Automation Plan. First, we must create a process monitor that will generate an event when the application fails. This will become the event on which we trigger the plan. Second, we must create a command definition to restart the failed application. This will become the action that is triggered by the plan.

Finally, we test the new Event Automation Plan to make sure that it does exactly what we intend.

Create the process monitor

To create the process monitor:

1. Ensure that the application (Windows Media Player) is running on the system that you want to manage.
2. In the IBM Systems Director Web interface, click **Find a Resource**.
3. Enter the name of the system that you want to manage in the search criteria box and click **Find**. In our example we search for `ws2k3cav04`, as shown in Figure 9-25.

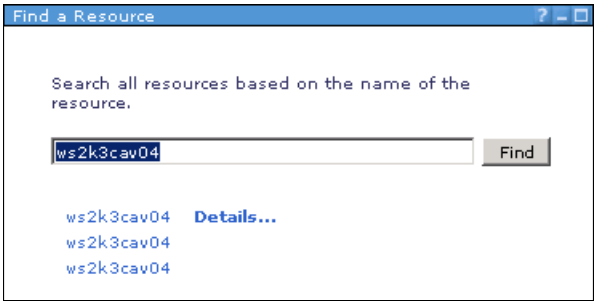


Figure 9-25 Find a Resource page

4. Click **Details** to show the resources that match the criteria, as shown in Figure 9-26.

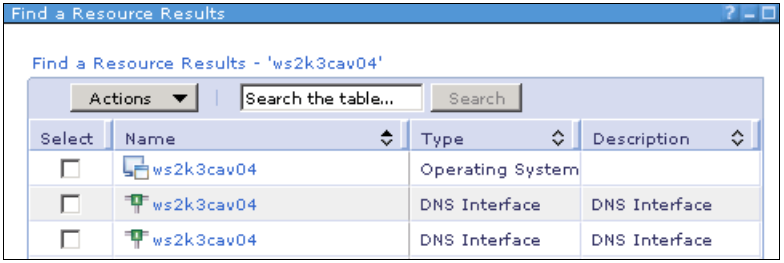


Figure 9-26 Find resource results

5. Right-click the resource of type **Operating System** and click **System Status and Health** → **Manage Processes**. This starts the Launched tasks program.

6. Once the Process Management window opens, locate the process **wmplayer.exe**, right-click, and select **Add to Monitors**, as shown in Figure 9-27.

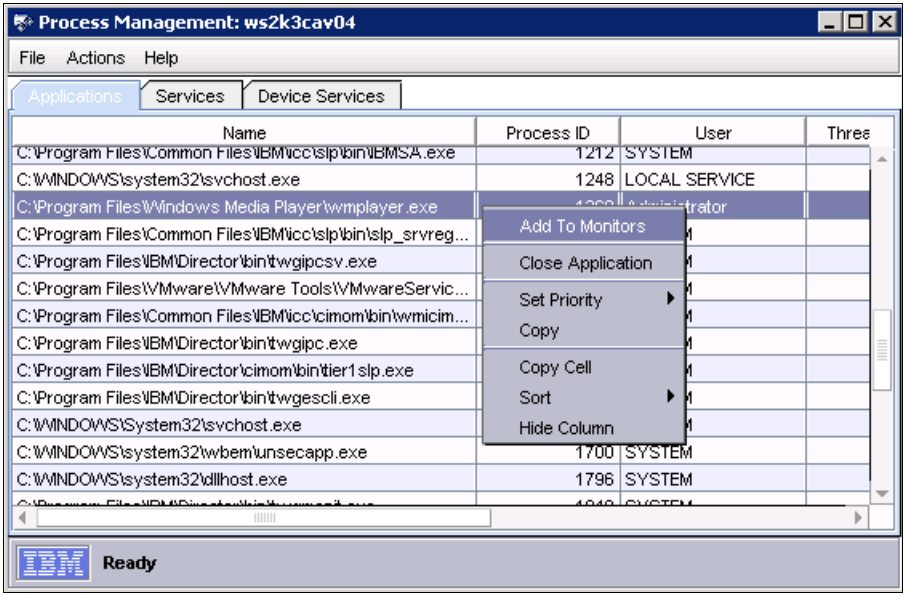


Figure 9-27 Add wmplayer.exe to monitors

7. Click **File** → **Close** to close the Process Management window.
8. Return to the resource results page and right-click the resource of type **Operating System** and click **System Status and Health** → **Process Monitors**.

9. This also starts the Launched tasks program. Once the Process Monitors window opens, select the check mark in the **Stop** column, as shown in Figure 9-28.

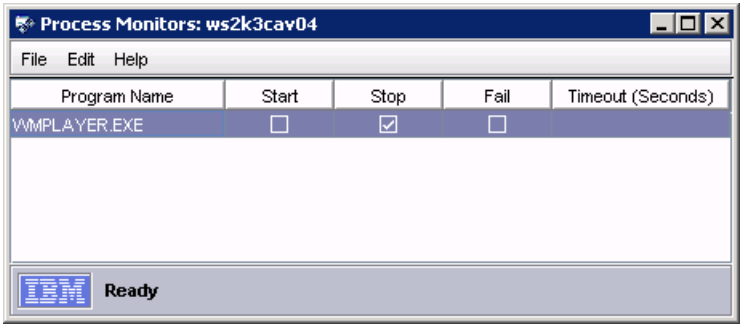


Figure 9-28 Process Monitors window

10. Click **File** → **Create task**.
11. Enter `Monitor Wmplayer.exe stopping` for the task name and click **OK**.
12. Click **File** → **Close** to close the Process Monitors view.
13. This prerequisite is now complete. You can close the Find a resources tab in the IBM Systems Director Web interface.

Create the command definition

To create the command definition task to restart the wmplayer.exe application:

1. Expand **Automation** from the navigation area and click **Command Automation**.
2. Click **Create** from the Command Automation page.

3. The Launch task program begins and opens the Command Definition window, as shown in Figure 9-4 on page 420.

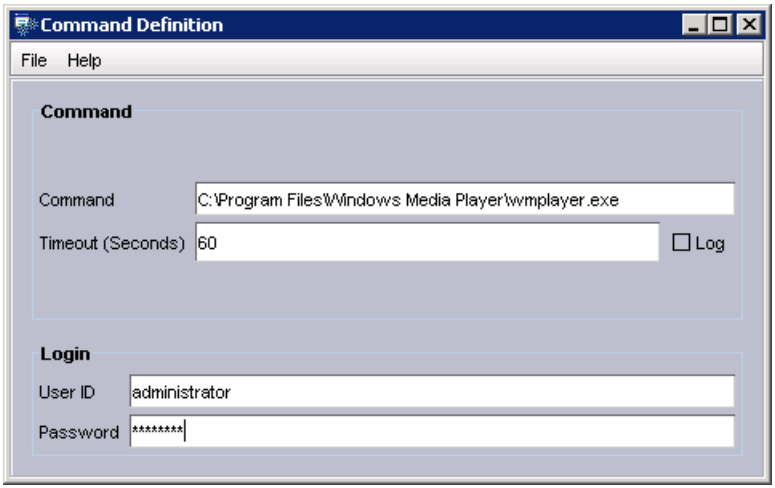


Figure 9-29 Command Definition window

Enter the following data in the fields:

- Command: `C:\Program Files\Windows Media Player\wmplayer.exe`
- Timeout (Seconds): `60` (This is optional for our example.)
- User ID: An appropriate user ID
- Password: A password to match the user ID entered above

4. Click **File** → **Save As**, enter an appropriate name for the command definition (`Start WMPlayer.exe`) and click **OK**.

   The new command definition appears in the Command Definitions table, as shown in Figure 9-30.

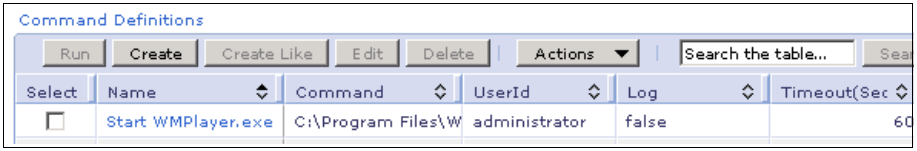


Figure 9-30 Command definition created

Build the Event Automation Plan

We are now ready to create the Event Automation Plan to monitor wmplayer.exe and restart it when it stops.

1. Expand **Automation** in the navigation area and click **Automation Plans**. The automation plan wizard opens.
2. Click **Next** if the welcome page appears.
3. Enter the name for the Event Automation Plan. In this case type `Monitor wmplayer.exe stopping and restart application`.
4. Enter a description for the Event Automation Plan (in this case, `Monitor wmplayer.exe stopping and restart application`). Click **Next**.
5. Choose the systems that you want to monitor. Select a target system and click **Add**. In our example, we monitor Windows Media Player on system ws2k3cav04.
6. Once the system is added to the Selected list, click **Next**.
7. Select **Advanced Event Filters** from the events option and click **Create** to create an event filter.
8. Select **Simple Event Filter** and click **OK**. This starts the Launched tasks program.

9. The Simple Event Filter Builder window opens. Deselect **Any** in the Event Type view and select the event type **Director** → **Systems Director Agent** → **Process Monitors** → **Process Terminated** → **WMPLAYER.EXE**, as shown in Figure 9-31.

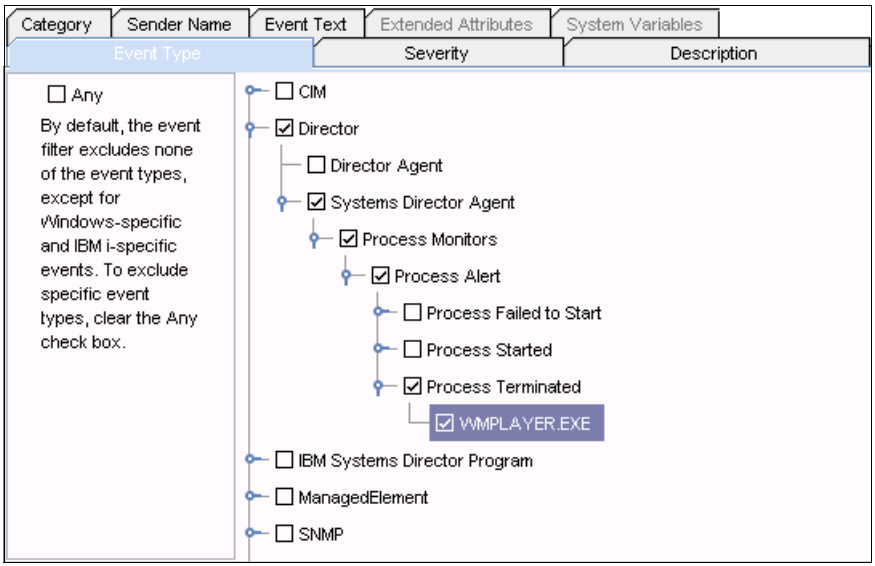


Figure 9-31 Select Process Terminated → wmplayer.exe

10. You can optionally make further selections. However, for this example we save this filter now. Click **File** → **Save As**, type `monitor wmplayer termination` for the name of the filter, and click **OK**. Click **File** → **Close** to close the Simple Event Filter Builder window.

11. Return to the automation plan currently being built within the IBM Systems Director Web interface. The Event filter should now be visible in the table, as shown in Figure 9-32.

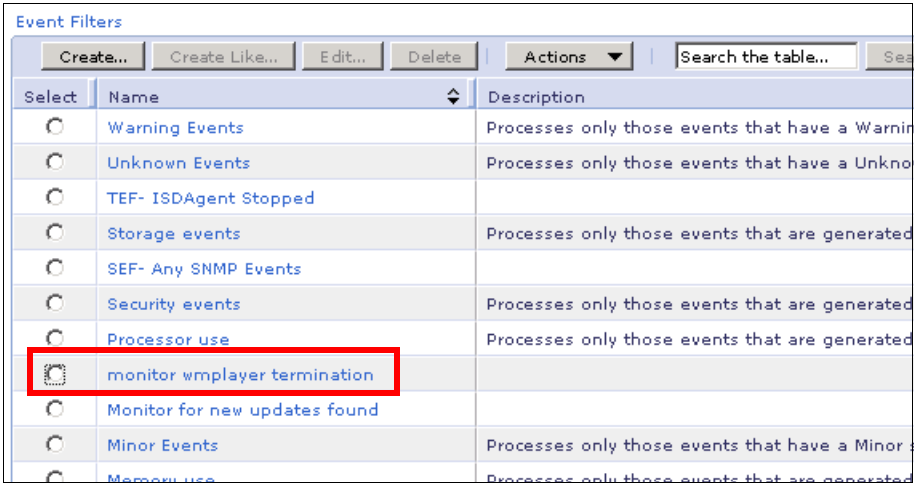


Figure 9-32 Monitor wmplayer termination filter available in table

12. Select filter **monitor wmplayer termination** and click **Next**.
13. Select **Start wmplayer.exe on event system** and click **Next**.
14. Click **Next** to accept the time range as All the time (24 x 7).
15. Check the summary, as shown in Figure 9-33. If correct, click **Finish** to create and activate the Event Automation Plan.

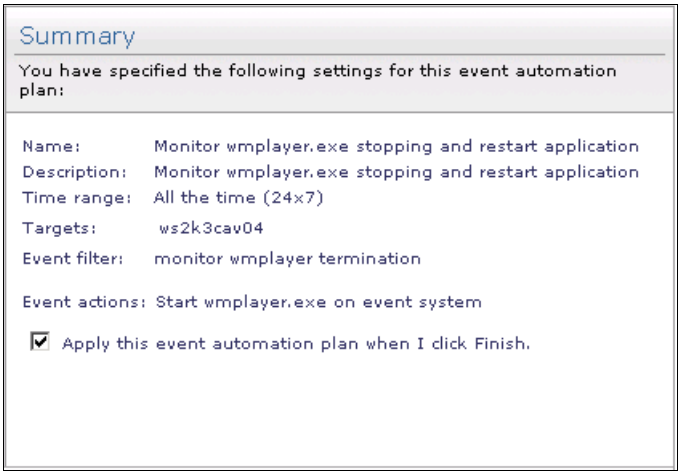


Figure 9-33 Event Automation Plan summary

The Event Automation Plan is now shown in the Event Automation Plans page, as shown in Figure 9-34.

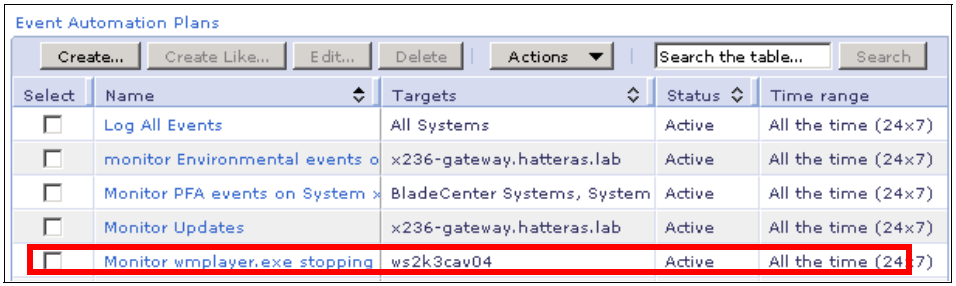


Figure 9-34 Monitor wmplayer stopping Event Automation Plan added to plans view

To see what happens on system ws2k3cav04 when Windows Media Player is stopped, see the next section.

Test the Event Automation Plan

We now stop Windows Media Player on system ws2k3cav04 to see what happens in the IBM Systems Director Web interface and on system ws2k3cav04.

1. In the Systems Director Web interface click **Navigate Resources** and locate system ws2k3cav04.
2. Right-click **ws2k3cav04** and click **Add to** → **Favorites**. Close the confirmation message displayed once the system has been added to favorites.
3. Click **View Favorites** or expand **System Status and Health** in the tasks list in the navigation area and click **Health summary**.

   System ws2k3cav04 is shown in the favorites table.
4. On system ws2k3cav04, stop the Windows Media Player application (which should still be running from setting up the process monitor).

   After a few seconds system ws2k3cav04 appears in the Systems with Problems table, as shown in Figure 9-35.

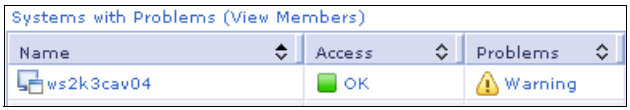


Figure 9-35 Systems with problems table

On system ws2k3cav04 you will see that Windows Media Player has restarted.

5. To remove this event, click **Warning** in the Problems column. This opens the Problems page, as shown in Figure 9-36.

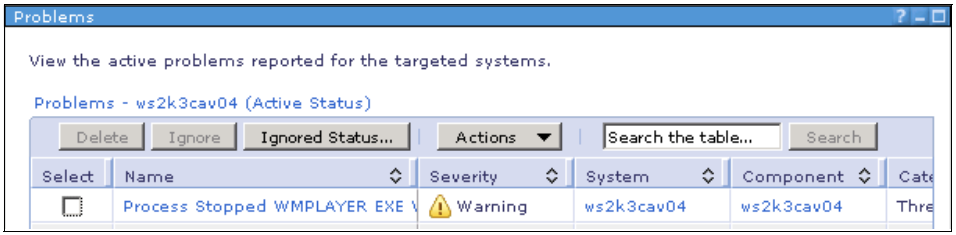


Figure 9-36 Problems page showing wmplayer warning event

6. Select the event and click **Delete**.
7. Close the Problems page and return to the Health Summary page.

   System ws2k3cav04 now returns to normal.

9.4.2 Monitor PFA events

To create an Event Automation Plan to monitor PFA events, refer to the example scenario in 17.1, “Hardware alerting” on page 742.

10

Update Manager

The IBM Systems Director Update Manager plug-in is installed by default during the installation and is used to acquire, install, and manage updates. It is also used to monitor your systems to ensure that they remain current.

This chapter includes the following topics:

10.1 Introduction to Update Manager

Update Manager provides tools for maintaining current versions of operating systems, device drivers, firmware and BIOS, and IBM Systems Director Agent and server code on managed systems without an upgrade or migration of the installed product. For an introduction to Update Manager view the tutorial included in the Information Center at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_c_elearning_updating_firmware_and_software.html

10.1.1 Prerequisites

To monitor and update systems, you must set up the environment correctly, including choosing the systems that you want to be monitored. You must also ensure that a check for updates is run periodically and that an administrator is periodically checking systems that have compliance issues raised. Lastly, you must take action by installing required updates.

For systems that are to be monitored for update management and compliance status, it is required that you:

- Make sure that the systems are discovered and not locked. If a system is locked, the update menu actions will not be displayed for it. You cannot select a locked system in any of the system selection actions.
- Collect inventory on these systems. Inventory collection must be run on any unlocked systems that are to be monitored for update management and compliance status. Applicability of updates to a system cannot be determined unless inventory has been collected on the system.

10.1.2 Tasks that Update Manager can perform

The tasks that Update Manager can perform include:

- Manages and installs updates to existing software products and firmware, external network and storage switches, and external storage servers.
- Installs updates to IBM Systems Director agents that have already been installed.
- For an individual update or update collection, performs this sequence of tasks to acquire and install it:

  a. Download, which copies the installable files for an update to the management server.

b. Installation staging, which copies the installable files for an update to an appropriate location for eventual installation.

c. Installation, which installs an update.

d. Uninstall, which removes an update. Not all updates support the uninstall task.

- Manages compliance policies, which provide notification of when systems are in need of updates and which updates are needed.
- Schedules a check for updates, which is a search for new updates of which update manager is currently not aware. If any new updates are found, update manager obtains necessary information to include these updates.
- Provide details about a specific update, such as its documentation and prerequisite requirements.
- Displays information about updates that were installed by IBM Systems Director. Updates installed by other means are not displayed.

10.1.3 Tasks that Update Manager cannot perform

The tasks that Update Manager cannot perform include the following:

- Install new software products.
- Install IBM Systems Director agents on systems that currently do not have an agent.

  IBM Systems Director agents can be installed using the Agent Installation wizard, which is included with IBM Systems Director. For more information about the Agent Installation wizard refer to 4.6.1, “Pushing agents from the management server” on page 211.
- Migrate to IBM Systems Director 6.1 from any other release of IBM Director.
- Migrate to IBM Director 5.2 from IBM Director 5.1.
- Perform actions on systems that are locked. Update actions can be performed only on systems that are unlocked.
- Update a different instance of the IBM Systems Director Server.

10.2 Update Manager summary page

The Update Manager summary page reports status and lists tasks for the management of updates. This page summarizes current system compliance and provides navigational links to common update-related tasks.

Topics in this section are:

- 10.2.1, “Configuring Update Manager” on page 453
- 10.2.2, “Getting started” on page 459
- 10.2.3, “System compliance” on page 464
- 10.2.4, “Manage” on page 468
- 10.2.5, “Search” on page 477

The Update Manager summary page consists of three main sections: System Compliance, Manage, and Search. There is also an additional section that looks at settings and helps you to get started, as seen in Figure 10-1 with the number ❶.

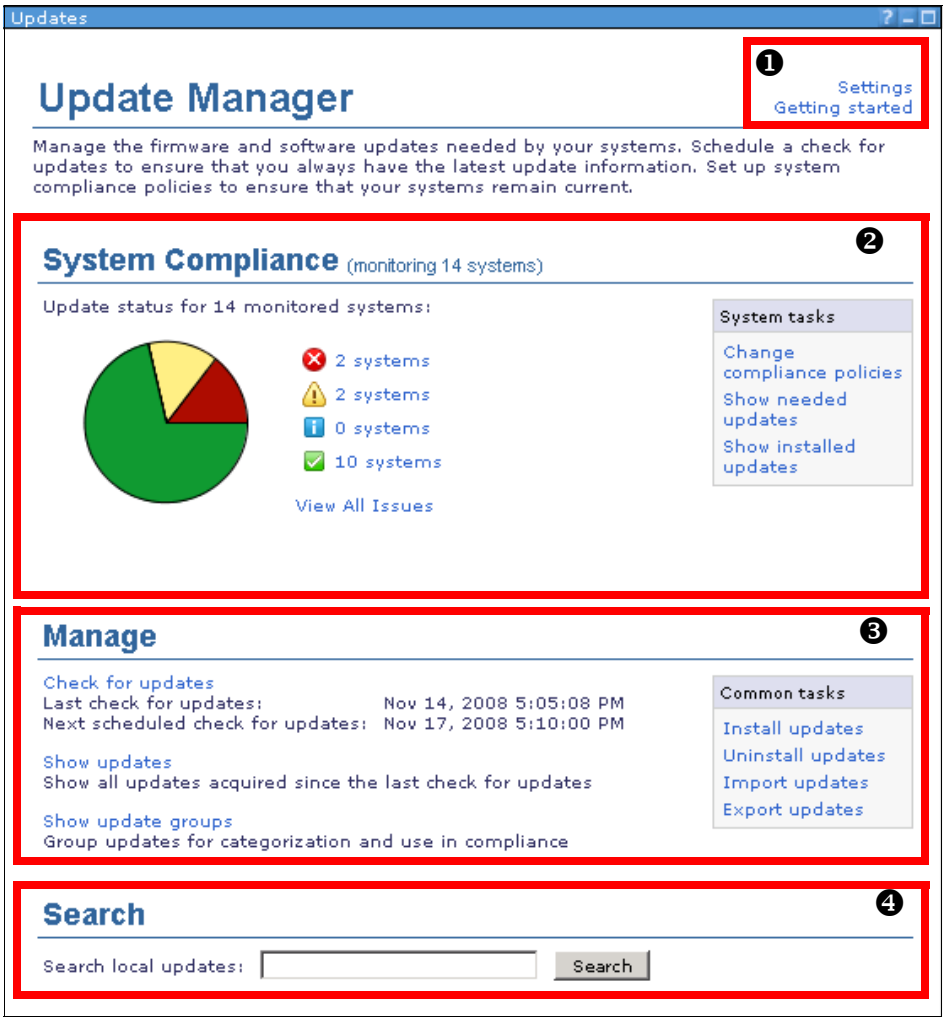


Figure 10-1 Update Manager summary page

10.2.1 Configuring Update Manager

Before you use Update Manager you should review the plug-in settings. The Settings link is marked in Figure 10-1 on page 452 with the number ❶. The Settings dialog shown in Figure 10-2 is used to specify settings for the various tasks performed with updates. The four tabs in this dialog are described in the following subsections.

Connection tab

As shown in Figure 10-2, here you configure how the internet should be accessed. You also have the option to test whether the connection is working correctly by clicking **Test Connection**.

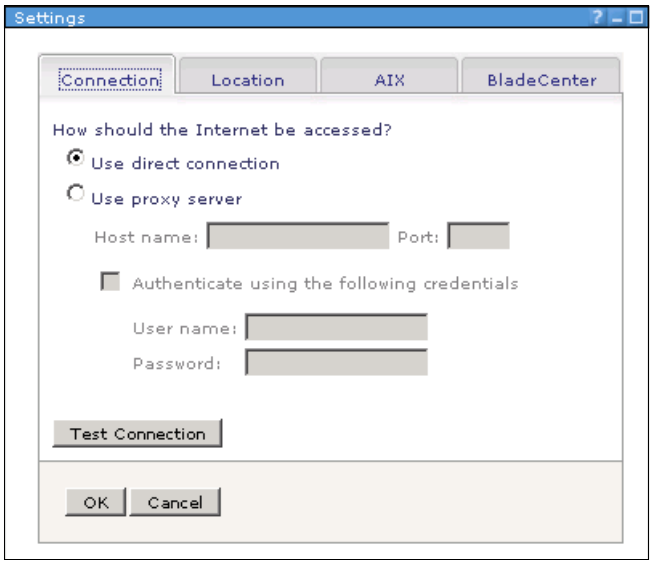


Figure 10-2 Update Manager Settings

Location tab

This page is used to set a maximum size on the update storage location for the management server. See Figure 10-3.

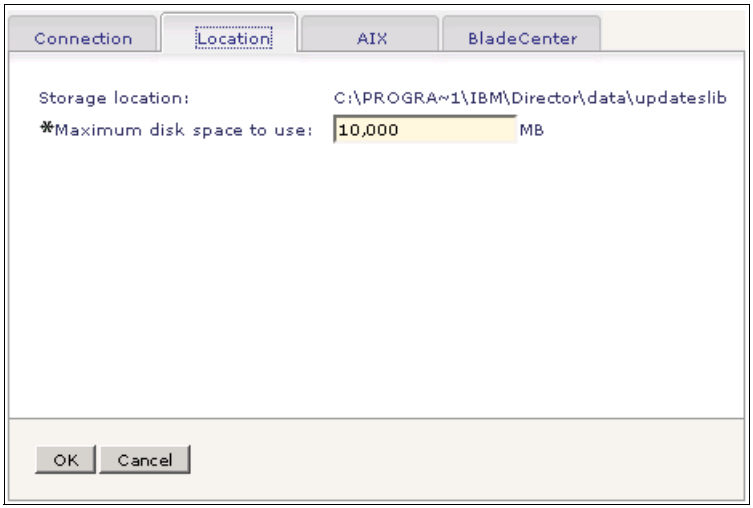


Figure 10-3 Update Manager settings: Location tab

The storage location itself cannot be changed, but it is displayed for reference. The storage location is `\<isd_install_path>\IBM\Director\data\updateslib`.

In the Maximum disk space to use field enter the maximum amount of disk space on the management server for updates. The default is 10,000 MB. The minimum is 1 MB and the maximum is 128,000 MB.

AIX tab

AIX updates must be installed from a NIM Master. This tab is used to specify the system that is to be the IBM AIX NIM master. We discuss this further in 10.14, “Updating AIX systems” on page 508. See Figure 10-4.

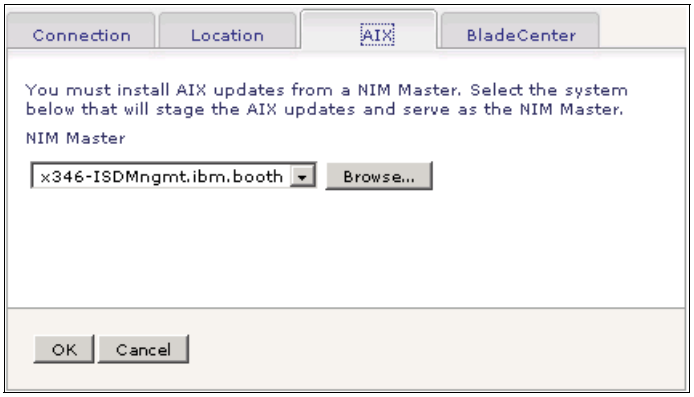


Figure 10-4 Update Manager settings: AIX tab

BladeCenter tab

This tab is used to specify the TFTP and FTP servers and options. IBM BladeCenter updates must be installed from a TFTP or FTP server. Figure 10-5 shows the settings required.

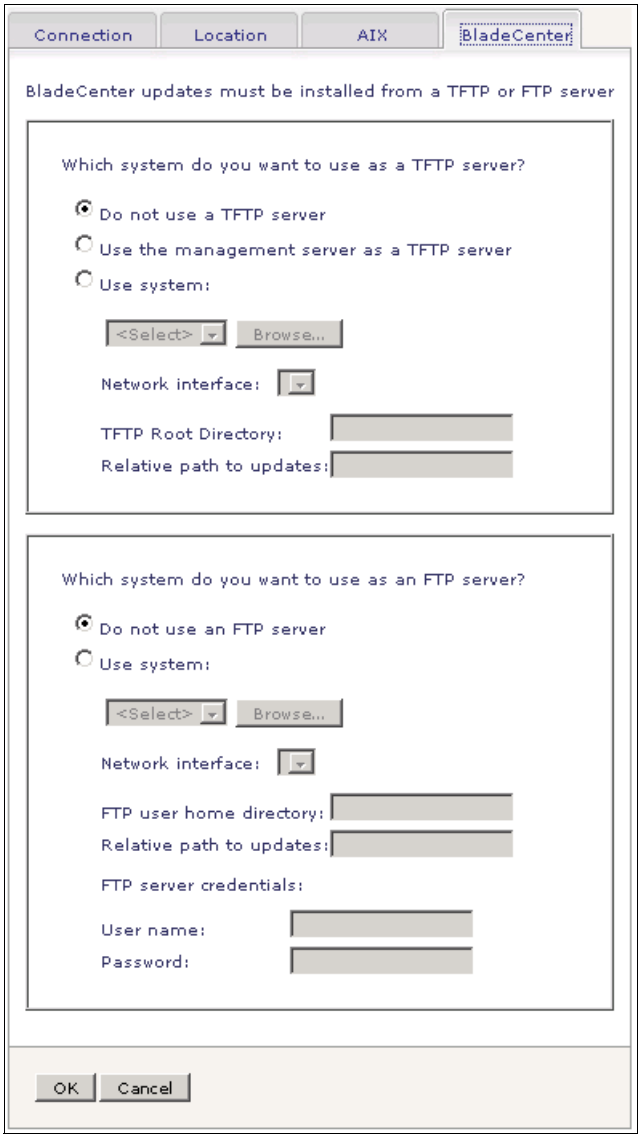


Figure 10-5 Update Manager: BladeCenter Settings

To specify IBM BladeCenter settings:

1. From the Settings task, click the **BladeCenter** tab. The BladeCenter Settings page is displayed as shown in Figure 10-5 on page 456.
2. In the top half of the dialog you are required to specify the system to use as the TFTP server. The choices are:
   - Do not use a TFTP server.

     If the TFTP server included with the management server has been enabled, choosing this option disables it.

     You will not be able to install updates on management modules and certain I/O modules that require a TFTP server if no TFTP server is specified.
   - Use the management server as a TFTP server.

     This starts and uses the TFTP server included with the management server.

     Note: If you acquire the BladeCenter updates from the IBM repositories, the updates will be filed in directory `<install_root>\director\data\updateslib\fixid`. Whenever install of the update is initiated an *out of band distribution* extension gets called first. It looks at the BladeCenter Configuration panel settings and distributes the update to whatever TFTP/FTP is selected.
   - Use system.

     Use a TFTP server on an external system. If the TFTP server included with the management server has been enabled, choosing this option disables it. Select a system. Click **Browse** to see details of a given system.

     If you select **Use system**, then there are three other fields:

     - Select a Network interface (IP address). This option is to choose an alternate network interface for the server specified in the Use system selection.
     - In the TFTP root directory field, type the full path to the root directory of the TFTP server (for example, `/tftpboot` or `C:\Program Files\TFTPServer\tftpboot`). This path is used to automatically distribute files to the TFTP server.
     - Optionally, in the Relative path to updates field, if the update files are located in a subdirectory of the TFTP server root directory, specify the

relative path of that subdirectory (for example, `update_manager/updates`).

If no path is provided, the TFTP server root directory is assumed to be where the update files are stored.

Note about the Relative Path To Updates field: There is a 64-character limit on the length of the relative path and the file names for updates installed from TFTP servers with SNMP. This includes updates to the IBM BladeCenter Management Modules and IBM BladeCenter pass-through modules. The 64-character limit is the sum of the lengths of:

- The Relative Path To Updates field
- The build identifier of the update
- The file name of the update

Therefore, the Relative Path To Updates field must be kept as short as possible if the IBM BladeCenter Management Modules and IBM BladeCenter pass-through modules are to be updated.

No such limit applies to switch module updates installed from TFTP or FTP servers.

Some IBM BladeCenter updates only support using FTP, and some only support using TFTP. If an update supports both TFTP and FTP then TFTP will be used.

3. In the bottom half of the dialog specify the system to use as the FTP server. The choices are:
   – Do not use an FTP server.

     An FTP server will not be used for the installation staging and install tasks.

     You will not be able to install updates on certain I/O modules that require an FTP server if no FTP server is specified.

     If you select this option, then you can skip the remaining fields and click **OK** to save the changes.

   – Use system.

     Use an FTP server on an external system. Select a system. Click **Browse** to see details about a given system.
4. Select a network interface (IP address). This option is to choose an alternate network interface for the server specified in the Use system selection.

5. In the FTP user home directory field, type the full path of the FTP user's home directory on the FTP server (for example, `/home/ftpuser`). This path is used to automatically distribute files to the FTP server.
6. Optionally: In the Relative path to updates field, if the update files are located in a subdirectory of the FTP user's home directory, specify the relative path of that subdirectory (for example, `update_manager/updates`). If no path is provided, the FTP user's home directory is assumed as the path where the update files are stored.
7. Type the FTP server credentials for user name and password.

   Note: Anonymous FTP (user name of anonymous) is supported. However, for Anonymous FTP, the need for a password (or the form of the password) is a requirement of the FTP server itself.

8. Click **OK** to have these choices take effect.

10.2.2 Getting started

The number ❶ marks this link in Figure 10-1 on page 452. This wizard helps you to start managing firmware and software updates by selecting the systems that you want to monitor and then checking for new updates. It helps you perform the following operations:

- Selecting the systems to keep in compliance with the latest updates
- Creating an update group to contain the updates for your selected systems
- Configuring a connection to the internet
- Running or scheduling a check for updates

To run the Getting Started wizard:

1. From the Welcome page, click **Manage** → **Update Manager**, or from the task menu expand **Release Management** and click **Updates**. The Update manager summary page is displayed as shown in Figure 10-1 on page 452. Click **Getting Started**, shown in Figure 10-1 on page 452 in section ❶.
2. The Getting Started wizard opens. If the welcome page is shown you can deselect the option to show this the next time that you log on. Click **Next** to continue.

   Using this wizard, choose those systems that you want monitored for update compliance and create an update group for updates appropriate to these systems. This update group gets added to the default update groups already available.
3. Type in an appropriate name for the group and (optionally) a description, and click **Next**.

4. Select the systems that should be monitored for the latest updates. The selected systems will be monitored using the new update group. Select the system and click **Add** → **Next** to continue.
5. Figure 10-6 appears. An internet connection is required to use this function. Specify how the internet should be accessed. If you are not sure whether your Director server is attached to the internet you can click **Test connection**.

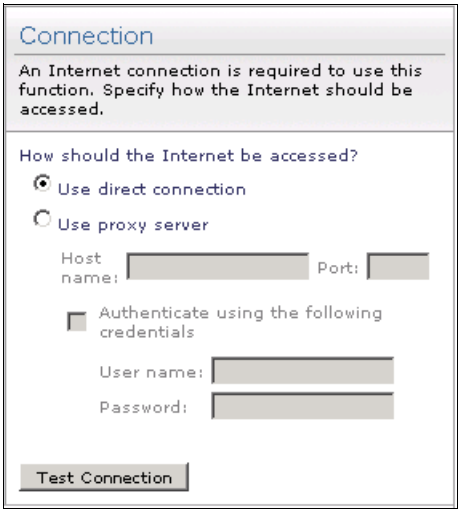


Figure 10-6 Test Connection option

6. Once you test the connection, if successful you will be presented with the message box seen in Figure 10-7.

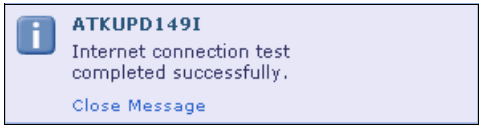


Figure 10-7 Test connection successful

7. Click **Close Message** and then within the wizard click **Next** to continue.

You will then be shown a summary of the choices made, as shown in Figure 10-8.

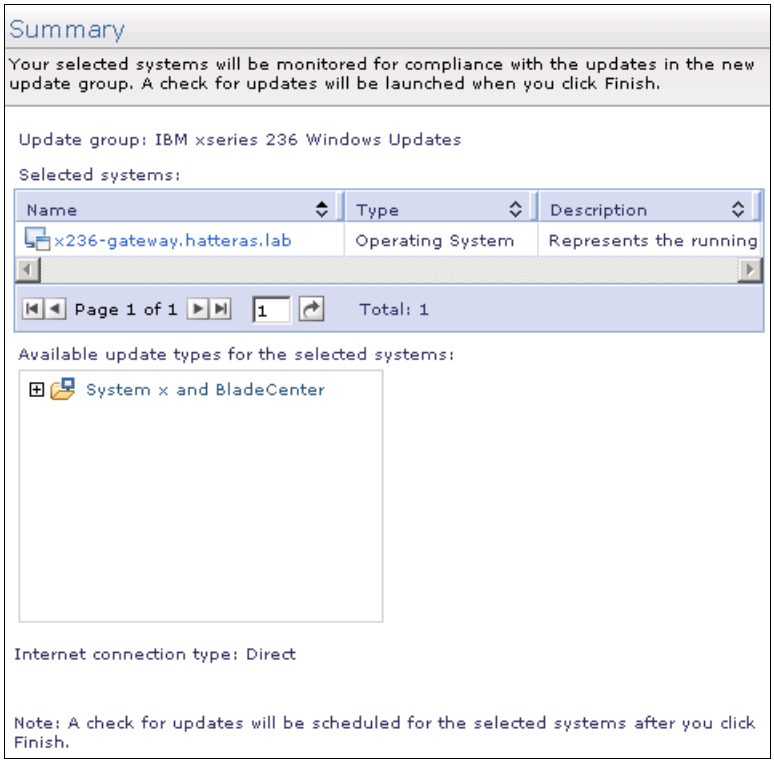


Figure 10-8 Getting Started Summary

If you are satisfied with the selections made click **Finish** or click **Back** and correct any incorrect or missing options.

8. You will now be prompted to execute the task now or schedule the get updates task for a later time. In our example we selected **Run Now**. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed your selections click **OK**.
9. To check the progress click **Display properties** from the information message that appears.

10. You will be presented with a progress summary window. The task is complete once the progress bar reaches 100%, as shown in Figure 10-9. To close this view click the **X** on the Getting started tab.

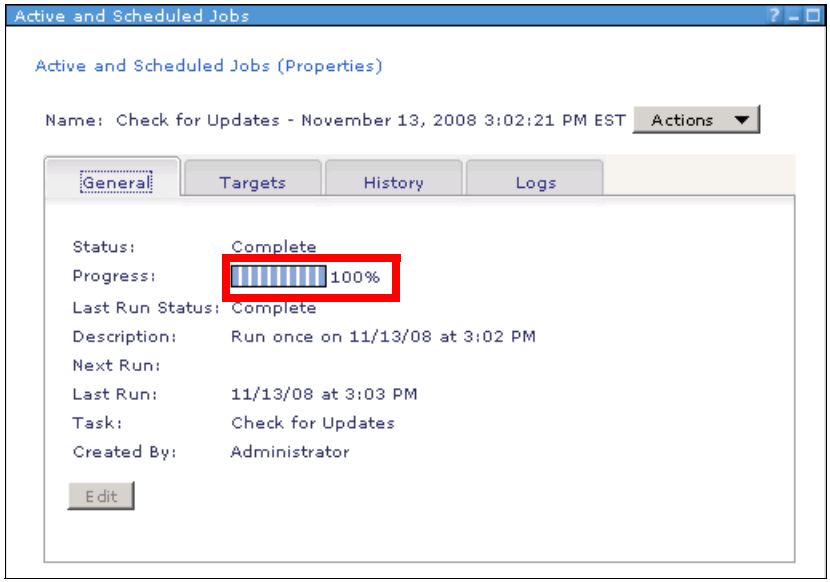


Figure 10-9 Download updates at 100%

11. To view the updates, return to the Check for updates tab, as shown in Figure 10-10, then click the **Show Updates** option.

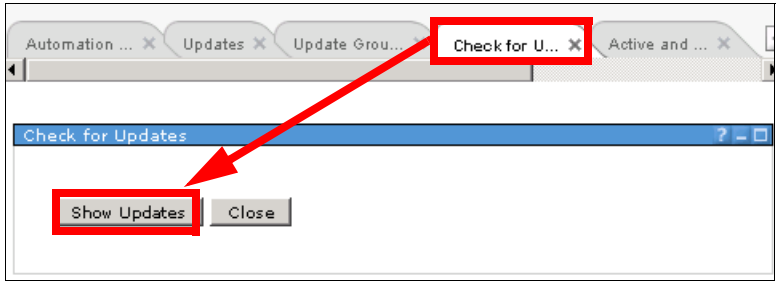


Figure 10-10 Show updates link

Next you are shown all the updates that were found, as seen in Figure 10-11.

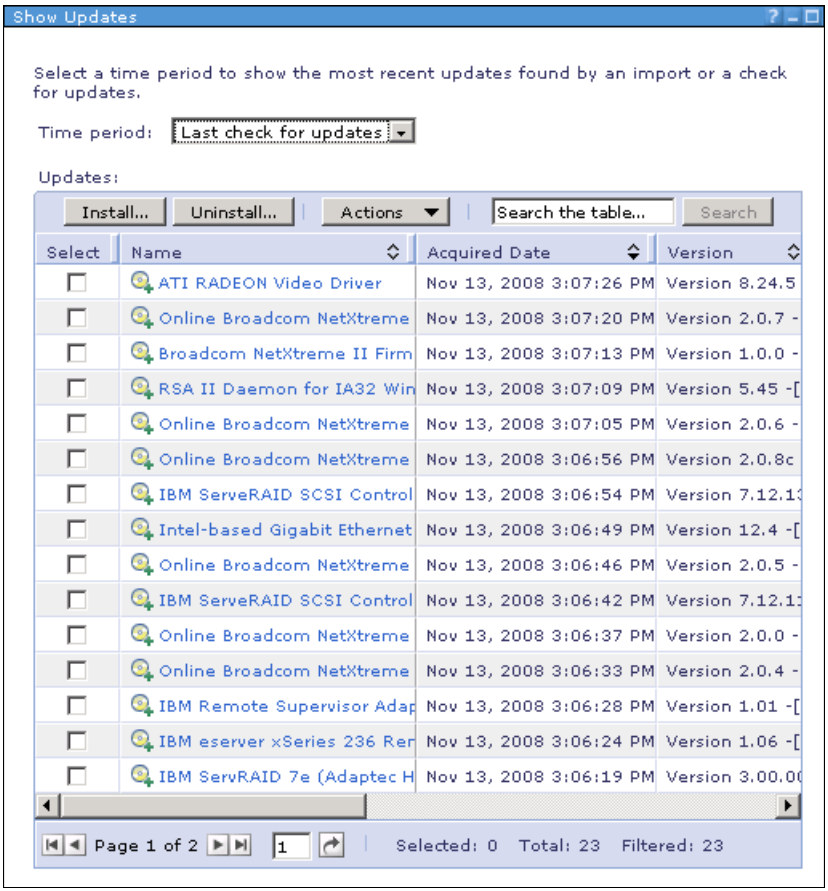


Figure 10-11 Show updates: Results

12. Review the System Compliance section of the Update Manager summary page (❷ in Figure 10-1 on page 452). The compliance status will not change on the monitored systems until the check for updates is complete and compliance has completed. This can take up to 10 minutes after checking for updates completes.
13. If some systems are in need of updates, review the exact compliance issues by clicking **View all issues** in the compliance area, and make plans to address them by installing needed updates.
14. Periodically perform steps 12 and 13 or create an Event Automation Plan to perform this task and notify you of any systems that are in need of updates.

10.2.3 System compliance

Located in Figure 10-1 on page 452 by the number ❷ and duplicated in Figure 10-12, this section provides a quick summary of the update health of your systems and provides access to several system-related tasks. A pie chart and a list indicate how many of your systems fall into each compliance category.

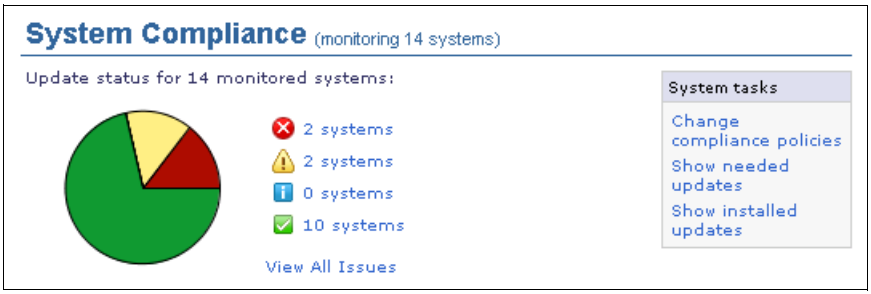


Figure 10-12 Update Manager summary page: System Compliance portion

The system-compliance status indicator represents the highest severity among all of the compliance policy updates that are not installed on the system. There are four compliance categories, represented by icons:

- Error icon: Indicates a missing update severity of critical or high
- Warning icon: Indicates a missing update severity of medium or low
- Information icon: Indicates a missing update severity that is not known or not applicable
- Ready icon: Indicates systems that are in compliance and have no missing updates

You can also select **View All Issues**, which shows all system compliance issues and recommendations, as shown in Figure 10-13.

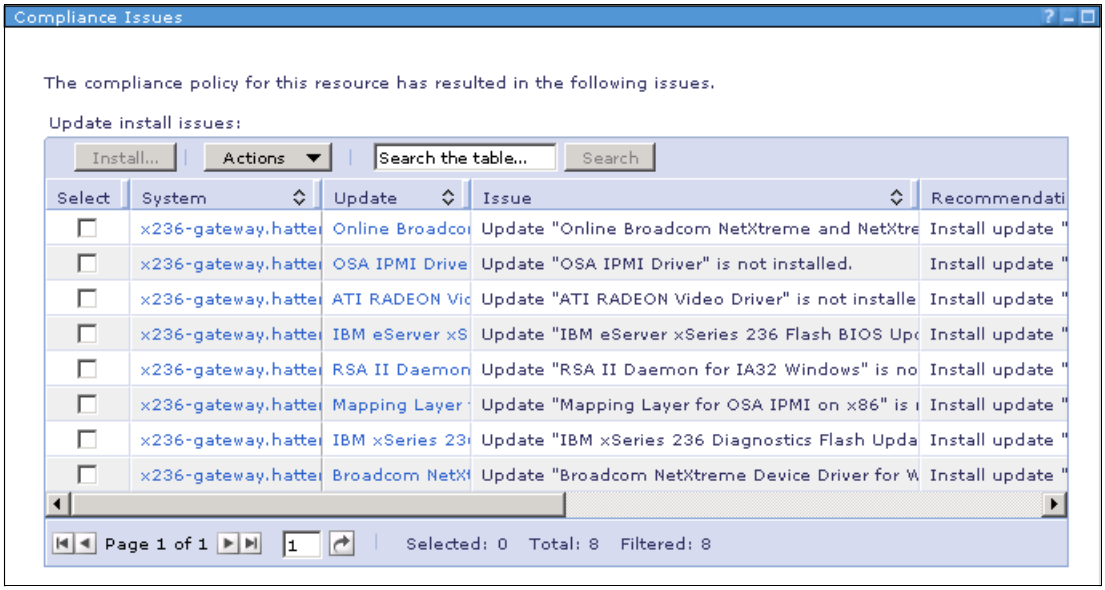


Figure 10-13 View all compliance issues

System tasks

The compliance categories in the Systems Task options are as shown in Figure 10-14.

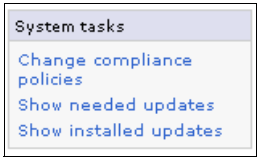


Figure 10-14 System tasks

Change Compliance Policies page

The Change Compliance Policies page displays compliance policies used to indicate when systems are out of compliance and make changes to compliance policies. This task is done, for example, when a new system is added and existing compliance policies must be changed to accommodate that system, as shown in Figure 10-15.

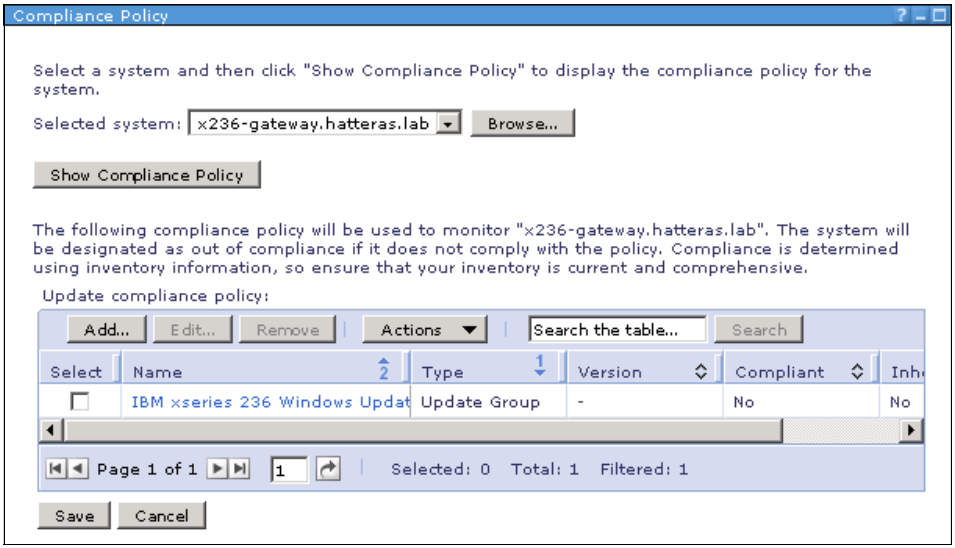


Figure 10-15 Change compliance policy

The fields shown in the table in Figure 10-15 are:

- Name: The name of the update or update group that will be used to monitor the system. A compliance status is raised on the system when it is found to need the updates from the group.
- Type: Indicates whether the selected entry is an update or an update group.
- Version: If the resource is an update, this is its version.
- Compliant: Indicates whether the system was found to be compliant during the last compliance evaluation. Valid values are:
  - Yes: All tested systems passed all compliance policies.
  - No: The compliance policy indicates that one or more monitored systems require one or more updates.
  - Unknown: The compliance policy has not yet been run.
- Inherited: Indicates whether the compliance policy is defined for this system or for a parent system group. Clicking the link displays a new page containing the compliance policy setup panel for the parent system group. You cannot

remove inherited checks. This can be done only from the system group's compliance policy panel.

Show Needed Updates page

The Show Needed Updates page displays updates that are needed on a system or system group.

First you must select the system or system group and then click **Show Needed Updates**. The needed updates are then displayed, as shown in Figure 10-16.

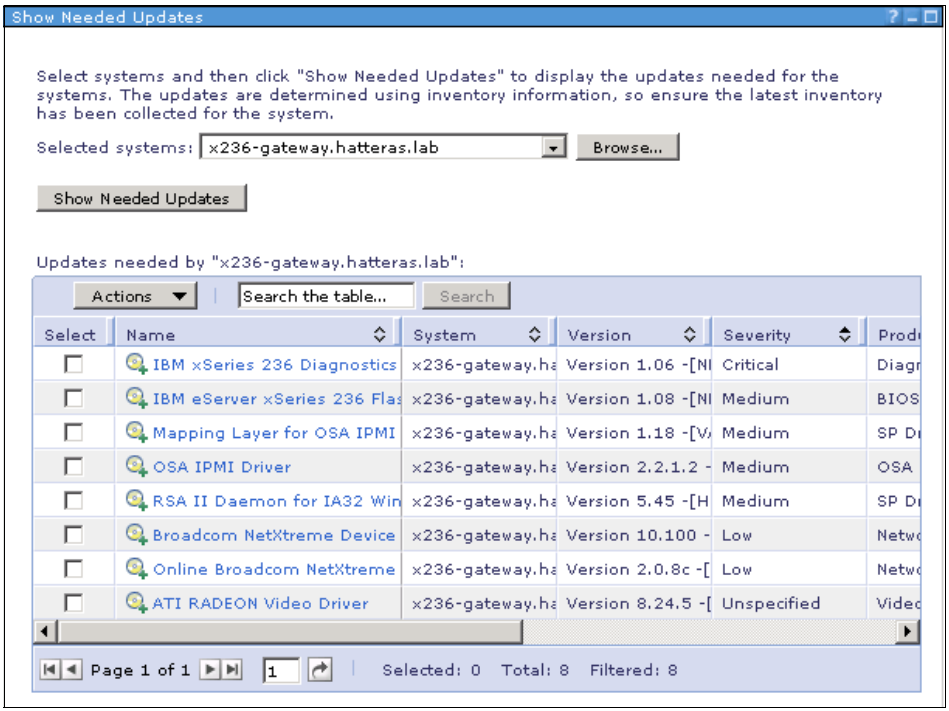


Figure 10-16 Show Needed Updates

Show Installed Updates page

The Show Installed Updates page displays updates that have been installed on a system or system group. First you must select the system or system group and then click **Show Installed Updates**. The installed updates are then displayed, as shown in Figure 10-17.

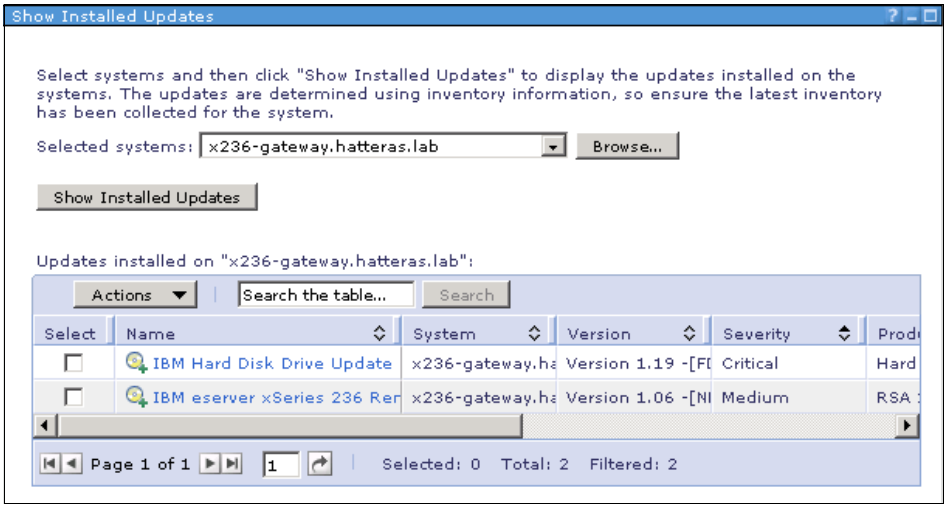


Figure 10-17 Show installed updates

10.2.4 Manage

Located in Figure 10-1 on page 452 with the number ❸ and duplicated in Figure 10-18, this section displays information about individual updates and groups of updates.

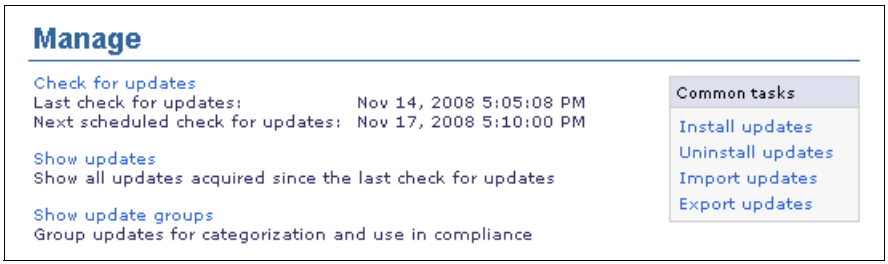


Figure 10-18 Update Manager summary page: Manage portion

Check for updates

The Check for Updates link is used to check for new updates that have become available since the last check for updates has been run. The dates of the last check for updates and the next scheduled check for updates are also displayed.

To use this function:

1. Select the update types that you wish to perform, as shown in Figure 10-19. Select the update types, then click **Add**. Click **Next** to continue.

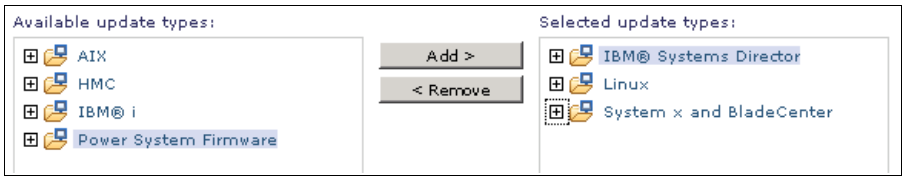


Figure 10-19 Check for updates

2. You will be prompted to schedule the task or run now. Make your selection. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed the selections click **OK**.

   You are then notified via the message shown in Figure 10-20 that the job has been created and started successfully.

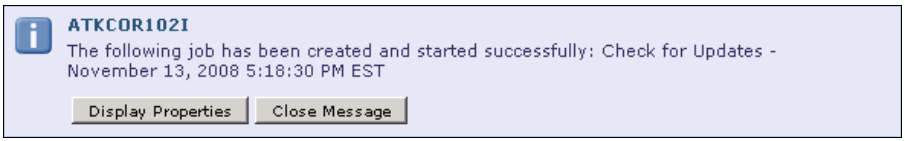


Figure 10-20 Notification job successful

3. You can display the progress of the job by selecting **Display properties**, which displays the window shown in Figure 10-21. Wait until the job is 100% complete before closing this view, as shown in Figure 10-21.

> **Note:** You can perform other tasks on other tabs while you wait for the job to complete.

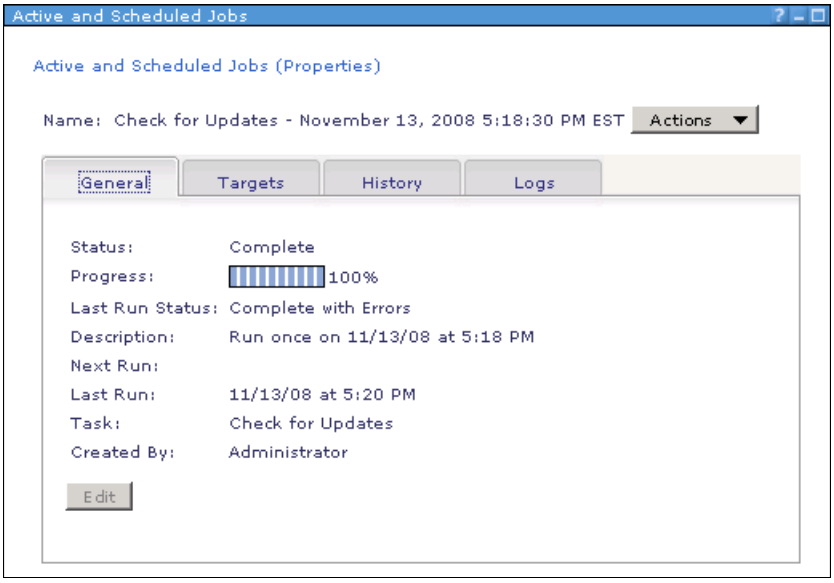


Figure 10-21 Check for updates job 100% complete

4. You are then prompted to View Updates or Close, as shown in Figure 10-22. Click **Show Updates**.

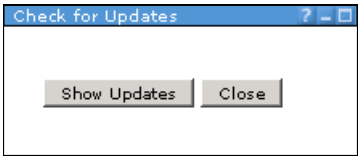


Figure 10-22 Option to select View Updates or Close

You will then see the updates available, as shown in Figure 10-23.

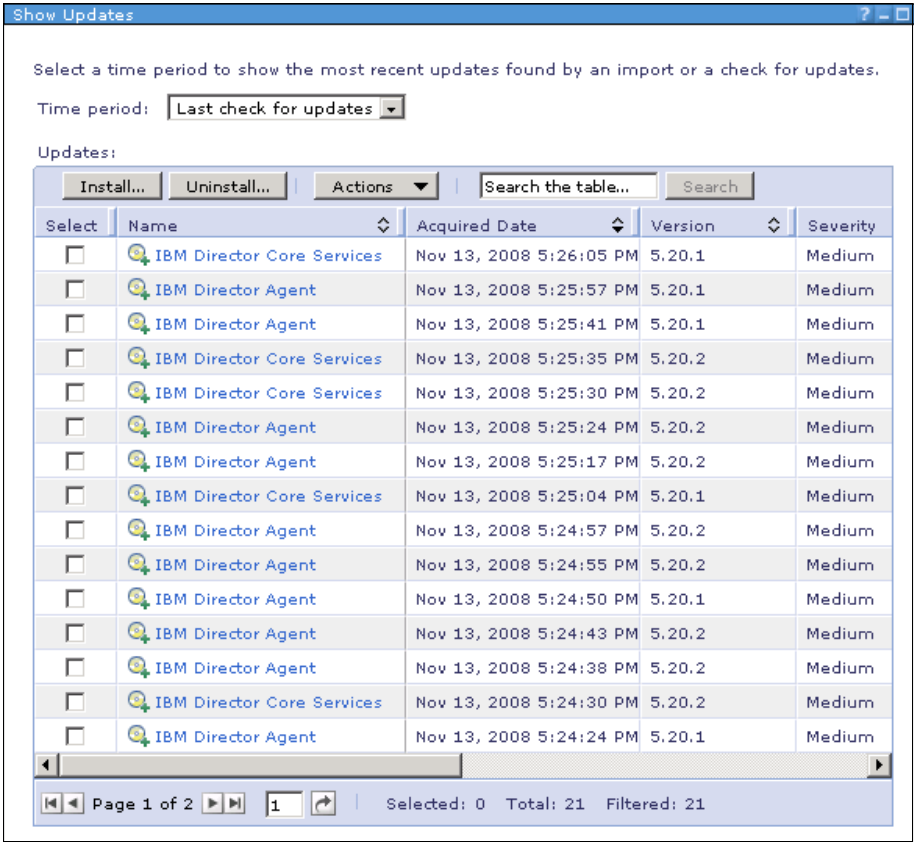


Figure 10-23 Updates available

5. The following actions can then be performed from this view:
   - Download the selected updates:
     i. Click **Actions** → **Download** and you will be notified of the download size and location to which the file will be downloaded, as shown in Figure 10-24.

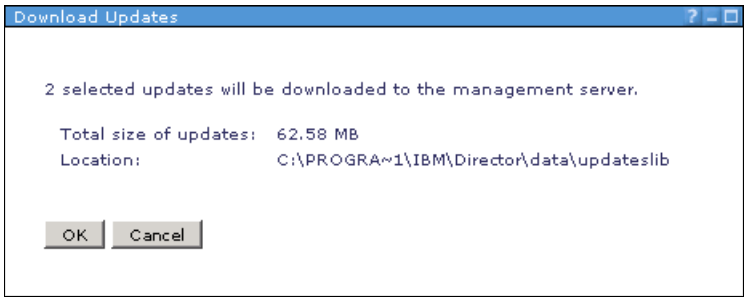


Figure 10-24 Download details including size and location

     Click **OK** to begin the download.

     ii. You are then prompted to schedule this job or run it now. Make your selection. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed your selections click **OK**. Once the download is complete you can view the updates via the show updates task.
   - Perform installation staging for the selected updates.

     Once you select updates, click **Actions** → **Installation Staging**. This starts the Installation staging wizard, which stages updates for installation to one or more systems by copying them to an appropriate location for future installations.

Once you make all the required staging selections the summary view opens, as shown in Figure 10-25. Click **Finish** to begin the staging process.

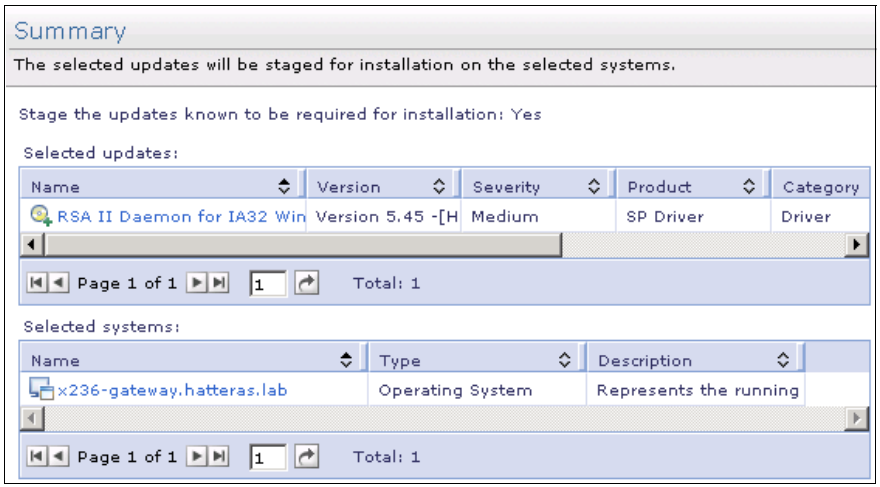


Figure 10-25 Staging Summary view

– Install updates: Described further in “Common tasks” on page 474.

– Uninstall updates: Described further in “Common tasks” on page 474.

Show updates

This is used to show the new updates that have been found since the last check for updates has been run. You can examine the list of updates to see whether any of these updates apply to your systems or require immediate attention. You can show updates using day ranges or use the all option to see all of them. See the example Show updates view in Figure 10-23 on page 471.

Show update groups

This is used to display update groups, which are sets of updates created to facilitate update maintenance and compliance. See Figure 10-26.

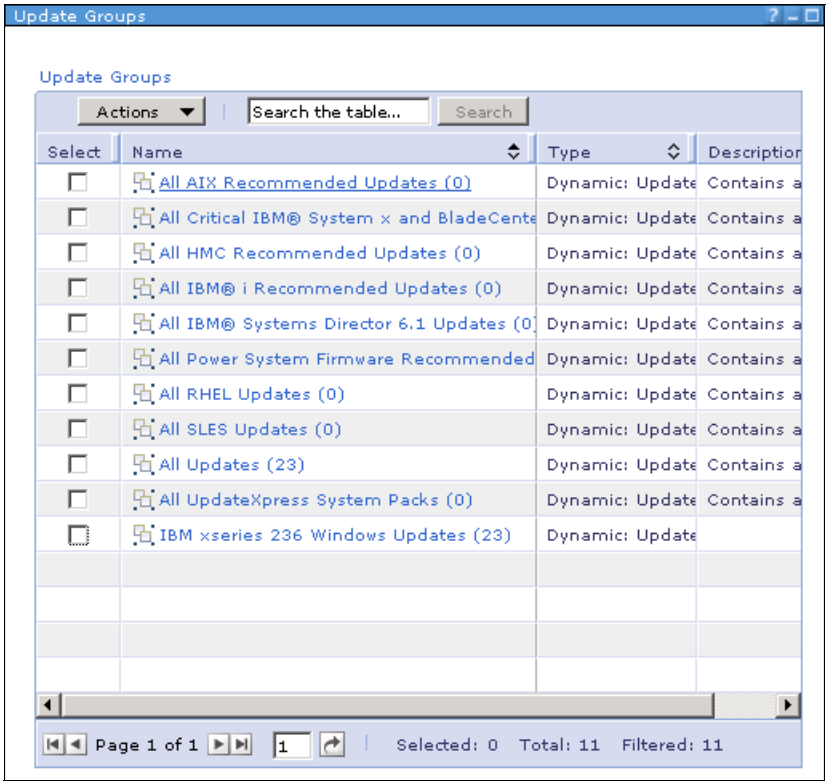


Figure 10-26 Update groups available

Common tasks

The common tasks shown in the box in Figure 10-27 can be performed on the various updates. We describe each in turn.

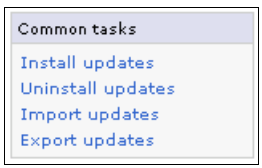


Figure 10-27 Common tasks

The common tasks are:

- Install updates.

  Once you select the updates, click **Action** → **Install**. This then starts the install wizard, where you select the updates and the system on which you want to install the updates.

  Within the wizard there is also an option available to automatically install missing update requirements. (Some updates might include installation options or require that additional updates be installed.) Note that this is selected by default.

  The installation of an update might require restarting of resources, so make sure that you take note of the requirements here and deselect the option to automatically restart as needed.

  For more information about install updates refer to 10.6, “Performing updates” on page 489.

- Uninstall updates.

  Reverse the installation process by removing updates.

  It may be necessary to remove an update from a system or group of systems. Use the uninstall updates task to do this. Not all updates support the uninstall task. For updates that cannot be uninstalled, it might be possible to roll them back to an earlier version by installing an older version on top of the current one.

- Import updates.

  Use the import update function to copy one or more updates from a directory on the management server to the update library.

To import updates:

a. Click **Import updates**.

b. In the Path field, type the directory of the update files on the management server, as shown in Figure 10-28.

> **Note:** All updates found within the specified directory will be copied to the update library. You cannot select specific updates from this directory.

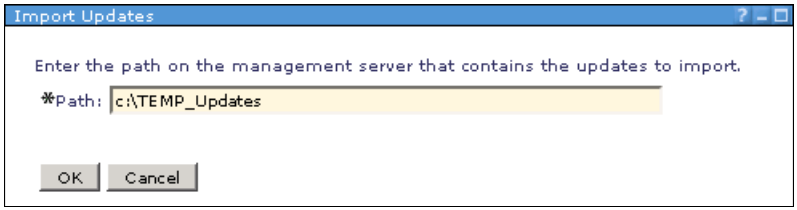


Figure 10-28 Import updates from temporary location on t he Management Server

c. Click **OK**. The scheduler is displayed. You can then choose to run the task now or to schedule it to run in the future. Make your selection. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed your selections click **OK**.

Any updates that can be generated in the specified directory will attempt to be generated and imported also.

More information about update generation can be found by viewing the **`importupd`** command and the -g option in the Information Center at:

`http://publib.boulder.ibm.com/infocenter/systems/topic/director.cli_6.1/fqm0_r_cli_importupd.html`

- Export updates.

Use the export function to copy updates from the update library to a target directory on the management server. To export updates:

a. Click **Export Updates** from the Common Tasks list. Or select **View Updates** and click **Actions** → **Export updates**.

b. If updates not already selected, from the list of updates select those that you want to export.

c. Specify a location for the update files by typing the path name on the management server in the Path field.

Note: The target directory must be accessible to the management server, and it is important to make sure that the export directory location exists, as the export manager does not create the location directory for you. It gives you an error (✖*Path:)

d. Click **OK**. The scheduler is displayed. You can then choose to run the task now or schedule it to run in the future. Make your selection. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed your selections click **OK**.

10.2.5 Search

Located in Figure 10-1 on page 452 by the number ❹ and duplicated in Figure 10-29, this section is used to search update documentation in order to find updates that are of specific interest, such as those for a particular operating system or level. Use the Search local updates field to enter search parameters. This field is used to initiate a search of the user-readable portion of update files.

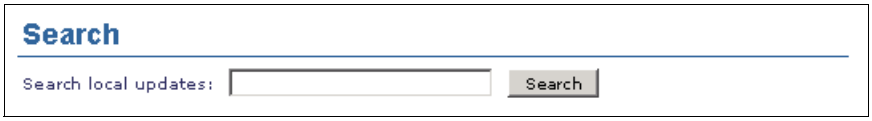


Figure 10-29 Update Manager summary page: Search portion

10.3 Updates supported

The following are supported update types and the systems to which they apply. Unless otherwise noted, the systems can be Common Agent-managed systems, Platform Agent-managed systems, or Agentless-managed systems.

- IBM Systems Director 6.1:
  - IBM Systems Director Web interface
  - IBM Systems Director Server
  - Common Agent
- Level 1 and Level 2 agents of IBM Director V5.20.
- Technology levels and service packs for IBM AIX 5.3 TL6 SP5 and later.
- Technology levels and service packs for IBM AIX 6.1.
- Linux (Red Hat, SUSE, VMware ESX) on all supported platforms.

- Cumulative PTF package and PTF Groups for IBM i systems running Platform Agent-managed systems.
- Hardware Management Console (HMC) systems with Hardware Management Console V7.3.3 SP2 and later. All updates will be Hardware Management Console V7.3.3 and later, as well.
- Power Systems Firmware for all IBM Power Systems p5 and later systems that meet one of the criteria in Table 10-1.

Table 10-1 Power Systems firmware criteria

Criteria	Target
In-band standalone (not managed by Hardware Management Console)	IBM Power Systems target systems running AIX or Linux. These systems must have the Common Agent installed.
Out-of-band (managed by Hardware Management Console)	Target systems running IBM i. No Common Agent is required because Secure Shell (SSH) performs the update.
IBM Power Systems	Target systems managed by Integrated Virtualization Manager and running VIOS Version 1.5.0.0 or later. No Common Agent is required because SSH performs the update.

- IBM BladeCenter I/O Module Firmware. Inventory for these devices is provided by SNMP.
- IBM BladeCenter Management Modules, Advanced Management Modules, and Passthru Modules. For these devices, inventory is provided by SNMP.
- IBM System x servers running Linux or Windows, device driver, and firmware updates. Support is provided for servers running all agent levels, including IBM Director V5.2 agents and Agentless-managed system.
- External Storage firmware (including IBM BladeCenter external storage firmware for IBM BladeCenter S SAS RAID Controller Module and IBM BladeCenter SAS Connectivity Module).

10.4 Downloads

There are multiple ways to download the updates for update manager. You can use update manager to download the updates or you can download the updates manually. We describe each method in this section.

- 10.4.1, “Manual download and import updates” on page 479
- 10.4.2, “Automatic download via Update Manager” on page 483

10.4.1 Manual download and import updates

Download the updates from the IBM Support Web site:

http://www.ibm.com/support/

Three are two types of downloads that you can retrieve from the IBM Support Web site:

- UpdateXpress System update packs
- Single updates

UpdateXpress System update packs

UpdateXpress System packs simplify the downloading and installation of all online driver and firmware updates for a given system, ensuring that you are always working with a complete set of updates that have been tested together and bundled by IBM. A single click downloads the entire update bundle, along with a readme file and a complete change history, if available.

UpdateXpress System packs are available for the following System x and BladeCenter OS types:

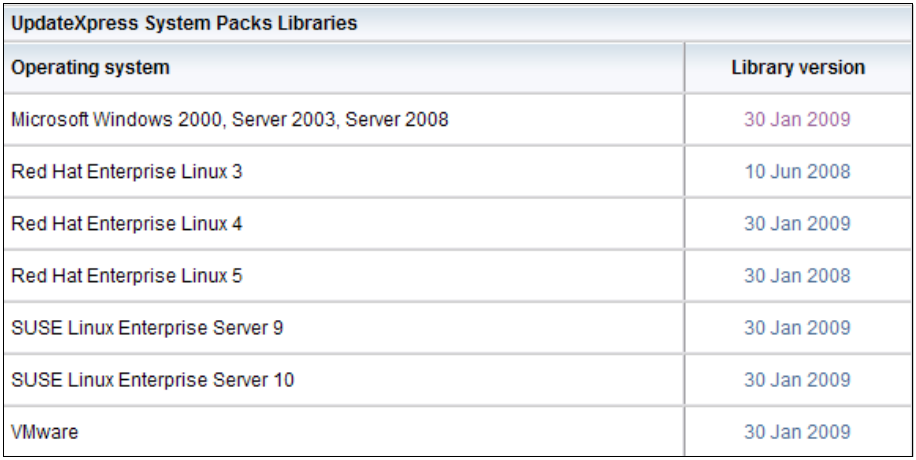
- Microsoft Windows 2000, Server 2003, Server 2008
- Red Hat Enterprise Linux 3
- Red Hat Enterprise Linux 4
- Red Hat Enterprise Linux 5
- SUSE Linux Enterprise Server 9
- SUSE Linux Enterprise Server 10
- VMware ESX

UpdateXpress System Packs are created for a machine type and operating system combination. Separate UpdateXpress System packs are provided for Windows and each of the Linux distributions. Therefore, there could be several UpdateXpress System packs for one particular machine type. To download System Update Packs without the use of Update Manager:

1. Go to the following page:

   http://www.ibm.com/support/docview.wss?uid=psg1SERV-XPRESS

2. Select the appropriate operating system, as shown in Figure 10-30.

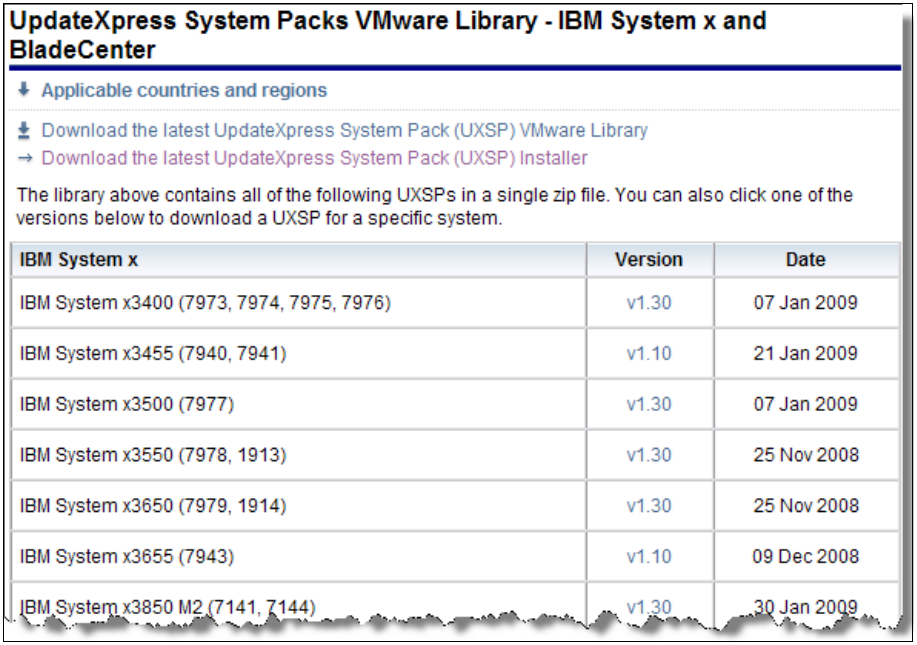


UpdateXpress System Packs Libraries

Operating system	Library version
Microsoft Windows 2000, Server 2003, Server 2008	30 Jan 2009
Red Hat Enterprise Linux 3	10 Jun 2008
Red Hat Enterprise Linux 4	30 Jan 2009
Red Hat Enterprise Linux 5	30 Jan 2008
SUSE Linux Enterprise Server 9	30 Jan 2009
SUSE Linux Enterprise Server 10	30 Jan 2009
VMware	30 Jan 2009

Figure 10-30 Update System Pack Libraries per OS type

3. Select the model type that you require (updates are specific to system type and operating system). See the example in Figure 10-31 for VMware Update System Packs.



UpdateXpress System Packs VMware Library - IBM System x and BladeCenter

Applicable countries and regions

Download the latest UpdateXpress System Pack (UXSP) VMware Library

Download the latest UpdateXpress System Pack (UXSP) Installer

The library above contains all of the following UXSPs in a single zip file. You can also click one of the versions below to download a UXSP for a specific system.

IBM System x	Version	Date
IBM System x3400 (7973, 7974, 7975, 7976)	v1.30	07 Jan 2009
IBM System x3455 (7940, 7941)	v1.10	21 Jan 2009
IBM System x3500 (7977)	v1.30	07 Jan 2009
IBM System x3550 (7978, 1913)	v1.30	25 Nov 2008
IBM System x3650 (7979, 1914)	v1.30	25 Nov 2008
IBM System x3655 (7943)	v1.10	09 Dec 2008
IBM System x3850 M2 (7141, 7144)	v1.30	30 Jan 2009

Figure 10-31 System Update Packs library specific to OS VMware

4. Select the link for the system model that you require and you will be presented with the download page and instructions about how to run the updates, as shown in Figure 10-32.

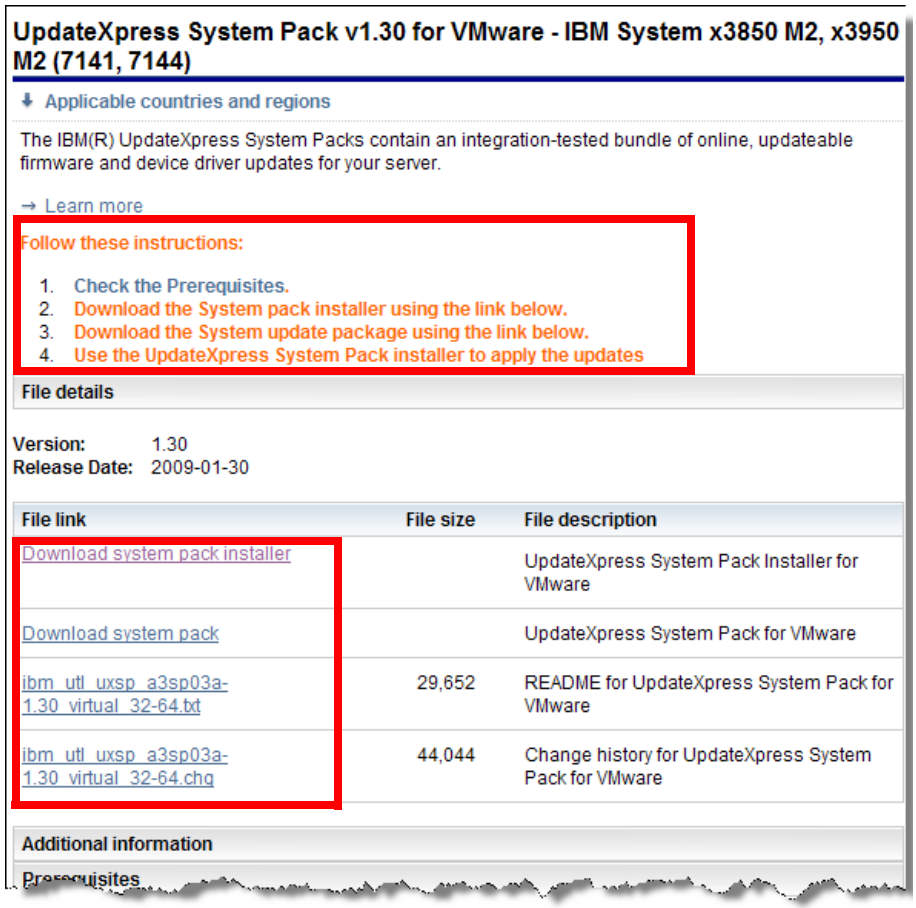
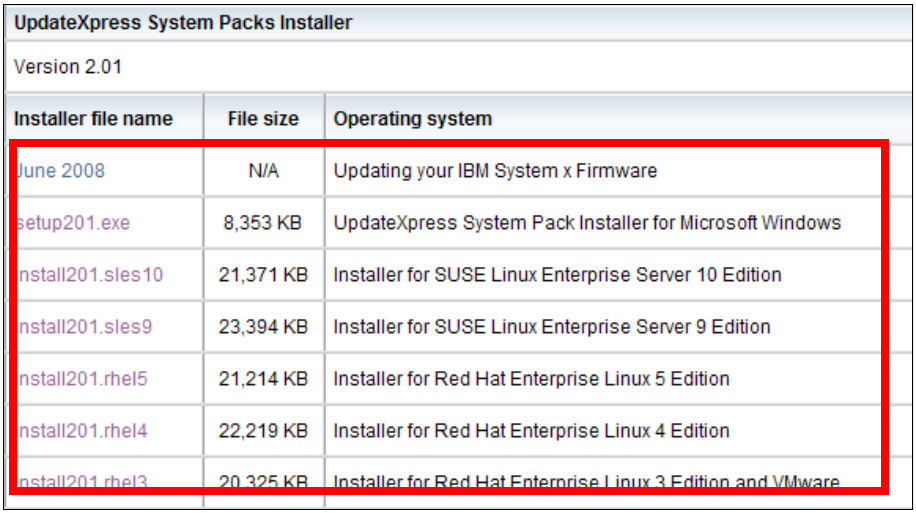


Figure 10-32 UXSP Download page: In this example x3850M2/x3950M2, VMware

Note that if you plan to use the System update pack on the Server/Blade locally you must download the UpdateXpress System Update pack installer, which also can be downloaded from same link:

`http://www.ibm.com/support/docview.wss?uid=psg1SERV-XPRESS`

The Update System Pack Installer is also specific to the installed OS, as shown in Figure 10-33.



UpdateXpress System Packs Installer

Version 2.01

Installer file name	File size	Operating system
June 2008	N/A	Updating your IBM System x Firmware
setup201.exe	8,353 KB	UpdateXpress System Pack Installer for Microsoft Windows
install201.sles10	21,371 KB	Installer for SUSE Linux Enterprise Server 10 Edition
install201.sles9	23,394 KB	Installer for SUSE Linux Enterprise Server 9 Edition
install201.rhel5	21,214 KB	Installer for Red Hat Enterprise Linux 5 Edition
install201.rhel4	22,219 KB	Installer for Red Hat Enterprise Linux 4 Edition
install201.rhel3	20,325 KB	Installer for Red Hat Enterprise Linux 3 Edition and VMware

Figure 10-33 Update Xpress System Pack Installer packages

Single updates

You can also download individual updates based on system type and operating system installed. Three operating systems are typically supported:

- Windows

  These are updates that can be applied while the server is running. They are known as *online updates*. Some updates may require a reboot to be activated. However, this can be scheduled for a maintenance period. These updates can be imported into IBM Systems Director to be used with Update Manager. The file formats are:

  - `<ibm_update_name>.exe`
  - `<ibm_update_name>.xml`

- Linux

  These are similar to the Windows updates but for Linux. The file formats are:

  - `<ibm_update_name>.sh`
  - `<ibm_update_name>.xml`

- DOS

  These are typically for hardware updates and the running server must be rebooted to run this update. The file formats are:

  - <ibm_update_name>.img
  - <ibm_update_name>.iso

If you decide to download your updates using the manual download methods and want to use Update Manager to push the updates to your servers, ensure that you have assessed the size of this repository when planning your Director server install. See Chapter 2, “Planning” on page 55, for more details about planning your Director server environment.

You must download the updates to a temp directory on the Director server. This cannot be a network share. It must be a local to the Director server. Once all the updates have been downloaded and placed on the local drive of the Director server you must import these updates using the method described in “Common tasks” on page 474.

The import task imports all updates within the temp directory specified. You will not be able to pick out specific updates to import.

10.4.2 Automatic download via Update Manager

Update Manager can be used to download the updates from the IBM repositories automatically. However, this can only be achieved if the IBM Systems Director server has access to the internet, either directly or via a proxy server, as described in 10.2.1, “Configuring Update Manager” on page 453.

The update repositories are held in the USA. The repository information is detailed in Table 10-2.

Table 10-2 Update Manager download repository information.

Host name	IP address	Port
eccgw01.boulder.ibm.com	207.25.252.197	443
eccgw02.rochester.ibm.com	129.42.160.51	443

Tip: When you check for updates, Update Manager downloads the meta data, which includes readme and update information files. It does not download the actual update file until you run the install update or download the update.

To download the updates:

1. Ensure that your environment meets the prerequisites for using update manager, as detailed in 10.10.3, “Prerequisites for performing updates” on page 496.
2. Expand R**elease Management** in the Navigation tasks area and click **Updates**. The Update Manager summary page opens.
3. Click **Getting Started** (located in Figure 10-1 on page 452 by number ❶).
4. The Getting Started with updates wizard opens. Click **Next** from the welcome window if this is visible.
5. Enter a name for the update group and an optional description. Click **Next** to continue.
6. Select the systems or groups that match the criteria for this update. Click **Next** to continue.
7. Enter the internet settings if not already configured. You have the option here to test the connection. Click **Next** to confine.
8. Examine the summary page (Figure 10-34), and if correct click **Finish**.

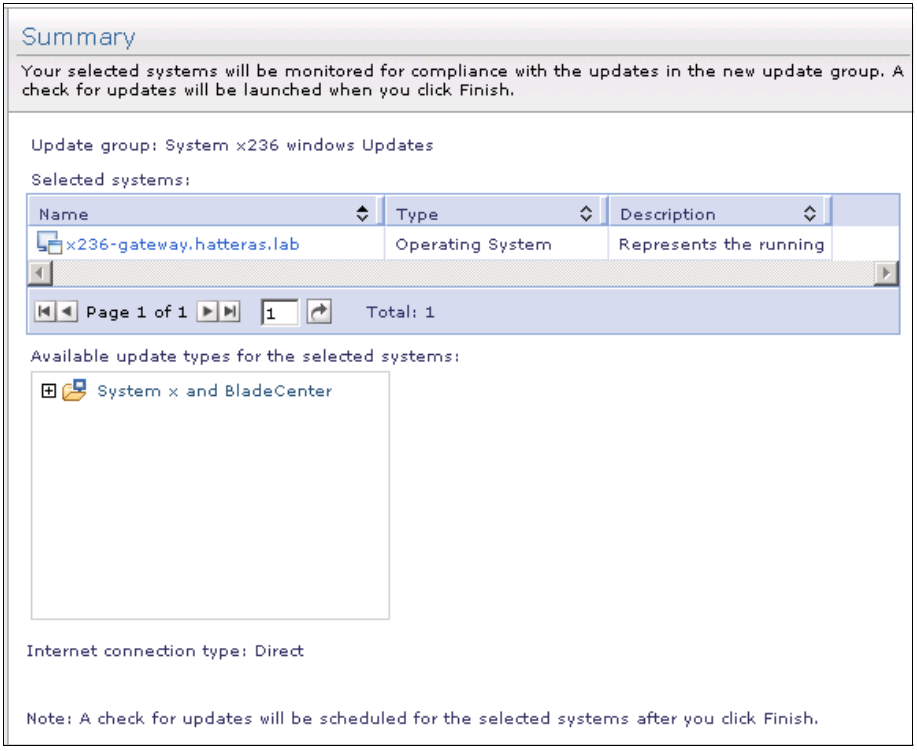


Figure 10-34 Check for the updates summary

9. Click **Finish** to complete and start task. When prompted to either run the task now or schedule it for a future time, make your selection. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed your selections click **OK**.
10. Once the job has started click **Display Properties** from the notification message or open Active and Scheduled tasks. Once tasks are completed 100% close this window. You may be provided with another view, as shown in Figure 10-35.

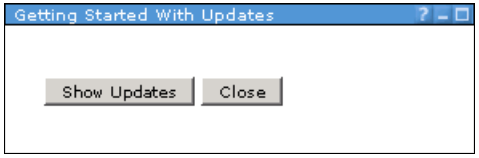


Figure 10-35 Show Updates or Close

11. Click **Show Updates**, which opens the Show Updates page. If no updates are shown in the table then there may not have been any newer updates available. However, if you previously checked for updates click the time period option and select the number of days in the past that you want to check. Once you have selected an appropriate time period the updates for this group appear.

> **Tip:** At this time the updates have not yet been downloaded.

12. To download the updates, select the updates individually or click **Actions** → **Select All**.
13. Once the updates are selected click **Actions** → **Downloads**. You will be shown the download location for the updates, as shown in Figure 10-36. Click **OK** to continue to download the updates.

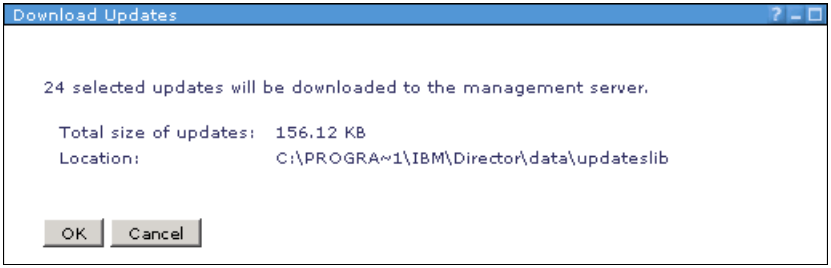


Figure 10-36 Download location

14. When prompted to run the task now or to schedule the download for later, make your selection and then click **OK**. You can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed the selections click **OK**.

How to tell whether an update has been downloaded

To determine whether a particular update has been downloaded, view the download status of the updates:

1. Open the Update Manager page by expanding **Release Management** and clicking **Updates**.

1. Click **Show Updates** from the Manage section on the Update Manager page.
2. Select the appropriate time period in order to view the updates list found on the IBM update sites (detailed in 10.4.2, “Automatic download via Update Manager” on page 483).

3. Using the horizontal scroll bar at the bottom of the table to scroll along until the Downloaded column is visible, as shown in Figure 10-37.

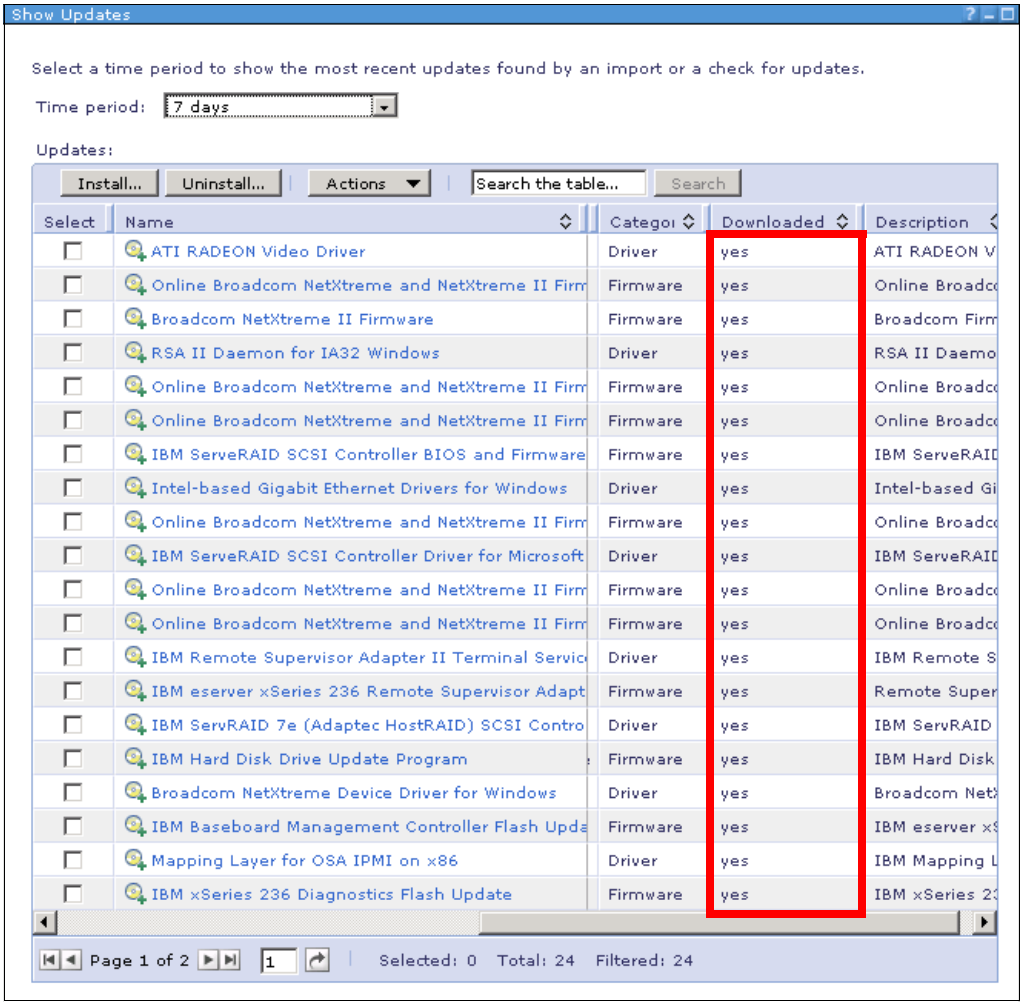


Figure 10-37 Download state

The Downloaded column shows `yes` when the update has been downloaded and `no` when you still need to download the update.

10.5 Removing update files

When an update is no longer needed, you can remove its associated installable files in order to save space.

Note: If an update has not been downloaded, this task is not available.

This task removes the installable files for an update, but the solution deployment descriptor and any human-readable files such as readme files are not removed. When this task completes, the update remains known to the update manager and is treated like any other update.

To remove the installable files from an update:

1. From any page where a list of updates is present, select the updates whose files you want to delete.
2. Click **Actions** → **Delete files**, as shown in Figure 10-38.

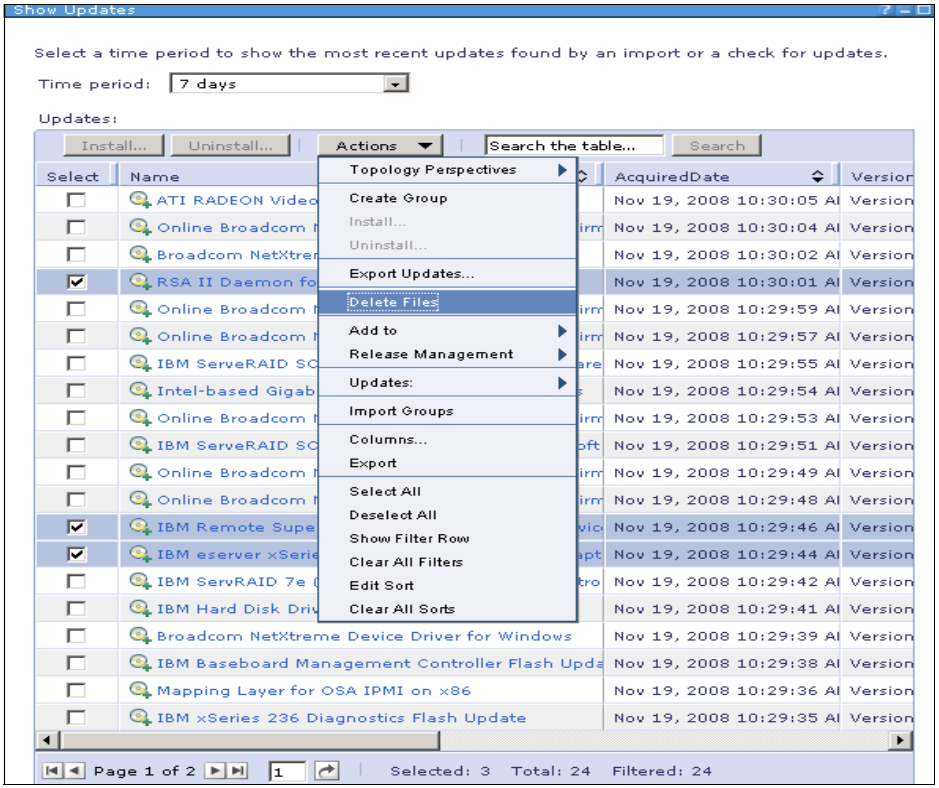


Figure 10-38 Deleting update files

3. Click **Yes** in the verification window to confirm the removal of the files.

   Once the files have been deleted you will receive a message like that shown in Figure 10-39.

Figure 10-39 Confirmation of deletion of update files

4. Click **Close Message**.

10.6 Performing updates

This section describes the ways to perform updates:

- 10.6.1, “Updating one system” on page 489
- 10.6.2, “Updating groups of systems” on page 491

10.6.1 Updating one system

To apply an update to one server:

1. Open the Update Manager page by expanding **Release Management** and clicking **Updates**.
1. Click **Install Updates** from the Common tasks list in the Manage section, as shown Figure 10-1 on page 452 (see the number❸).
2. This opens the install wizard. Click **Next** on the Welcome window.
3. Select the updates that you want to apply to the system and then click **Add** to the selected list. Click **Next** to continue.
4. Select the systems to which you want to apply the updates and click **Add** to the selected list.

5. Configure the options as shown in Figure 10-40. You can deselect **Automatically install missing update requirements** or you can leave this selected. This is selected by default.

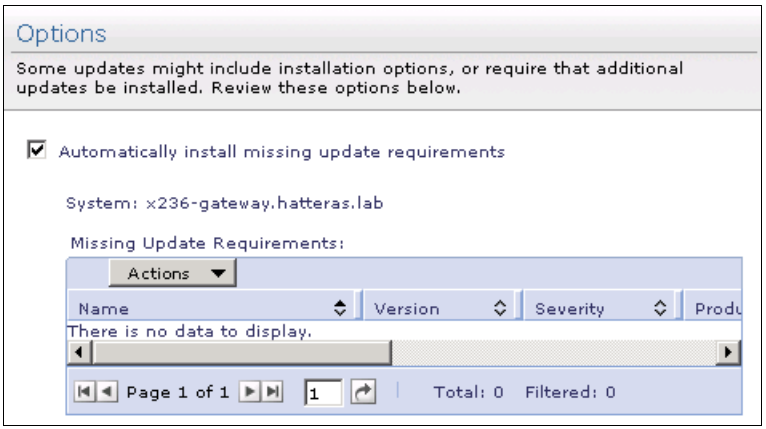


Figure 10-40 Options

In our example there are no missing update requirements. Click **Next**.

6. To configure the restart settings for the updates to avoid the server shutting down, deselect the option to **Automatically restart as needed during installation**. In our example you will notice that the Restarts Required column value is Deferred.

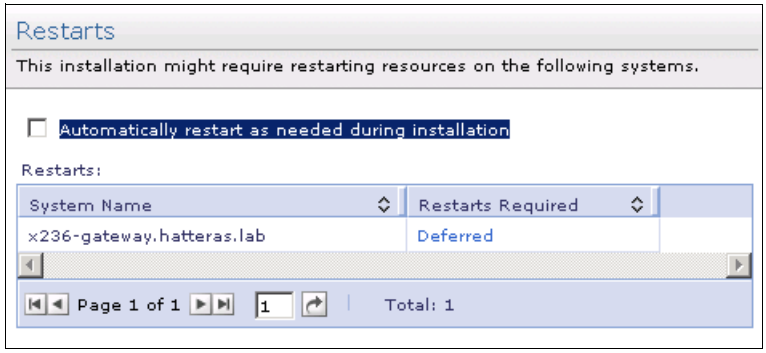


Figure 10-41 Restart options

7. Click **Deferred** and you will see which updates require that the resources be restarted.
8. Click **Close**, and then click **Next** to continue.
9. At the summary view check whether this is correct and then click **Finish**.

10. At the scheduler page make the selection of when you want the update process to run. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed the selections click **OK**.
11. If you select Run Now, the update runs on the system and you can view the progress via active and scheduled jobs or display properties from the confirmation message.

Tip: Do not forget to update your inventory for this system after the update has completed.

10.6.2 Updating groups of systems

To apply an update to a group of systems or blades:

1. Open the Update Manager page by expanding **Release Management** and clicking **Updates**.
1. Click **Install Updates** from the Common tasks list in the Manage section, as shown Figure 10-1 on page 452, located via the number❸. This opens the install wizard. Click **Next** on Welcome window.
2. Select the updates that you want to apply to the group of systems and click **Add** to the selected list. Click **Next** to continue.
3. Select the group to which you want to apply the updates and click **Add** to add these groups to the selected list.
4. The Options page opens, as shown in Figure 10-42. You can deselect **Automatically install missing update requirements** or you can leave this selected. This is selected by default.

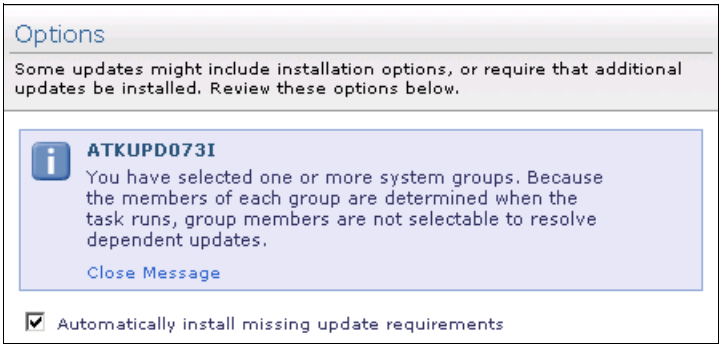


Figure 10-42 Options when installing updates to a group of systems

When installing updates to groups the message shown in Figure 10-42 on page 491 appears. Click **Next** to configure the restart settings for the updates.

5. To avoid the server shutting down, deselect the option **Automatically restart as needed during installation**.

   When installing to groups the restart is not displayed, and you will the messages shown in Figure 10-43.

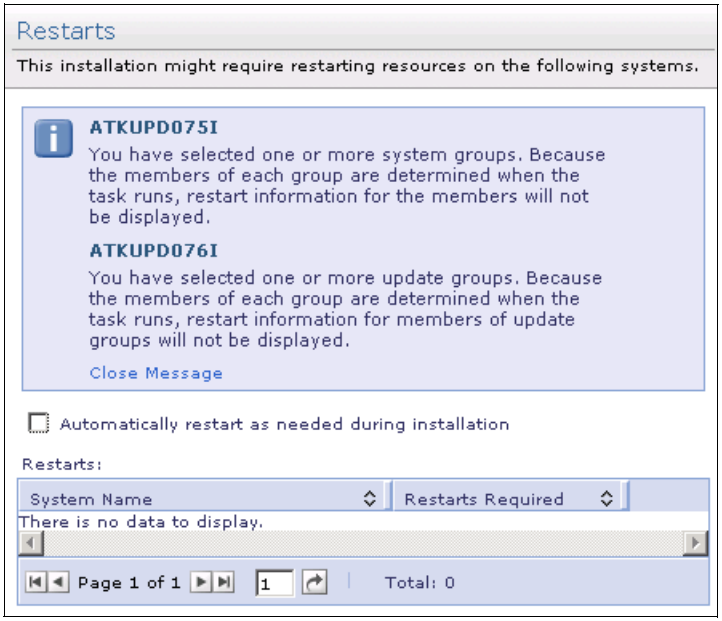


Figure 10-43 Restart options for groups

Click **Next** to continue.

6. At the summary view shown in Figure 10-44 check that this is correct and then click **Finish**.

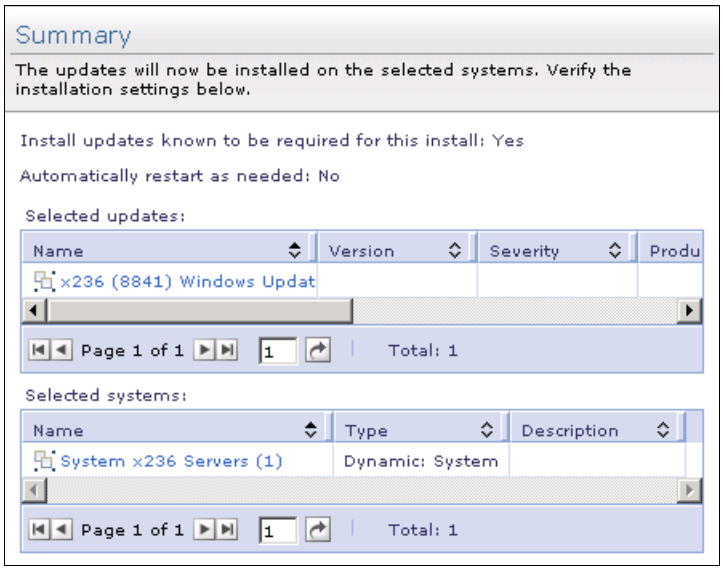


Figure 10-44 Groups installation summary

7. At the scheduler page make the selection of when you want the update process to run. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed your selections click **OK**.
8. If you selected Run Now the update runs on the system and you can view the progress via active and scheduled jobs or display properties from the confirmation message.
9. Do not forget to update your inventory for these systems after the updates have completed.

10.7 How to determine whether a system requires updating

In order to determine whether a system requires an update, you should use compliance policies that enable you to be informed of systems that are missing specific updates, as described in 10.2.3, “System compliance” on page 464.

Alternatively, you can manually check via the Check for Updates and Show Needed Updates option, described in 10.2.4, “Manage” on page 468.

10.8 Updating earlier versions of IBM Director

Consider these points when applying updates to systems that are at a level earlier than the current level of IBM Systems Director:

- Migration to IBM Director 5.20 from IBM Director 5.10 cannot be performed by Update Manager.
- Migration to IBM Systems Director 6.1 from any version of IBM Director 5.10 or 5.20 cannot be performed by Update Manager. However, you can upgrade an IBM Director Agent 5.20 to a IBM Systems Director 6.1 Common-Agent-managed system using Agent Manager. See 10.10, “Updating IBM System x and BladeCenter systems” on page 495.
- IBM Systems Director supports the updating of systems that are at earlier versions of IBM Director, provided that the updates do not change the version or release level.

10.9 Updating IBM Systems Director

Update manager can be used to obtain and install updates for IBM Systems Director. However, consider these points when updating IBM Systems Director:

- Ensure that software inventory has been recently collected for the management server before using Update Manager.
- IBM Systems Director updates require that IBM Systems Director be restarted before the updates will be active. This restart is required before additional updates can be installed. If you are also installing firmware or operating system updates, these updates might require that the IBM Systems Director Server be restarted as well. If the update requires a restart but you choose to not permit these automatic restarts, you must manually restart IBM Systems Director.

10.9.1 Performing updates to IBM Systems Director Server

To update IBM Systems Director:

1. Ensure that you have collected the latest inventory for the IBM Systems Director Server.
2. Click the **View updates** link on the Welcome page in the upper-right corner.
3. Click **Check for updates** to run or schedule a check for new updates. When the check for updates completes, the updates needed by the IBM Systems Director Server are displayed in the table.
4. Optional: If your management server does not have a connection to the internet:
   a. Download IBM Systems Director updates from this IBM Web site:

      `http://www.ibm.com/eserver/support/fixes/fixcentral`

      Fix Central provides fixes and updates for your system's software, hardware, and operating system. For additional information see:

      `http://www.ibm.com/systems/support/fixes/en/fixcentral/help/getstarted.html`

   b. Copy the updates to the management server.
   c. Use the update manager Import updates task.

   For more information about importing updates see “Common tasks” on page 474.
5. From the View updates panel, select the updates to install and select the **Install** button to start the Install wizard (for more information about the Install wizard refer to “Common tasks” on page 474).

10.9.2 Upgrading IBM Director Agents to Common Agents

For information about how to perform this upgrade procedure, refer to the scenario in 17.2, “Update management” on page 748.

10.10 Updating IBM System x and BladeCenter systems

Updates to IBM System x and IBM BladeCenter can be installed using the Update Manager, but you cannot uninstall or roll back System x and IBM BladeCenter updates.

10.10.1 Update considerations for I/O and management modules

Consider these factors when updating IBM BladeCenter I/O Modules and Management Modules:

- Before you can update the IBM BladeCenter S SAS RAID Controller Module, you must discover the Storage Management Initiative Specification (SMI-S) provider used to communicate with the module.
- Before you can update out-of-band switches and IBM BladeCenter Management Modules, you must create a configuration template for them.
- Updates to I/O modules, management modules, advanced management modules, and pass-thru modules must be installed from a Trivial File Transfer Protocol (TFTP) or File Transfer Protocol (FTP) server. Use the settings function to specify TFTP or FTP server properties. For information about the configuration settings for the TFTP and FTP servers refer to “Configuring Update Manager” on page 453.

10.10.2 Update considerations for IBM System x systems

When updating IBM System x systems, review these considerations for device driver and firmware updates involving IBM Director systems:

- Applying IBM System x and IBM BladeCenter device driver and firmware updates to IBM Director 5.20 systems is supported. This includes IBM Director 5.20 Common-Agent-managed systems, Platform-Agent-managed systems, and Agentless-managed systems.
- Applying IBM System x and IBM BladeCenter device driver and firmware updates to IBM Director 5.10 systems is not supported.

For more information about installing updates to System x servers see 10.6, “Performing updates” on page 489, or the scenario in 17.2, “Update management” on page 748.

10.10.3 Prerequisites for performing updates

This section describes the prerequisites need for System x servers and BladeCenter chassis.

The main prerequisites, as detailed in 10.1, “Introduction to Update Manager” on page 450, are:

- Make sure that the systems are discovered and not locked. If a system is locked, the update menu actions will not be displayed for it. You cannot select a locked system in any of the system selection actions.
- Once unlocked, collect inventory on these systems. Inventory collection must be run on any unlocked systems that are to be monitored for update management and compliance status. Applicability of updates to a system cannot be determined unless inventory has been collected on the system.

10.10.4 Updating BladeCenter chassis

To update BladeCenter chassis components ensure that inventory collection has been performed and check configuration settings for BladeCenter chassis updates:

1. Expand **Release Management** in the navigation area and click **Updates**.
2. Click **Settings** on Update Manager summary page.
3. Click the **BladeCenter** tab and see “BladeCenter tab” on page 456 for the settings required for TFTP and FTP servers. Enter the settings required and click **OK** to close the Settings page.

Downloading BladeCenter chassis updates

To download updates for any switches and the management modules in a BladeCenter chassis:

1. Return to the Update Manager summary page,
2. Click **Check for updates** from the Manage section.

3. Select and expand  from the list of system types available, expand **Category**, select the management module and switches in turn, and click **Add** to add this into the selected list, as shown in Figure 10-45.

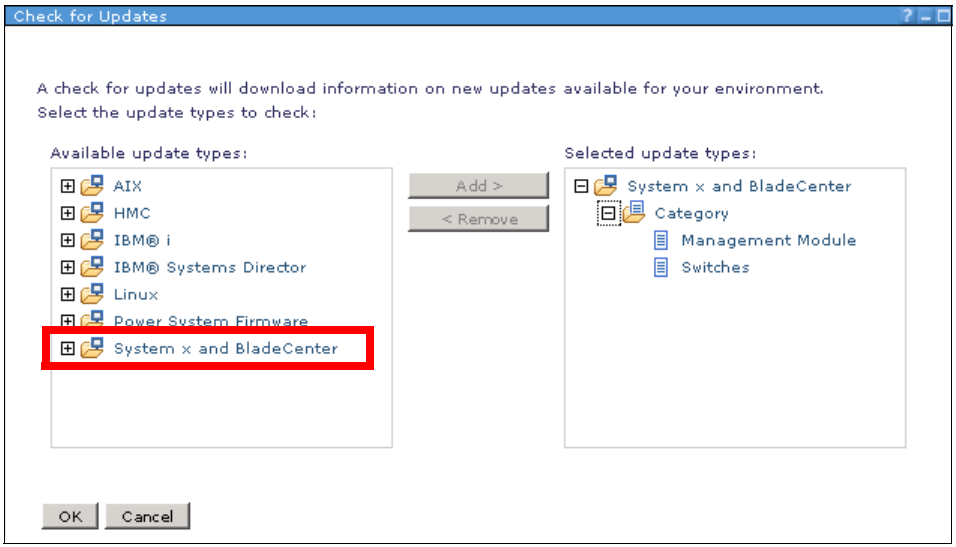


Figure 10-45 BladeCenter Chassis devices selected

4. Once both are selected click **OK**.
5. When prompted to run the job now or schedule for a later time or date make your selection. Before clicking OK you can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed your selections click **OK**.
6. If you selected Run Now, Update Manager now checks the IBM repository for available updates.
7. You can monitor progress of the job by clicking **Display Properties** after the job starts.
8. Once the job is 100% complete, from the Updates Summary page you can click **Show Updates** in the Manage section or via the **Check for Updates** tab, which may still be open.

The available updates are displayed on the Show Updates page, as shown in Figure 10-46.

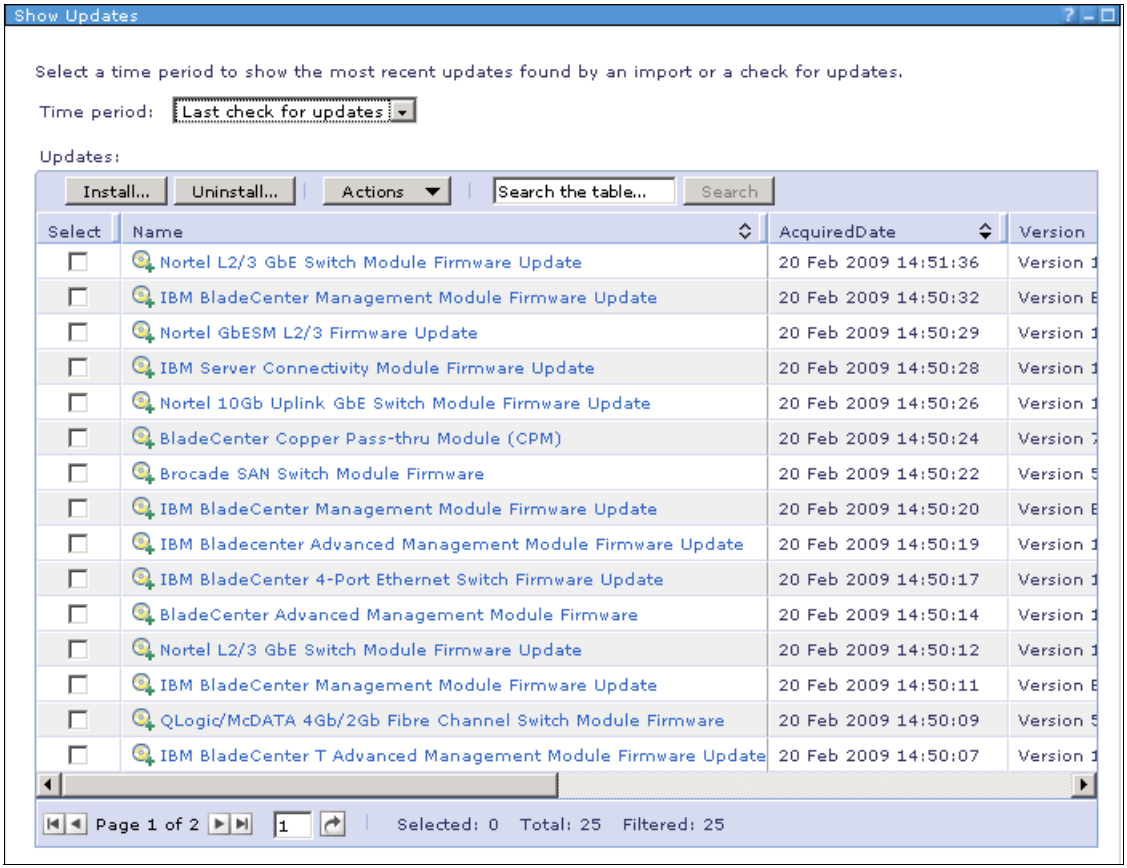


Figure 10-46 BladeCenter updates

9. Some of the updates listed must be downloaded manually. To determine which updates these are, scroll along to the column titled Downloaded, as shown in Figure 10-47.

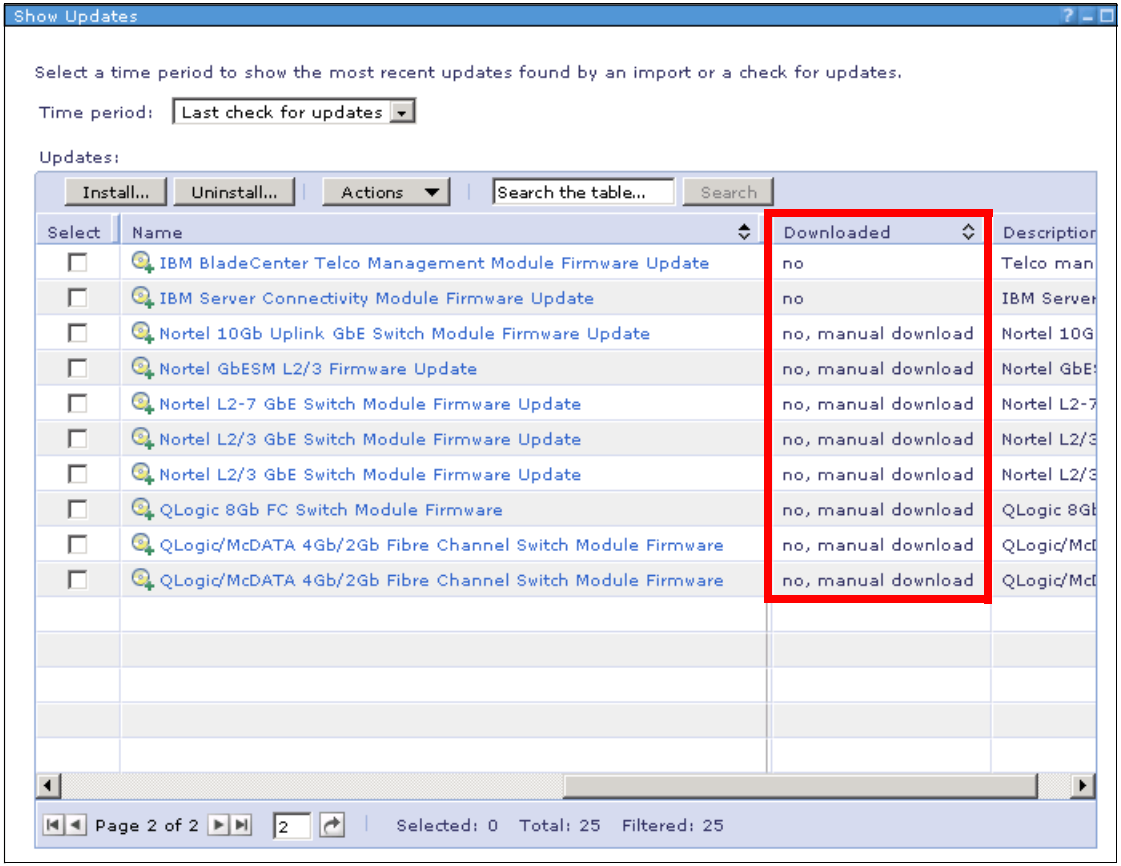


Figure 10-47 Example of BladeCenter updates requiring manual download

10. To perform the download for these updates select the update and click **Actions** → **Download**.

11. You are then presented with the Download Updates view, which explains that this update must be downloaded manually and then imported. This view also includes the link for the download site, as shown in Figure 10-48.

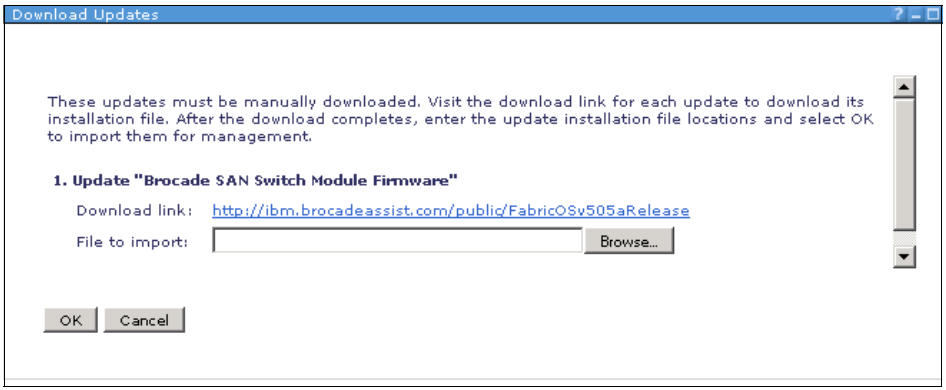


Figure 10-48 Manual download notification

12. Updates that can be downloaded via Update Manager can be selected one-by-one and downloaded. However, multiple updates can also be downloaded together. Once you have selected all the updates that you want to download click **Actions** → **Download**.
13. The Download updates view appears confirming the number of updates to be downloaded and a location where these updates will be downloaded to, as shown in Figure 10-49.

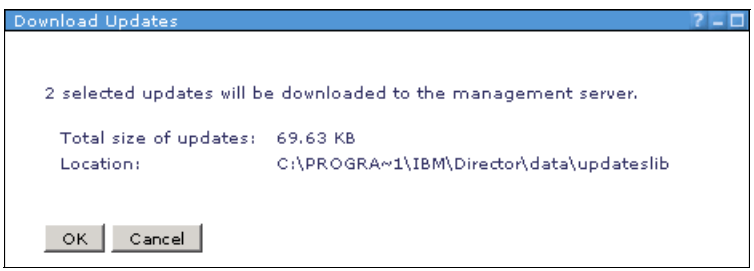


Figure 10-49 Updates downloaded via Update Manager

14. To continue with this download click **OK** and follow options for scheduling as appropriate.

Required updates for a specific BladeCenter chassis

The updates shown in Figure 10-47 on page 500 are all the currently available updates for any BladeCenter chassis. These updates are not specific to what has

been discovered within your environment. The check for updates shows what updates are available for download on the IBM Repository matching your specified criteria. To determine updates required for a specific BladeCenter chassis:

1. Click **Navigate Resources**, then click **Groups by System Type** → **BladeCenter Systems** → **BladeCenter Chassis and Members (View Members)**.
2. Select the BladeCenter chassis object that you are enquiring about and click **Actions** → **Release Management** → **Show needed updates**, as shown in Figure 10-50.

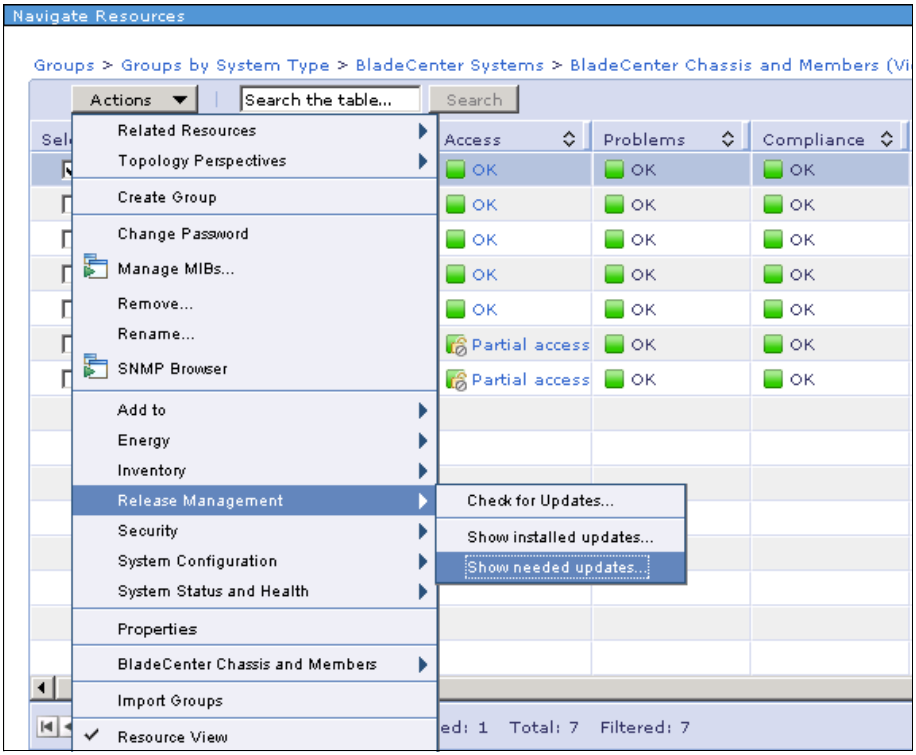


Figure 10-50 Show needed updates for BladeCenter chassis

You will then be presented with the updates available as per the chassis requirements, as shown in Figure 10-51.

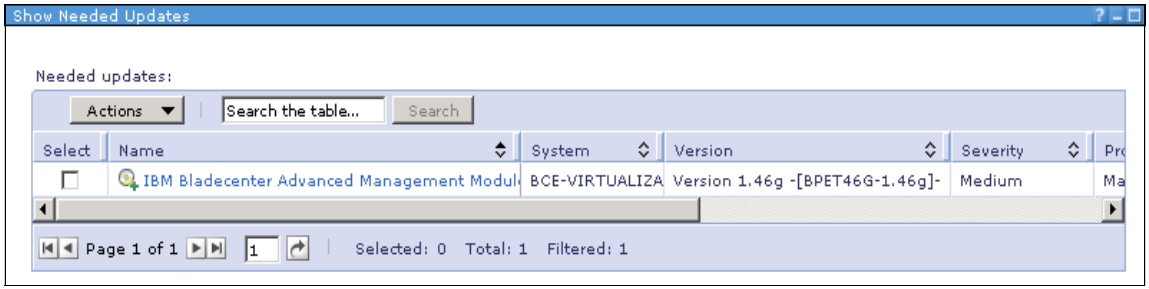


Figure 10-51 Updates needed specific to once chassis

3. To install this update on the BladeCenter chassis, select the update via the Select check box and click **Actions** → **Install**. The Install Wizard opens. Click **Next** if the Welcome window opens.
4. Select the BladeCenter chassis and click **Add**, then click **Next** to continue.
5. The Automatically install missing update requirements option is selected by default. Accept the default settings and click **Next** to continue.
6. Restart information is provided. Ensure that this meets your requirements, then click **Next** to continue.

You are then presented with the summary for this install task, as shown in Figure 10-52.

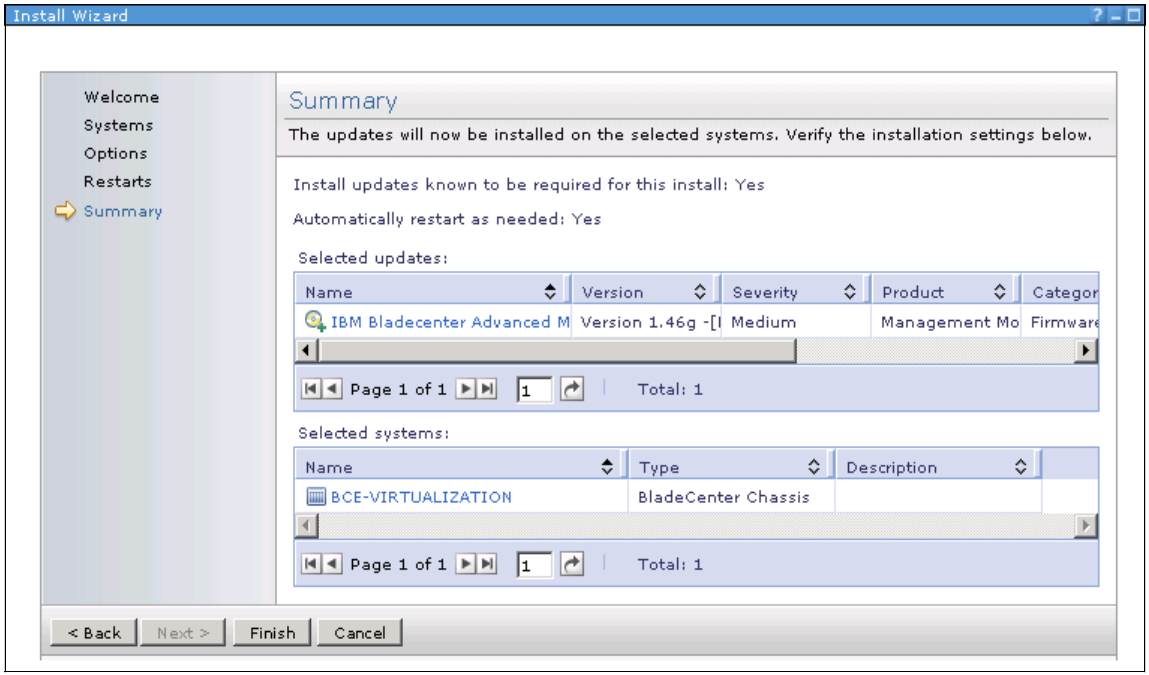


Figure 10-52 BladeCenter chassis updates summary

7. Click **Finish** to continue or click **Back** to modify any aspect of this task.
8. You are now prompted to run the task now or schedule this task to run at another time. Make your selection and click **OK**. You can also specify notification settings and options via the appropriate tabs, as described in 10.15, “Scheduling updates” on page 510. Once you have completed the selections click **OK**. You will also be able to see the status of the task by clicking **Display Properties**, when prompted.

10.10.5 Using the platform configuration file

An IBM System x and IBM BladeCenter platform configuration file can be used to specify systems that you have not discovered or collected inventory for with IBM Systems Director. This file is then used to perform update tasks on the systems listed in the file.

This capability applies to IBM System x and IBM BladeCenter systems. A blank IBM System x and IBM BladeCenter platform configuration file is created

automatically on the management server the first time that any IBM System x or IBM BladeCenter update criterion is displayed. You can customize this file for systems that have not been discovered by IBM Systems Director so that their updates can be downloaded.

The IBM System x and IBM BladeCenter platform configuration file has the name *director install*/data/xbc_platforms.cfg, where *director install* is the directory in which IBM Systems Director has been installed.

Use this procedure only in situations where the normal update tasks cannot be performed. Customize the IBM System x and IBM BladeCenter platform configuration file so that you can check for updates and download updates for systems that you have not discovered or for which you have not collected inventory using IBM Systems Director.

To modify the IBM System x and IBM BladeCenter platform configuration file for a particular IBM System x or IBM BladeCenter system, see the following link:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.updates_6.1/fqm0_c_um_platform_criteria_extension_file.html

10.11 Updating Linux operating systems

Each Linux distribution partner provides updates for its specific Linux distribution. To download updates and install them, you must have an internet connection and be registered with the Linux distribution partner.

Consider these factors when updating Linux systems:

- IBM Systems Director supports the application of updates only to Enterprise Linux, Red Hat Enterprise Linux Version 5, and Enterprise Linux SUSE Linux SLES Version 10.
- In order to apply Linux updates, each system must be registered with the appropriate Linux distribution's update service. See these Web sites for more information:
  - For Red Hat Enterprise Linux distributions

    https://rhn.redhat.com
  - For SUSE Linux SLES distributions

    http://www.novell.com/customercenter
- All Common Agents must be running at root level, which means that you should be logged in as root when performing the Common Agent installation, which is the default.

- You must have network connectivity between the management server, the target system, and the internet. The internet connection is needed to obtain the updates from the Linux Distribution Partner.
- The commands **yum** and **rug** must be installed on each system that is to receive an update. If they are missing, no interactive messages are displayed, but the error logs indicate this error.
- Uninstalling updates and rolling back updates are not supported.
- For the Linux operating system to receive updates, it must have the Common Agent installed.

10.12 Updating Power Systems firmware

Consider these factors when updating Power Systems firmware:

- You must perform extended discovery or inventory collection for the target system before working with Power Systems firmware updates.
- If the target system is managed by Hardware Management Console (HMC) or Integrated Virtualization Manager (IVM), extended discovery or inventory collection must be performed for the managing IVM or HMC of the target system before using any Power Systems firmware functions in Update Manager.
- For stand-alone Power Systems, the installation staging and installation tasks require that the installed operating system (Linux or AIX) is available.
- The fix service provider will have only the firmware level 01SF240_338.201 for IBM System p5® Power System firmware.
- All IBM System p6 firmware will be available from the fix service provider.
- Some IBM System p5 and IBM System p6 Power systems have Bulk Power Control (BPC) firmware to control each bulk power unit in the central processor complex (CPC) and towers. This bulk power is attached to the frame. These systems must be managed by an HMC.

  When the power systems firmware is updated for these systems, the bulk power firmware might require updating as well. Update Manager for Power Systems firmware will automatically update this bulk power firmware in this situation.

  An example is if you upgrade your IBM System p5 or IBM System p6 Power systems firmware to a new level and that level requires an update to the bulk power firmware. Update Manager will automatically download and install this bulk power firmware as part of the Power Systems firmware download and installation tasks.

- Power systems firmware updates can be obtained from:

  http://www14.software.ibm.com/Webapp/set2/firmware/gjsn

  You can find a description of firmware at:

  http://www-941.ibm.com/collaboration/wiki/display/LinuxP/P5+System+Firmware+Upgrade
- Some levels of Power Systems firmware being installed on a system managed by HMC have a requirement that the HMC managing the system be at a minimum HMC level. Consult the readme file for the Power Systems firmware. If you attempt to update the Power Systems firmware when the HMC is not at the required level, the task fails and logs an appropriate message.
- Uninstalling and rolling back Power Systems firmware updates or upgrades is not supported.

Supported configurations

The configurations supported for updating Power System firmware are:

- Standalone IBM System p5 and later systems running Linux or AIX with the Common Agent installed
- IBM Power Systems p5 and later systems managed by HMC (see 10.13, “Updating HMC systems” on page 507) and running Linux, AIX, or IBM i
- IBM Power Systems p5 and later systems (IBM Power Systems p6 and so forth) managed by IVM, with VIOS 1.5.2.1 and later fix packs

10.13 Updating HMC systems

Hardware Management Console systems can have updates, upgrades, and interim fixes installed.

Note these restrictions and hints for working with HMC updates:

- Only HMC Version 7 Release V7.3.3 SP2 and later versions and releases are supported.
- Only Virtual I/O Server (VIOS) Version 1.5.2.1 and later fix packs are supported.
- HMC upgrades are not supported for the installation staging task. If installation staging is attempted, a message is displayed with instructions for creating and using a CD to manually perform this task.
- A download is automatically performed for an ISO disc image, and the files that are downloaded can be used for installation on the management server.

You must manually create a CD with this ISO image and then install the update from the CD.

- HMC upgrades are not supported for the installation task. If you attempt an installation task, after having successfully performed a manual installation staging task, a message is displayed with instructions for installing the upgrades on each HMC system. If you attempt an installation task and installation staging has not been performed manually, a message is displayed with the installation staging instructions using the CDs mentioned above.
- Uninstalling and rolling back HMC updates, upgrades, or interim fixes is not supported.
- Extended discovery or inventory discovery must be performed for the target HMC before using any HMC update manager functions.
- Sometimes upgrades require that you install the media manually by storing the obtained ISO image on a CD, for example, when there is no HMC update path to a new release. When a manual CD installation is required, the upgrade ISO image must be downloaded using update manager and stored in the <*director install*>\data\updateslib\HMC\Update_ID directory, where <*director install*> is the location of the IBM Systems Director installation. Subsequently, if the install task is chosen, installation instructions are displayed to upgrade the HMC manually using the CD installation.

10.14 Updating AIX systems

Updating AIX systems with IBM Systems Director requires the use of Network Installation Management (NIM) software and a Common Agent. IBM Systems Director supports updating AIX 5.3 TL6 SP4 and later releases, as well as updating AIX 6.1 and later releases.

10.14.1 Terms used for updating AIX

These are terms that you will encounter when you are working with AIX updates:

- Network Installation Manager master: An AIX system that has been designated as a focal point to receive updates and install them on other AIX systems, known as NIM clients.
- Network Installation Manager client: An AIX system that is installed from a NIM master.
- Technology level (TL): The twice yearly AIX releases, which contain new hardware and software features and service updates. The first of the twice yearly TLs is restricted to hardware features and enablement, as well as

software service. The second of the twice yearly TLs includes hardware features and enablement, software service, and new software features.

Make sure that you install all parts of a TL. Back up your system before installing a TL.

- Service pack (SP): A collection of service-only updates (also known as PTFs) that are released between technology levels to be grouped together for easier identification. These fixes address highly pervasive, critical, or security-related issues.
- Maintenance level: The service updates (fixes and enhancements) that are necessary to upgrade the base operating system (BOS) or an optional software product to the current release level.
- Recommended level: The level of an SP that is recommended for a given AIX TL. Not all TLs have a recommended SP level.
- Latest level: The most recent level of SP or TL.

10.14.2 Tips for updating AIX

Consider these tips and restrictions when you are working with AIX updates:

- Back up your system before installing a TL.
- Updates can be installed only within a release of AIX. You cannot perform a migration to a new version of AIX with update manager.
- You cannot perform a new overwrite installation of AIX with update manager.
- AIX 5.3 TL6 SP4 and later releases are supported, as well as AIX 6.1 and later releases.
- In order to perform an installation or installation staging for AIX updates, your system must meet these requirements:
  - An AIX NIM master is required to stage and install the updates.
  - A NIM environment is required.
  - The AIX NIM master and the AIX managed systems (NIM clients) require a Common Agent.
  - The AIX NIM master cannot be the same system as the management server.

- The updates will always be staged to a NIM master, and they will be put into a directory named `/export`. When creating the NIM environment, create a separate file system and mount it in `/export` to avoid using the root file system to store updates.
- Installation of an update that requires a license acceptance must be done manually on the AIX target system. There are cases in which an update contained in a TL or an SP can require license acceptance. The ability to accept a license is not supported from the user interface and must be performed by installing the file set through the System Management Interface Tool (SMIT) interface and responding yes to the query to accept new license agreements.

10.15 Scheduling updates

Whenever you create a task within IBM Systems Director including checking for updates and installing updates, after you create the task you are asked whether you want to run the update now or whether you want to schedule the task to run at another time (Figure 10-53).

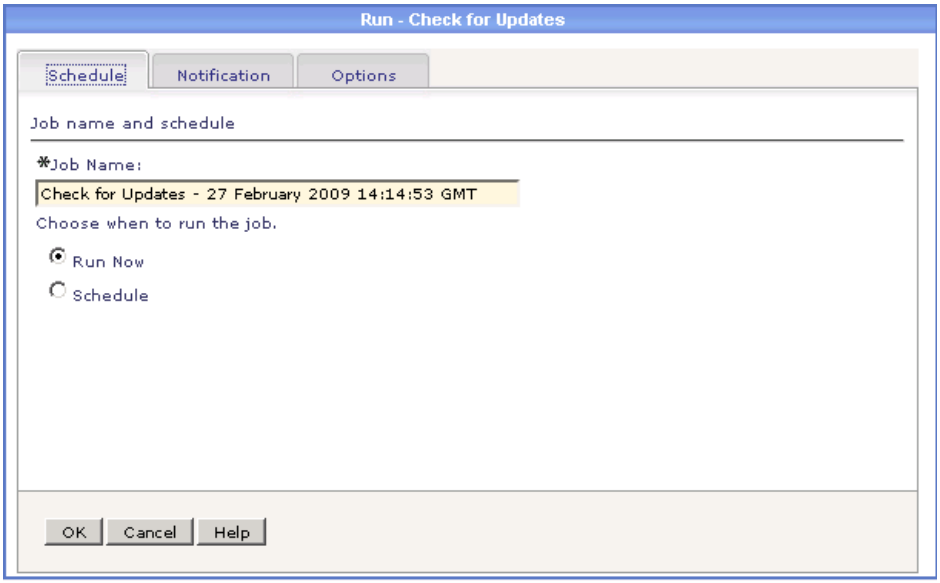


Figure 10-53 Schedule tasks view

When you select **Schedule** and click **OK** you will be required to enter the details shown in Figure 10-54.

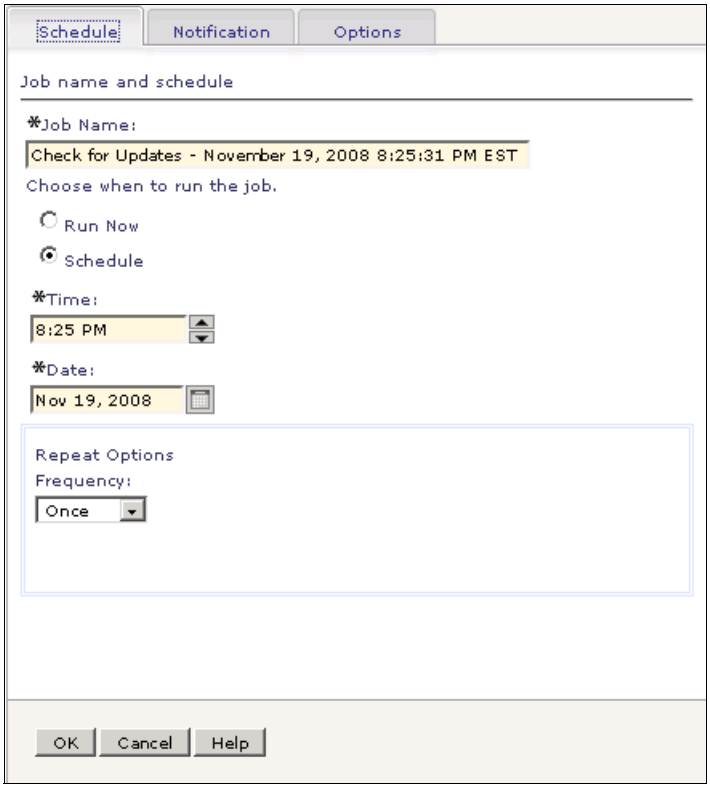


Figure 10-54 Schedule update manager job

You must enter the time that you want the update to run, the date when you want the update to run, and whether you must repeat this job. select from the following options:

- Once
- Hourly
- Daily
- Weekly
- Monthly
- Yearly
- Custom

As this is a code update you would select **Once** here, as the update only must be run once.

10.15.1 Status notifications

To be notified if there are any problems during the task execution there is an option within the window, as shown in Figure 10-55.

Figure 10-55 Notification tab

After selecting your task run options (Run now or Schedule) click the **Notification** tab and you will see the notification options shown in Figure 10-56.

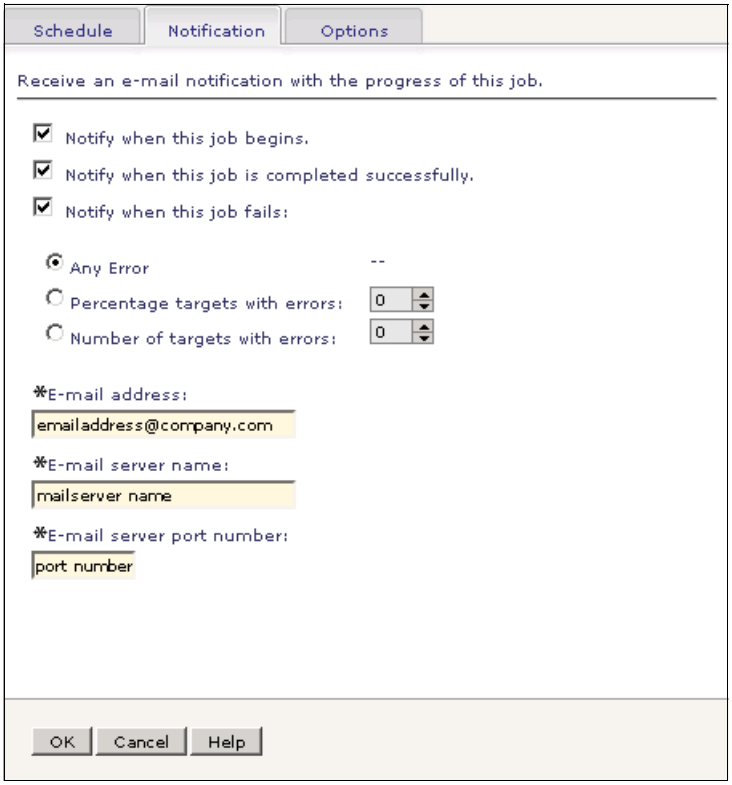


Figure 10-56 Notification options

10.15.2 Options when running or scheduling tasks

You can also select the options shown in Figure 10-57 from the Options tab.

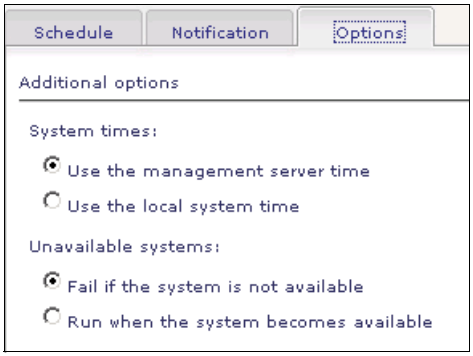


Figure 10-57 Options tab

10.16 Troubleshooting

For information about troubleshooting Update Manager go to the IBM Information Center at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.tbs_6.1/fqm0_r_tbs_um_general.html

11

Remote Access

In IBM Systems Director 6.1 the term *remote access* refers to a number of capabilities. Using the Remote Access plug-in you can perform a file transfer between two systems, as well as gain access to managed systems using both full-window and command-line modes. You can also launch a browser against any managed system that is running a Web server.

This chapter contains the following topics:

11.1 File transfer

File transfer is used to send files from one system to another and to synchronize files, directories, or drives. The file transfer task is a secure alternative to File Transfer Protocol (FTP) and works much as it did in Director 5.

You can transfer individual files and directories between the following systems:

- The browser system and the management server
- The browser system and a managed system
- The management server and a managed system

You cannot transfer files between two systems if neither is the management server nor the browser system. However, you can transfer a file from one system to the management server or browser system, and then transfer that file to another system (that is, a two-step transfer).

Particular care should be taken when synchronizing directories to ensure that files are not deleted accidentally. The synchronization process *deletes the entire contents of the target directory*, replacing those contents with files from the source directory. As a result, any files in the target directory that have different names from those in the source directory will be gone after synchronization.

In Figure 11-1 we see both source and target directories set up and ready for synchronization. Notice that the directory names themselves do not need to match, although you will get a warning message if this is the case.

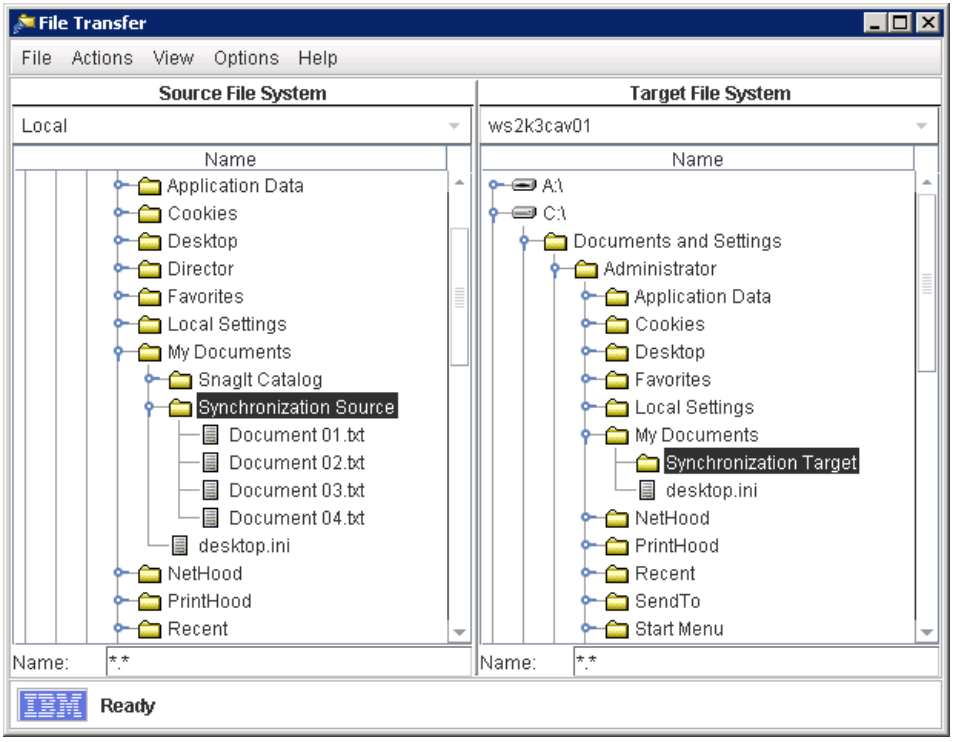


Figure 11-1 File transfer function ready to perform a directory synchronization

By right-clicking the **Synchronization Target** directory (Figure 11-1 on page 517) and selecting **Synchronize from Source** you can replace the existing content of the target directory (in this case empty) with the current content of the source directory (in this case, four text files). The result is shown in Figure 11-2. Note that the name of the directory itself is unchanged.

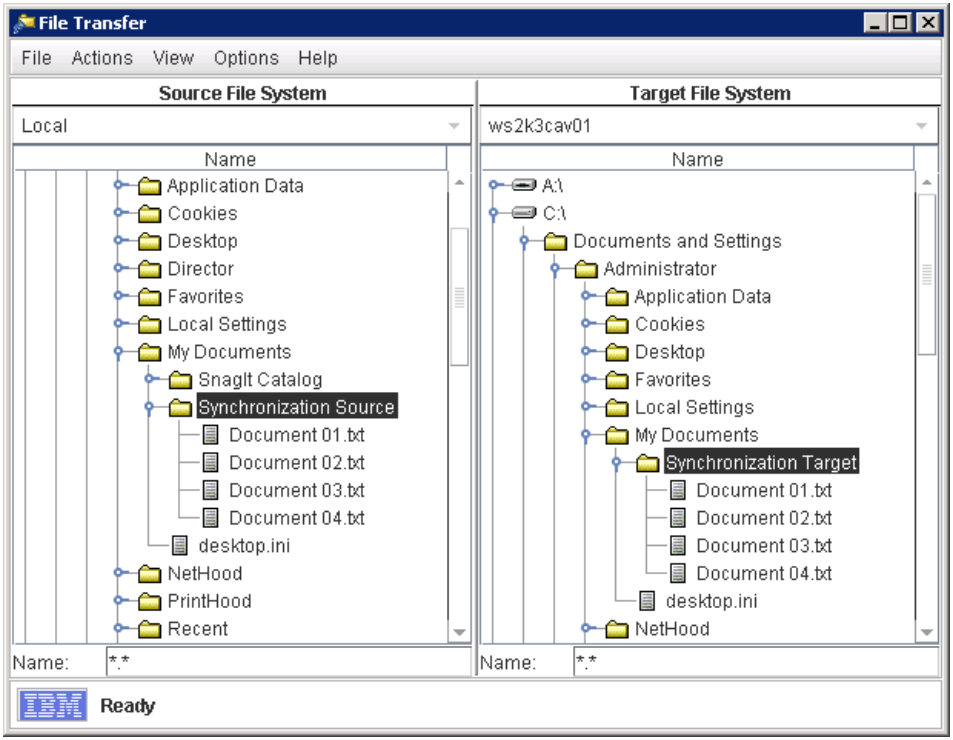


Figure 11-2 After directory synchronization, contents are identical

Before synchronization takes place you may see a warning message stating that this action could delete some files and directories on the target system. Verify that this is what you intend before clicking **Yes** since these changes cannot be undone.

11.2 Hardware command line

The hardware command line function, also know as IBM Management Processor Command-Line Interface (MPCLI), is run from an established remote session. MPCLI provides system management functions from a command-line interface (CLI) that connects to a service processor, such as a Remote Supervisor

Adapter (RSA). Using MPCLI, you can access and set a wide range of information about the health, configuration, communication, and state of your system. These functions are immediately available after you make a connection to a service processor.

Using the hardware command-line function in IBM Systems Director is very similar to using the remote command line function, as described in 11.3, “Remote command line” on page 521. When you click **Hardware Command Line** in the Remote Access page of the Systems Director Web console you are presented with a list of legal targets for this function. Legal targets are service processors on IBM Netfinity, xSeries, and System x servers, including Baseboard Management Controller (BMC), Advanced System Management Adapter (ASMA), and RSA family service processors (but not BladeCenter AMMs).

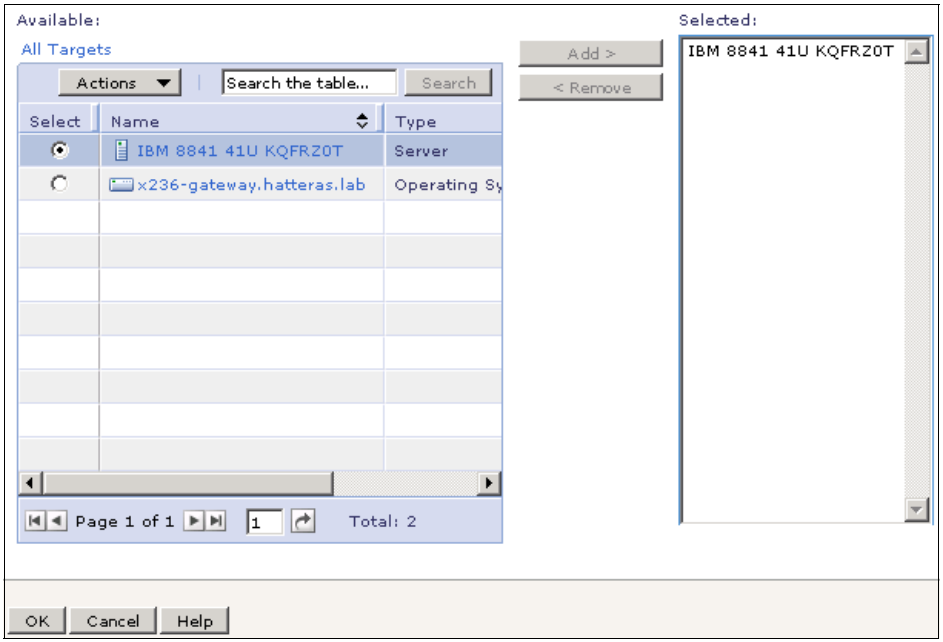


Figure 11-3 Target selection for hardware command line with RSA II system selected

Once you choose a target from the Available list and add it to the Selected list, as shown in Figure 11-3 on page 519, click **OK** to finish launching the hardware command-line session.

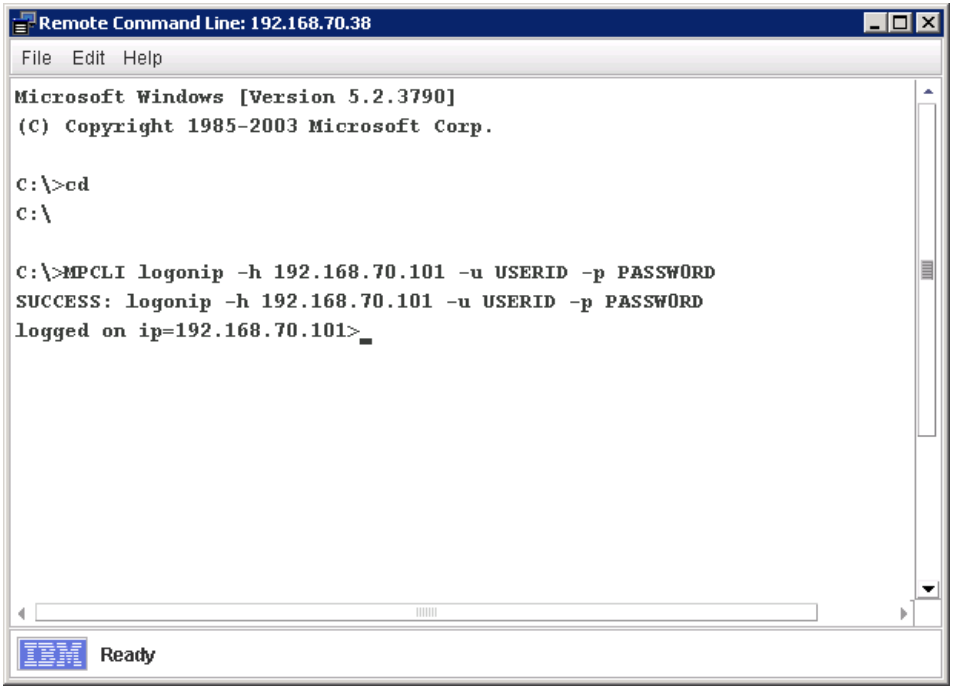


Figure 11-4 Remote Command Line window with MPCLI invoked against an RSA

In addition to opening a command line window targeting the appropriate service processor, you will see the hardware command line function automatically log into the service processor and initiate an MPCLI session, as shown in Figure 11-4.

Important: As you can see in Figure 11-4, this function opens a command-line window that makes the service processor login credentials visible to the user. Therefore, careful consideration should be given when deciding which users or roles are allowed to use the Hardware Command Line function.

11.3 Remote command line

You can use the Remote Command Line window to establish a fully active command session with a system. The remote command line task initiates a command-line session with a target system and opens a window to display the session in the management console browser window.

Tip: This function is similar to the Remote Session task in Director 5.

Figure 11-5 shows a remote command line session open against a managed VMware ESX host. Any commands that can be entered at the local console will work from this remote session.

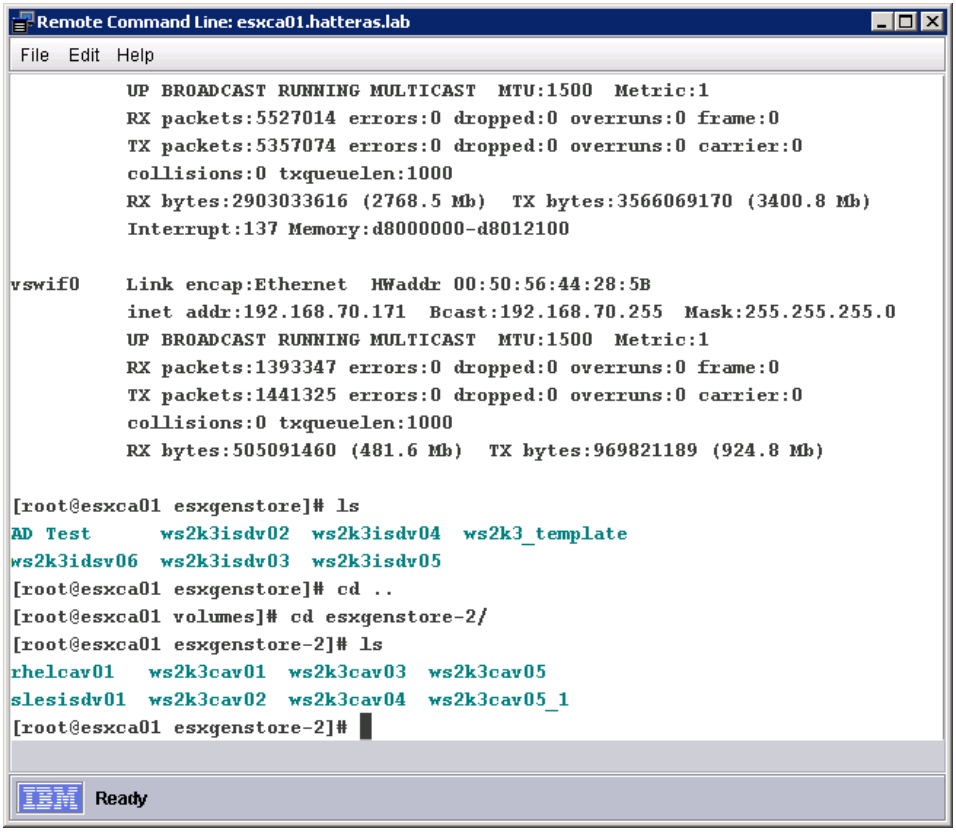


Figure 11-5 Remote command line session with a VMware ESX host

The first time that you attempt a remote command line session with a managed system from a given Web console machine you might see the error message shown in Figure 11-6.

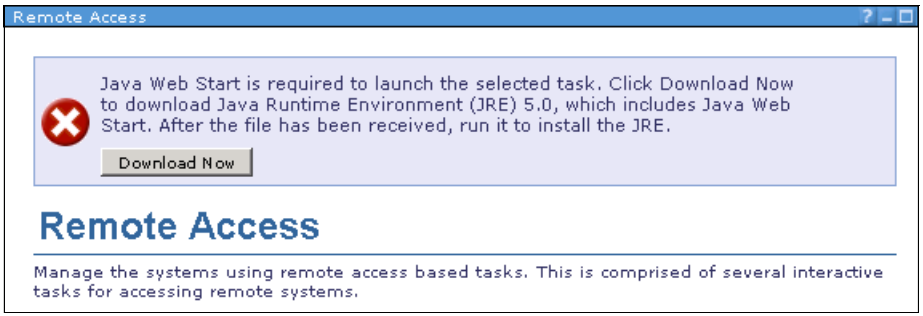


Figure 11-6 Error message displayed if Java Web Start is not already installed

If you see this message, click the **Download Now** button to have the Java Web Start installer automatically downloaded. Figure 11-7 shows the dialog box displayed when you click the **Download Now** button. Note that there is no choice for download destination. This is a 58.5 MB file and is downloaded to the system running the Systems Director Web interface (the exact location depends on your browser configuration).

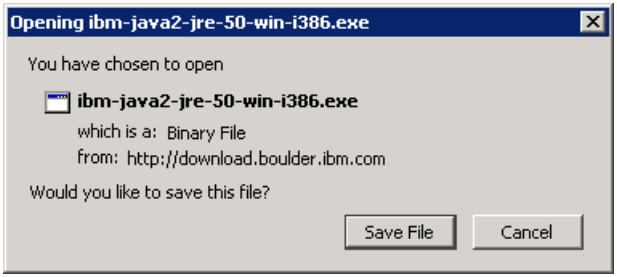


Figure 11-7 Dialog box allows download of Java Web Start

Locate the file and run the installer. After choosing the setup language and accepting the license agreement, leave the installation directory at the default location. You will see the window shown in Figure 11-8.

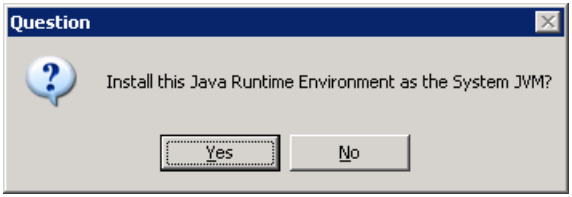


Figure 11-8 Dialog box for Java Web Start installer

Click **Yes**, then **Next** to install the IBM Runtime Environment for Java 2. Choose the Web browsers that you want to associate with the plug-in, as shown in Figure 11-9, then click **Finish**. You can now run the remote command line task or any other task that requires Java Web Start from the system on which the current Web console is running.

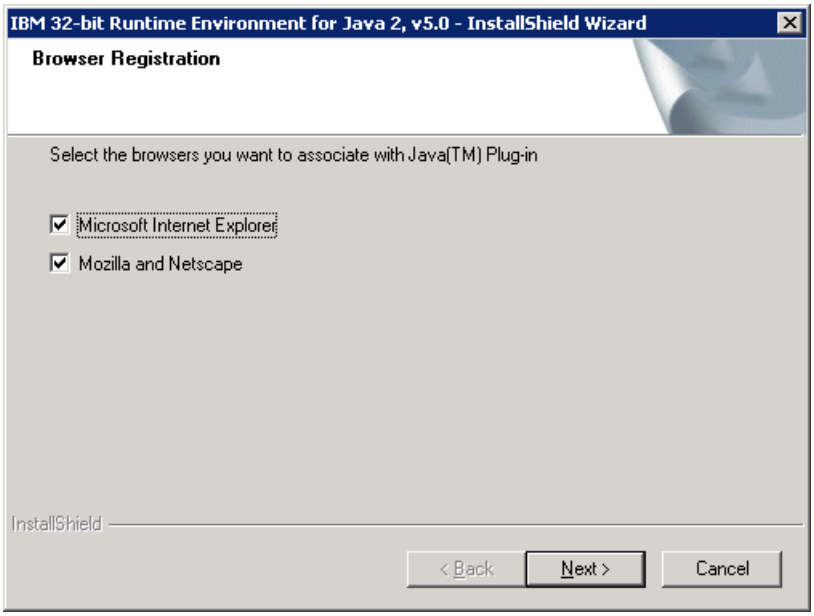


Figure 11-9 Dialog box offering choice of Java plug-in association

Once you complete the process above, you must restart the remote command line session. This time, the task launches and you will see the window shown in Figure 11-10. To prevent this window from appearing each time Java Web Start is needed for a task, check the box labeled **Do this automatically for files like this from now on**, as shown in Figure 11-10.

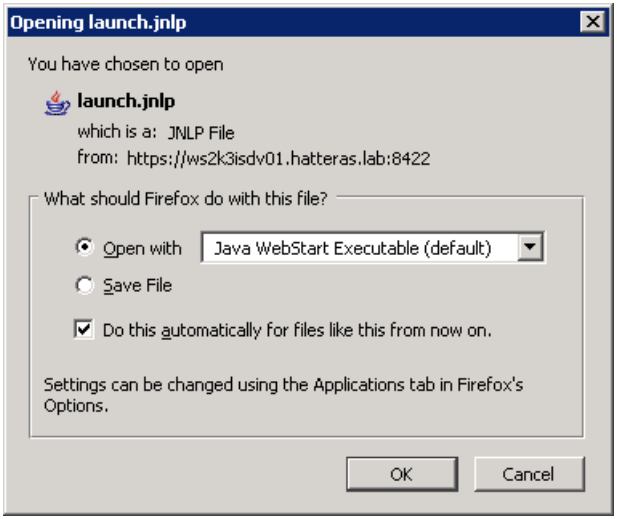


Figure 11-10 Dialog box to launch Java Web Start

The next step deals with security certificates, as shown in Figure 11-11. If desired, check the **Always allow content from this publisher** box in order to suppress this window on future attempts.

Figure 11-11 Digital certificate warning

Now that the certificate issue has been addressed, we see another security warning window, this one complaining about the application's digital signature, as shown in Figure 11-12. You can click the **More Information** link to see that the signature does indeed belong to IBM and that it has not expired. Select **Always trust content from this publisher** if you want to suppress future warnings of this type and click **Run**.

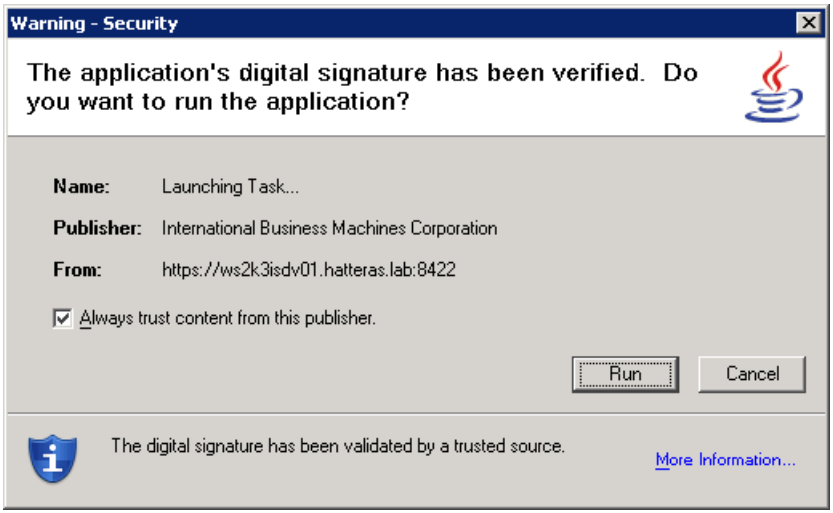


Figure 11-12 Digital signature warning

Before you are connected to the target system via remote command line access, you will likely see a number of inconsequential windows, including those shown in Figure 11-13, Figure 11-14 on page 526, and Figure 11-15 on page 526.

Figure 11-13 Momentary window shown when launching external tasks

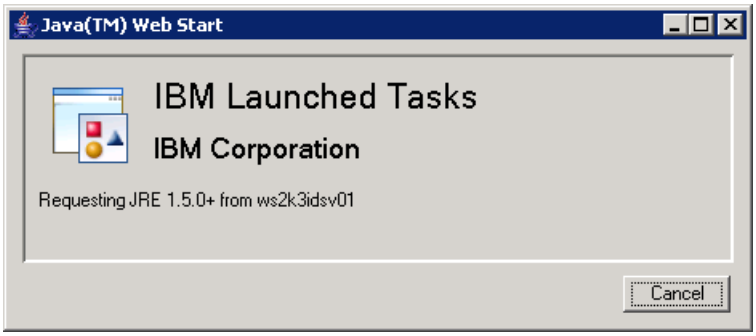


Figure 11-14 Java Web Start launch window

Although the first two windows are displayed only for a moment, the last one, shown in Figure 11-15, remains on your window and displays all the launched tasks that are currently open.

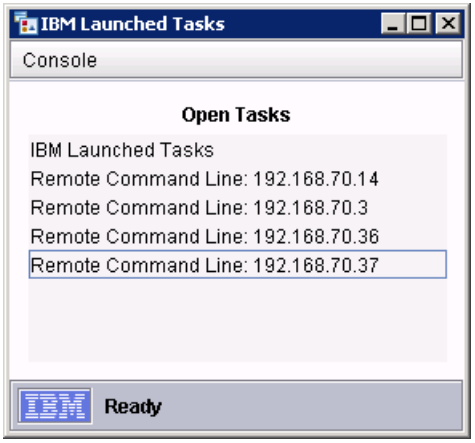


Figure 11-15 IBM Launched Tasks window from IBM Systems Director

Now that Java Web Start has been downloaded and installed, and both digital certificate and signature have been accepted, the remote command line session finally opens, as seen in Figure 11-16.

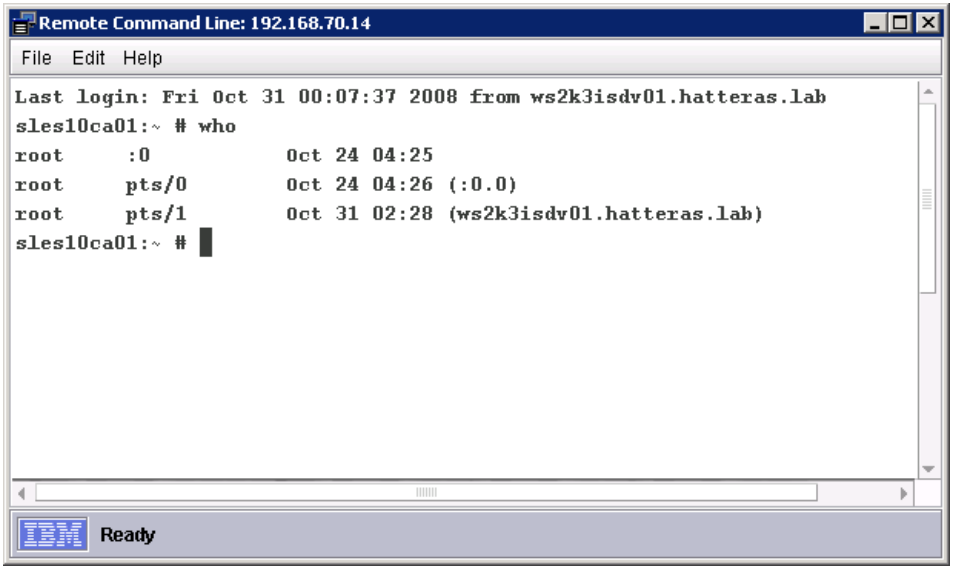


Figure 11-16 Remote command line session showing login with root level privilege

If a Windows system is the target of the remote command line operation, you would see a similar window, as shown in Figure 11-17.

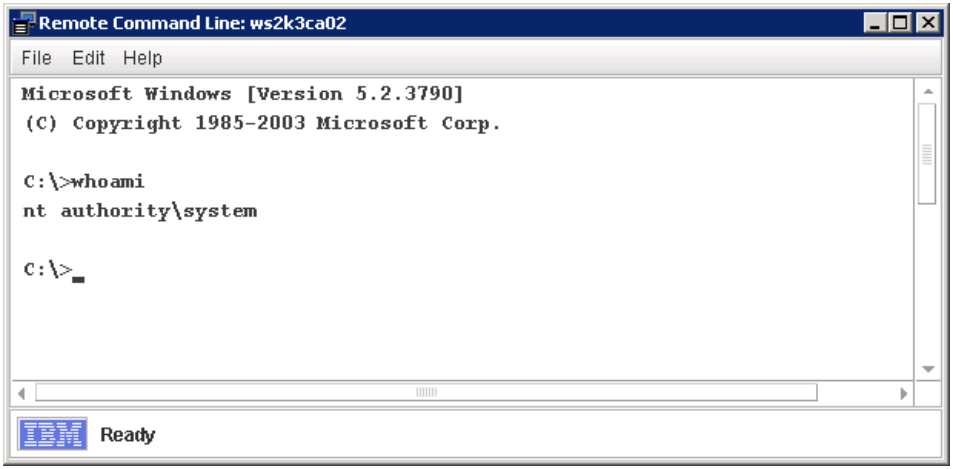


Figure 11-17 Remote command line session showing login with system level privilege

Important: Remote command line sessions initiated by IBM Systems Director automatically log in using whatever credentials were used to request access from the managed system. In many cases, this will be a privileged account (that is, root on UNIX or Linux systems). This is shown in Figure 11-16 for a Linux system (root level access) and Figure 11-17 for a Windows system (system level access).

Although this may be convenient, many organizations would consider this a serious security risk. Furthermore, the remote command line operation can be applied to any managed system, including agentless-managed systems, as long as access has been granted. Therefore, careful consideration should be given when deciding which users or roles are allowed to use the remote command line function.

You can have multiple remote command line sessions active at the same time. However, you can have only one active remote command line session through a management server to a single system at a time.

When you connect to a system that is running Windows, the remote command line uses IPC (native agent protocol) to ensure privacy of the data being exchanged between the management server and the managed endpoint. You cannot use the remote command line operation on an agentless managed Windows system unless it is configured to use Secure Shell (SSH), in which case, SSH is used.

For a system running UNIX or Linux, remote command line uses the SSH protocol. If the SSH server on the system does not respond, the remote command line attempts to connect using the Telnet protocol.

For a system running IBM i, the remote command line uses only the Telnet protocol.

By default, the remote command line uses TCP. If you disable support for TCP sessions, the remote command line uses UDP.

11.4 Launch Web browser

Use the Launch Web browser facility to access a system on which a Web server is running. The IP address that Systems Director has for the system is used to launch the Web browser using the HTTP protocol.

This can be particularly convenient for opening the service processor Web interface to an IBM BladeCenter AMM or System x RSA card. To initiate this

capability, select the **Launch Web Browser** option from the Remote Access Summary page.

This opens a page in which you can choose your intended target, exactly like the other remote control functions. The list of legal targets will include all systems that are running a Web server. As you can see in Figure 11-18, this includes IBM BladeCenter chassis, certain switch modules, RSA cards, and any Windows or Linux system running a Web service, such as an IBM Systems Director Server.

Note: Although the system is displayed as a legal target, attempting to open a Web browser against the management server on which you are currently running the Web console will fail and you may need to restart your Web console session.

In order to open the Web interface to an IBM BladeCenter management module, simply add a BladeCenter chassis managed object to the Selected side of the window, as shown in Figure 11-18, and click **OK**.

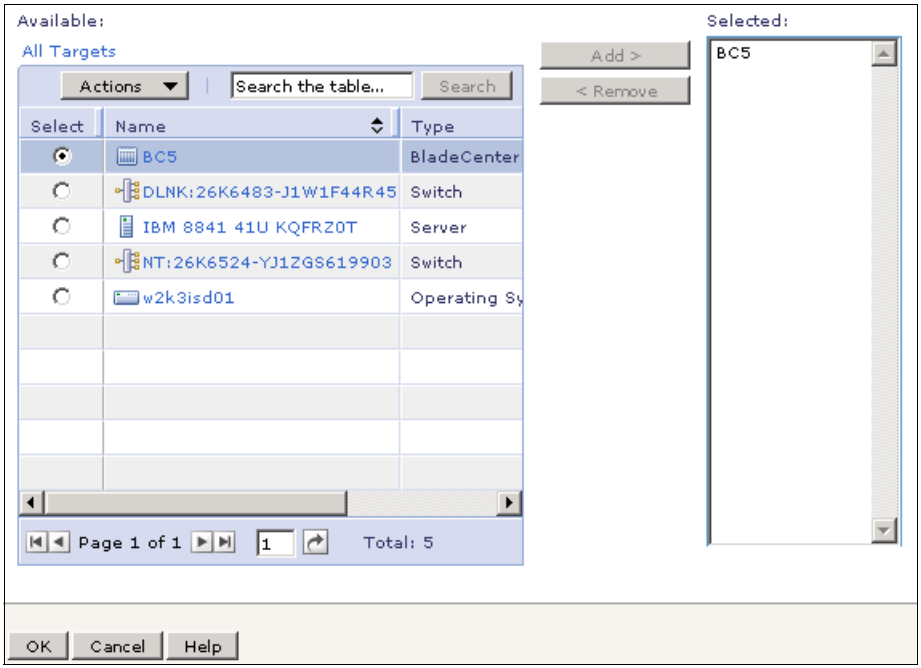


Figure 11-18 Target selection for launching Web browser with BladeCenter chassis selected

A new tab opens in your Web browser, containing the Web session to the logon window for the BladeCenter management module, as shown in Figure 11-19.

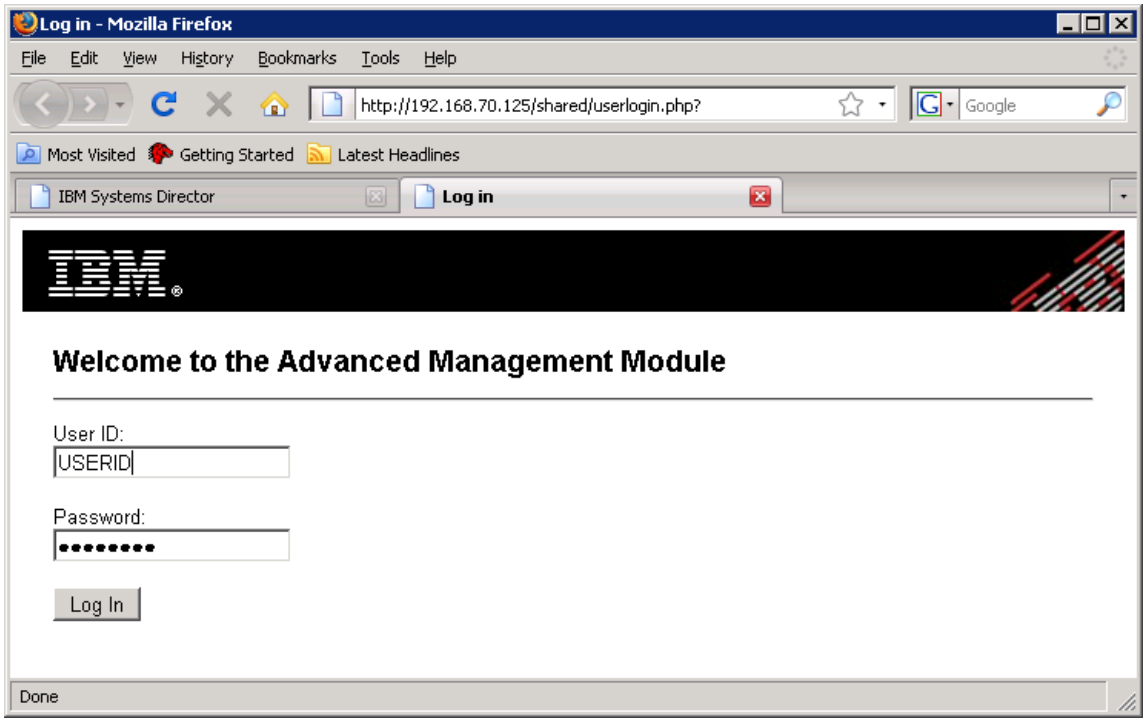


Figure 11-19 BladeCenter Advanced Management Module login page

Enter appropriate credentials and click **Log In** to begin a Web session with the management module, as shown in Figure 11-20.

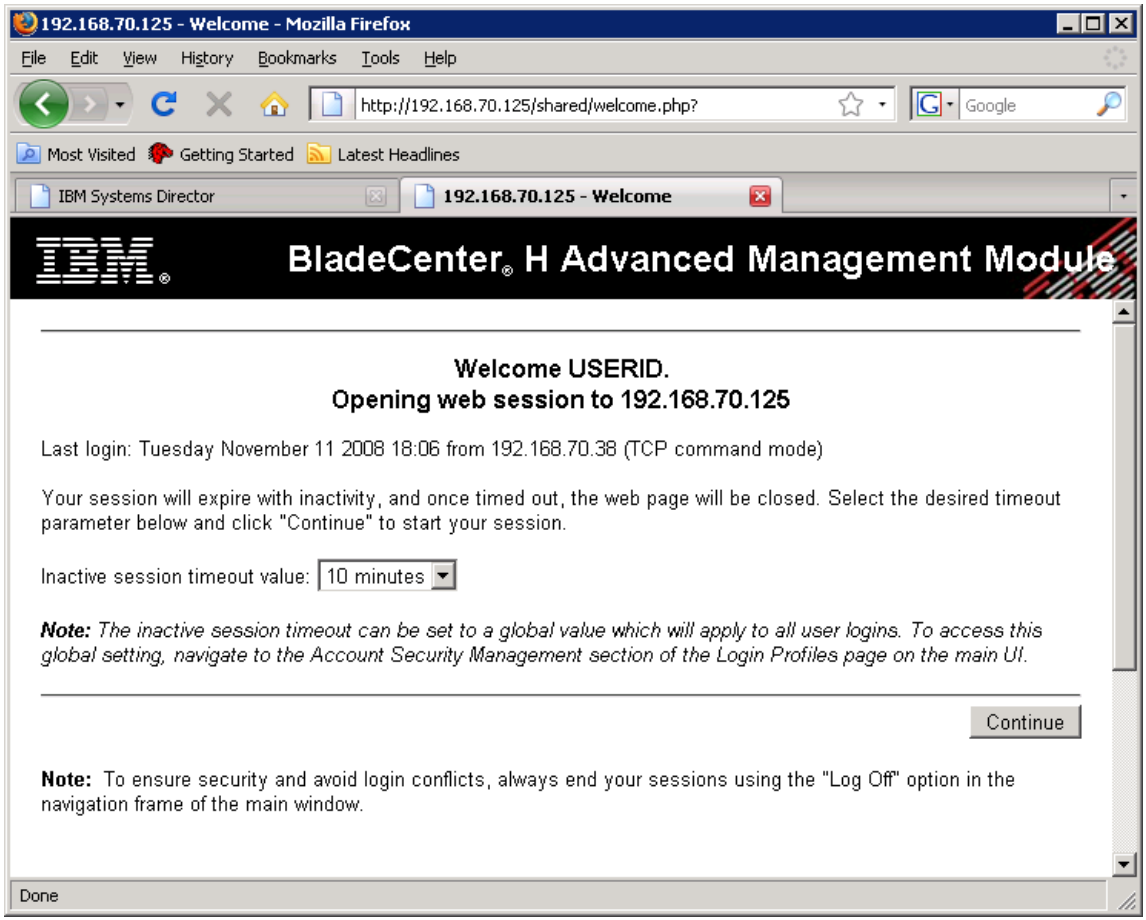


Figure 11-20 BladeCenter H Advanced Management Module Web interface

You can open a Web browser interface to an IBM System x RSA card using exactly the same process, or you can use the remote control operation discussed in the next section.

11.5 Remote control

Remote control establishes a full-window session to the remote system using a remote control application. The following types of remote control are supported:

- BladeCenter and RSA Remote Control (via browser interface)
- Microsoft Windows Remote Desktop Connection (RDC)
- Virtual Network Computing (VNC)

In order to use RDC or VNC, these applications must be installed and enabled on both ends of the connection (that is, on the target-managed system and on the system running the Systems Director Web console). More details about specific requirements are noted below for each method of remote control.

11.5.1 BladeCenter and RSA Remote Control

If the target of the remote control operation is an IBM Blade Server hardware platform or System x RSA card, then the service processor Web interface is invoked.

Note: Although it might make logical sense to target a BladeCenter chassis for this function, you will find that there is no chassis listed in the target selection window for this operation. This is because this function is a subset of the remote control operation and, strictly speaking, you cannot *remote control* a BladeCenter chassis. You can, however, remote control any of the blade servers installed in a chassis. Therefore, the individual blade server systems will be listed as legal targets for this function.

Tip: This has exactly the same effect as selecting the Launch Web Browser operation from the Remote Access Summary page and targeting an RSA card or BladeCenter chassis. See 11.4, “Launch Web browser” on page 528, for more about this.

You can perform all normal functions through this interface, including full keyboard video mouse (KVM) remote control. To initiate this capability, select the **Remote Control** option from the Remote Access Summary page.

This opens a page in which you can choose your intended target, exactly like the other remote control functions. The list of legal targets will include all Windows, AIX, and Linux OS systems, as well as service processors.

In order to open the Web interface to an IBM service processor, simply add a service processor managed object to the Selected side of the window, as shown in Figure 11-21, and click **OK**.

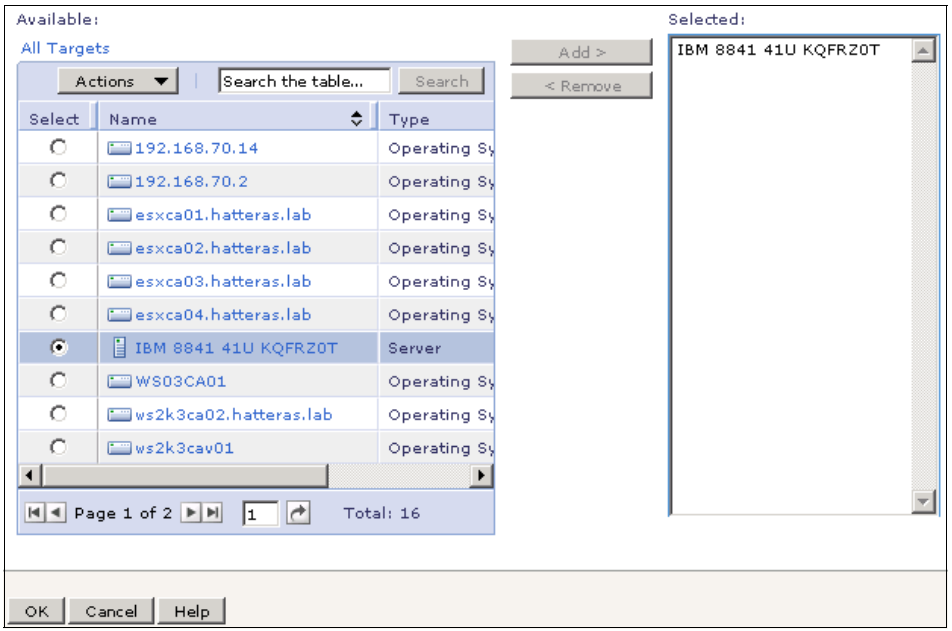


Figure 11-21 Target selection for remote control function with service processor selected

The first time that you connect to a given service processor in this manner you may see a dialog box asking for credentials, as shown in Figure 11-22.

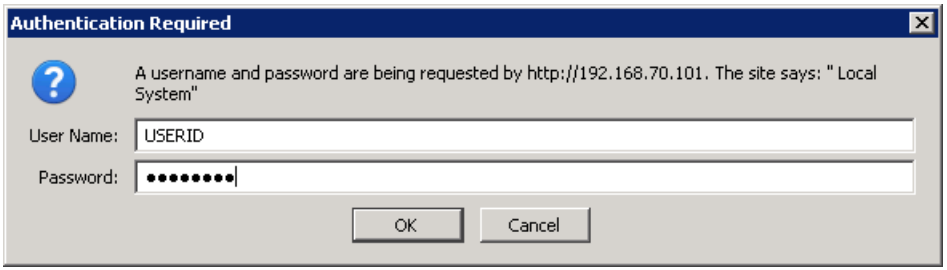


Figure 11-22 Request for credentials to access an IBM service processor

Once you supply the proper credentials, a new tab opens containing the Web session to the service processor. Figure 11-23 shows an example of using this function to connect to an RSA II service processor.

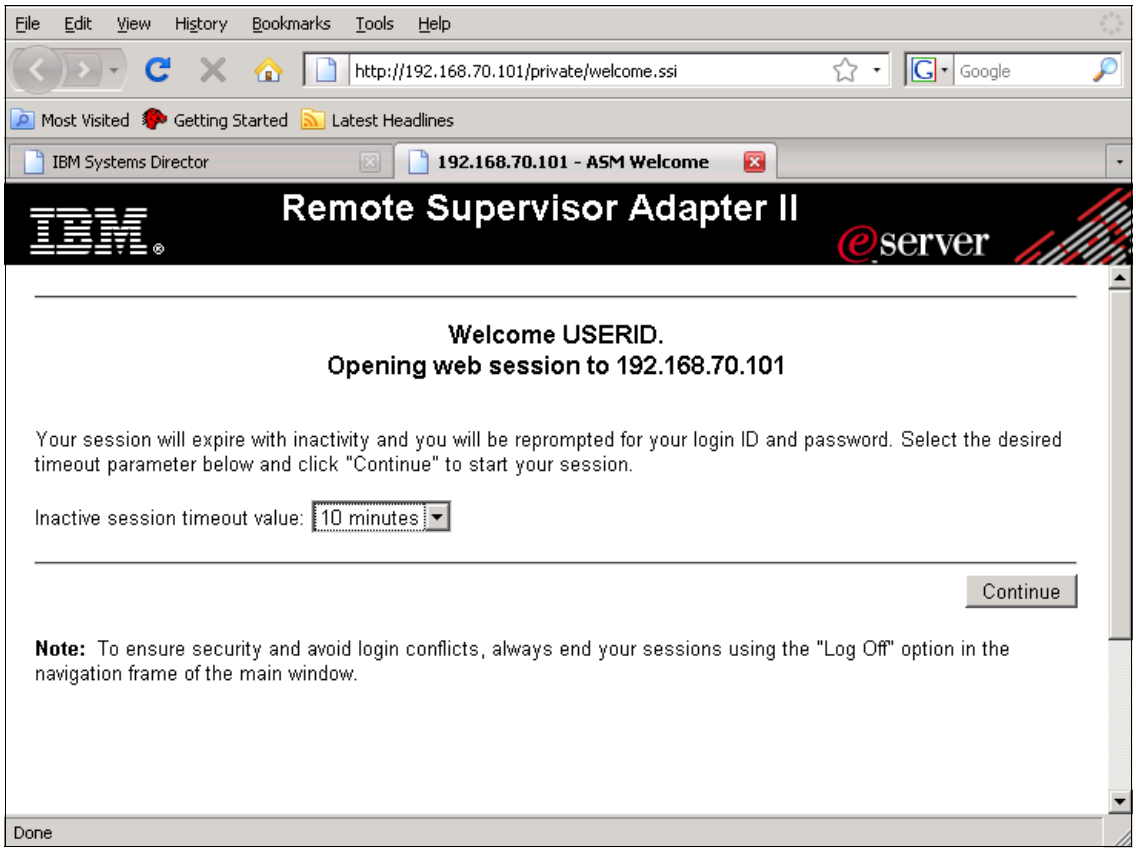


Figure 11-23 Web interface of an IBM RSA II service processor

11.5.2 Microsoft Windows Remote Desktop (RDP) connection

If the target of the remote control operation is a Windows operating system, then an RDP session is invoked. For this to work, Remote Desktop must be enabled on the target system (known as the *host* for this operation). To do this:

1. Right-click **My Computer** and select **Properties**.
2. Choose the **Remote** tab.

3. On this page make sure that the **Allow users to connect remotely to this computer** check box is selected, as shown in Figure 11-24.

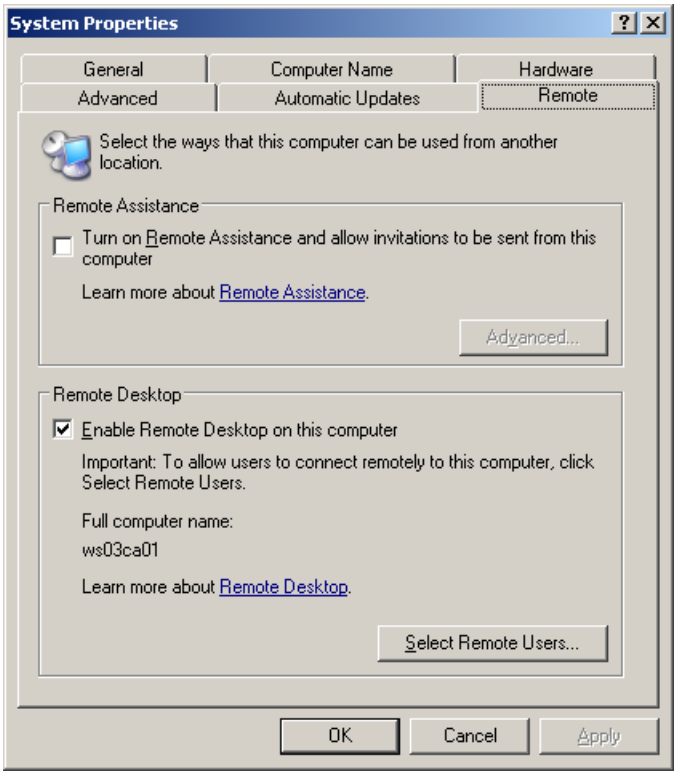


Figure 11-24 System Properties window showing Remote Desktop enabled

4. Click **OK** to save this setting and enable remote access.

If the system on which the management console is running (known as the client for this operation) is a Linux system, you must install the rdesktop and tsclient applications. The rdesktop package is the Linux implementation of RDP. The tsclient package is a wrapper for rdesktop that understands the RDP file format, sent by the management server to initiate the session. These are packages included with most distributions of Linux.

Finally, firewalls between the host and the client must allow RDP traffic on the default port of 5901. This includes Windows Firewall running on Windows XP and later versions of Microsoft operating systems.

Once all the enabling and configuring is complete, initiate this capability by selecting the **Remote Control** option from the Remote Access Summary page.

This opens a page in which you can choose your intended target, exactly like the other remote control functions. The list of legal targets will include all Windows, AIX, and Linux OS systems, as well as service processors.

To initiate an RDP session, add a Windows operating system to the Selected side of the window, as shown in Figure 11-25, and click **OK**.

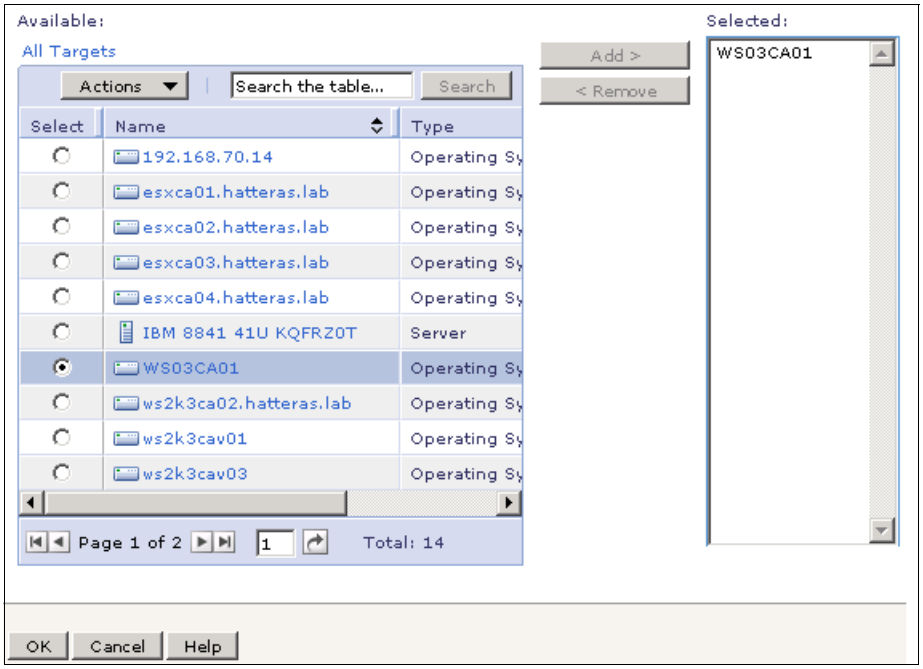


Figure 11-25 Target selection window for remote control function with Windows operating system selected

A dialog box opens asking how to treat the RDP file that has been received from the management server. The name of the file is in the format *ipaddress*`.rdp`, where *ipaddress* is the IP address of the target system. If using Internet Explorer, just click **Open** to proceed. A Remote Desktop session is started.

If running Firefox, you must specify the application that should be used to open the RDP file. Select **Open with** and check the **Do this automatically for files like this from now on** box to avoid having to take this step for subsequent sessions. Figure 11-26 shows this window.

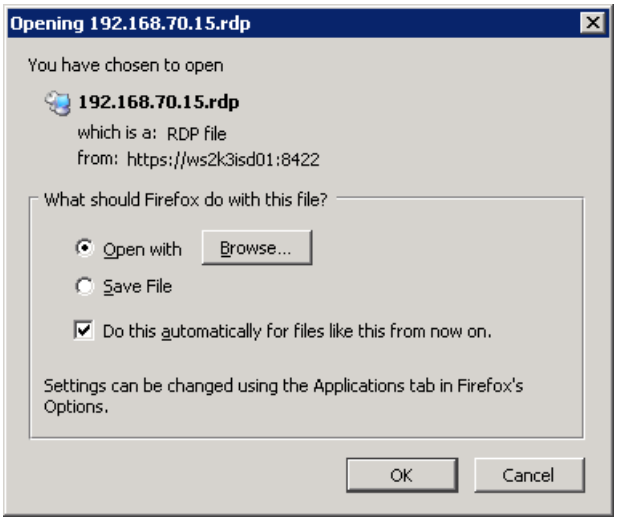


Figure 11-26 Firefox dialog box requesting application to open file

Since Firefox does not know which application to use to open an RDP file, you must specify the path and application to use.

For a Windows client, make sure that the **Open with** radio button is selected. Browse to `C:\WINDOWS\system32\mtsc.exe` and click **Open**. The dialog box updates and should look like Figure 11-27.

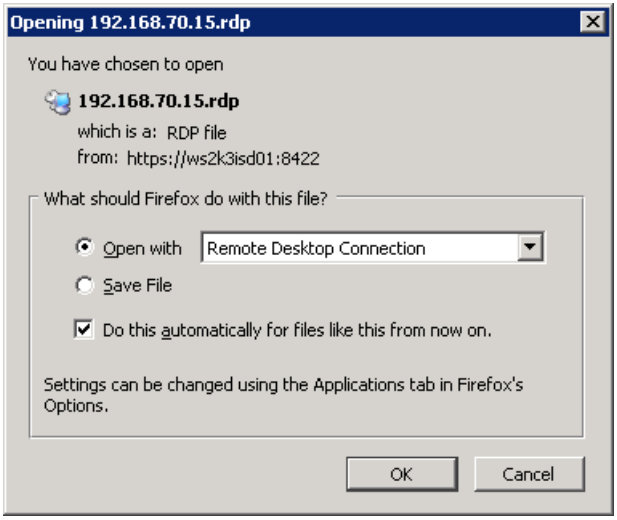


Figure 11-27 Firefox dialog box ready to launch RDC against a Windows target

Click **OK** to initiate a Windows Remote Desktop Connection session, as shown in Figure 11-28.

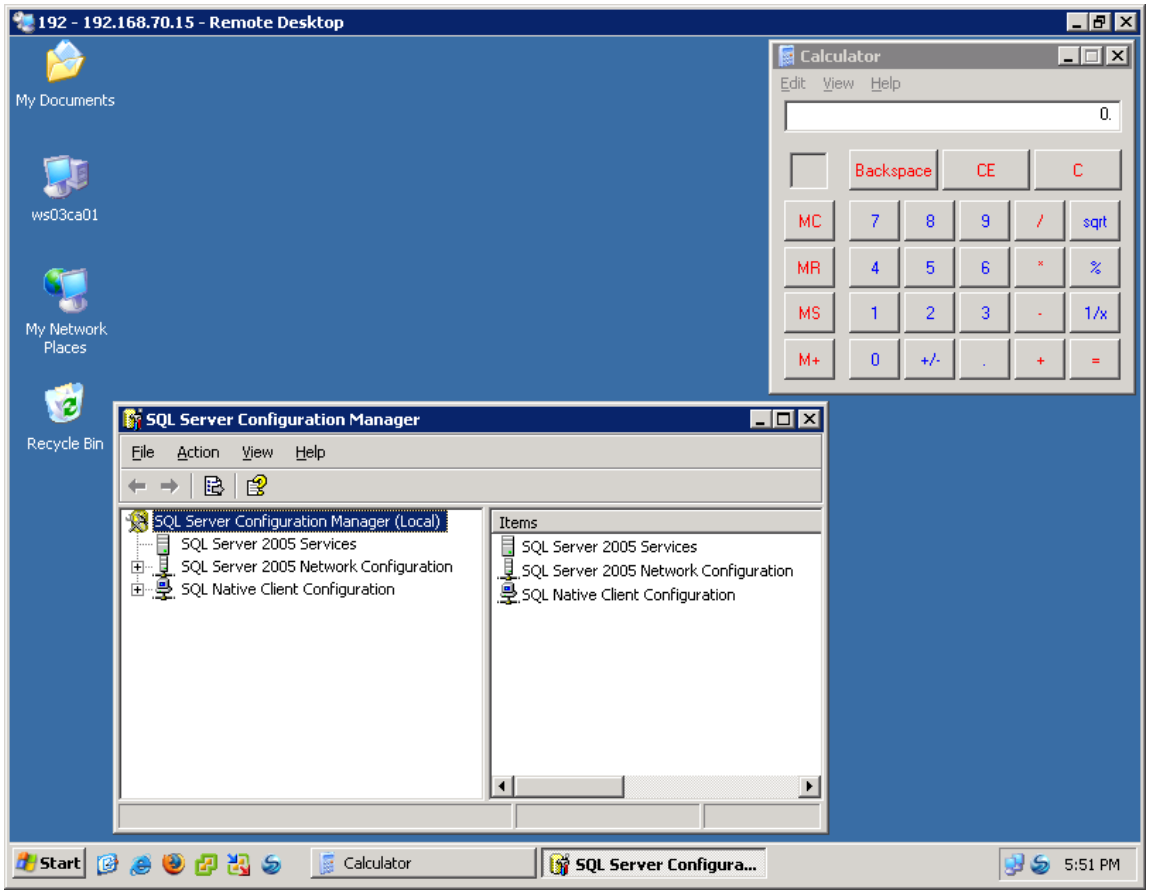


Figure 11-28 Windows Remote Desktop Connection

For a Linux client, you will see a very similar window. Make sure that the **Open with** radio button is selected. Browse to the location where tsclient is installed, usually `/usr/bin/tsclient`, and click **Open**. The dialog box updates and should look like Figure 11-29.

Tip: To see where tsclient is installed, use **`whereis tsclient`** from the command line.

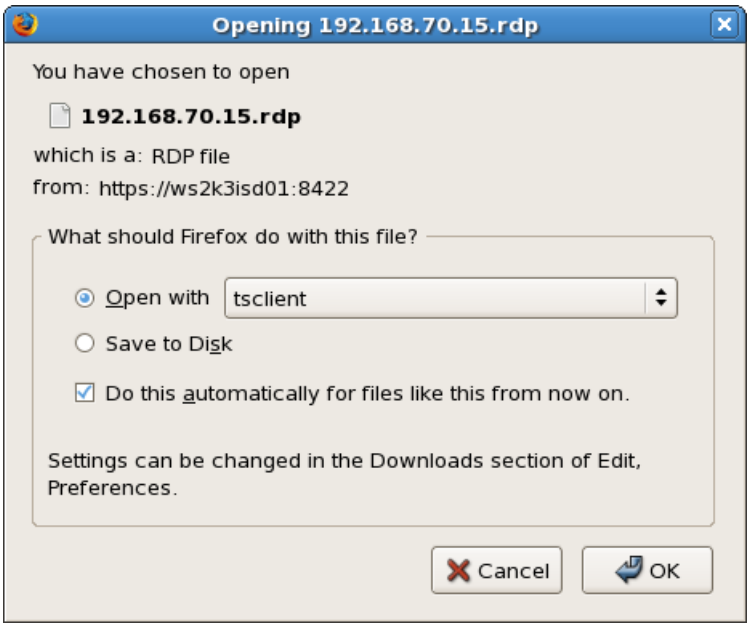


Figure 11-29 Firefox dialog box ready to launch VNC against a Windows target

Click **OK** to open the Terminal Server Client window, as shown in Figure 11-30.

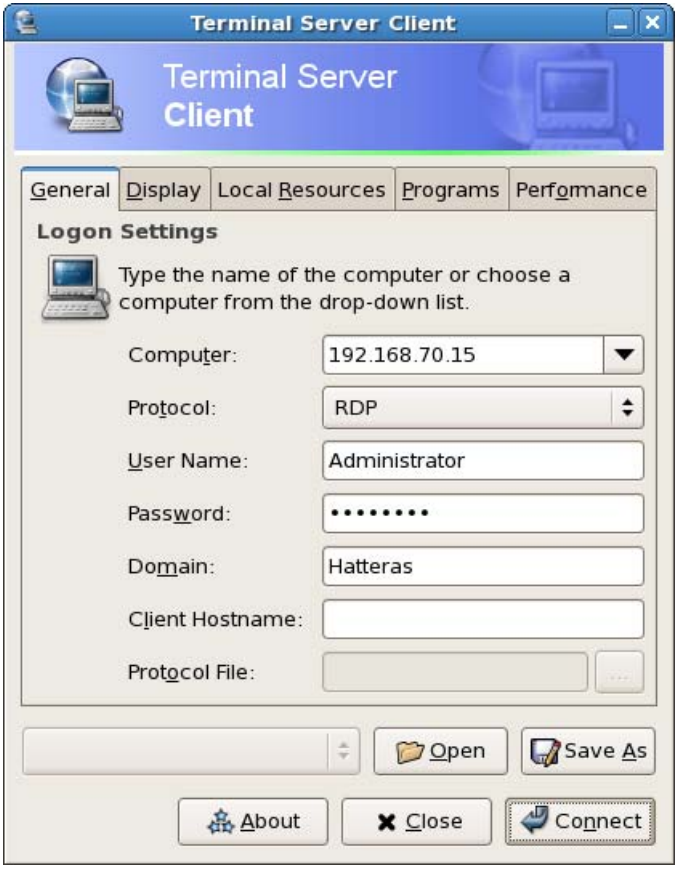


Figure 11-30 Terminal Server Client window

Although the IP address may be entered, you must specify a valid Windows user name and password (and domain if the user account is a domain account). Once these fields are complete, click **Connect** to initiate a remote control session with the target system, as shown in Figure 11-31.

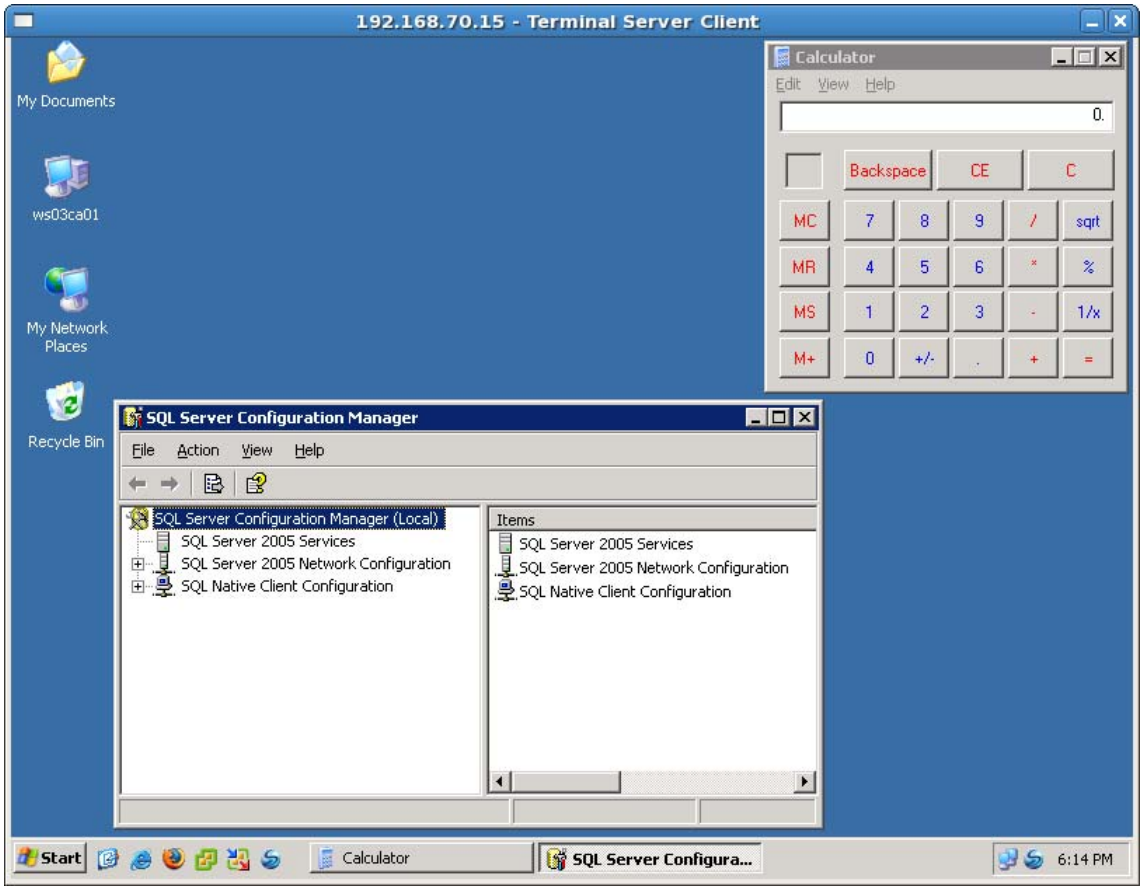


Figure 11-31 Remote control window of a Windows host from a Linux client

What happens in the background is that an RDP file is downloaded from the management server to the system on which the Web console is running. This file is opened by the client-side application (RDC for Windows and **`tsclient`** for AIX or Linux).

If the client is a Windows system, a *pure* Windows Remote Desktop Connection is established using the RDP protocol. If the client system is an AIX or Linux system, tsclient reads the RDP file and opens an appropriate connection using rdesktop, thereby establishing the remote control session against the target using the RDP protocol.

11.5.3 Virtual Network Computing

If the target of the remote control operation is an AIX or Linux operating system, then a VNC session is initiated. Whereas the RDP protocol is part of Windows and is enabled with a simple check box, the VNC protocol must be enabled on the target system (known as the *host* for this operation) by configuring vncserver.

Note: The use of remote control against a Linux or AIX target assumes that a graphical user interface (GUI) is installed and running on the target. Although this might be fairly common for desktop systems running Linux, many corporate users choose not to enable a GUI on their AIX or Linux servers.

Since IBM Systems Director uses only port 5901 for remote control, and since this corresponds to VNC display 1, vncserver must be configured to allow a remote connection to display 1.

Also, we recommend using vncpassword or some other authentication method for login when the VNC session initiates.

If the system on which the management console is running (known as the client for this operation) is a Linux system, you must install the rdesktop and tsclient applications. The rdesktop package is the Linux implementation of RDP. The tsclient package is a wrapper for rdesktop that understands the RDP file format, sent by the management server to initiate the session. These are packages included with most distributions of Linux.

If the client is a Windows system, you must install and configure the VNC Viewer application. To install VNC Viewer on the Web console system, go to the Remote Access Summary page and click **Set up remote control** in the Common Tasks pane. This opens another browser tab to the RealVNC home page:

`http://www.realvnc.com/`

Various editions of VNC are available here, including free editions for Windows and Linux, as well as a free VNC Viewer for Windows.

Finally, firewalls between the host and the client must allow RDP traffic on the default port of 5901. This includes Windows Firewall running on Windows XP and later versions of Microsoft operating systems if the client is a Windows system.

Once all the enabling and configuring is complete, initiate the remote control operation by selecting the **Remote Control** option from the Remote Access Summary page.

This opens a page in which you can choose your intended target, exactly like the other remote control functions. The list of legal targets will include all Windows, AIX, and Linux OS systems, as well as service processors.

To initiate a VNC session, add an AIX or Linux operating system to the Selected side of the window, as shown in Figure 11-32 and click **OK**.

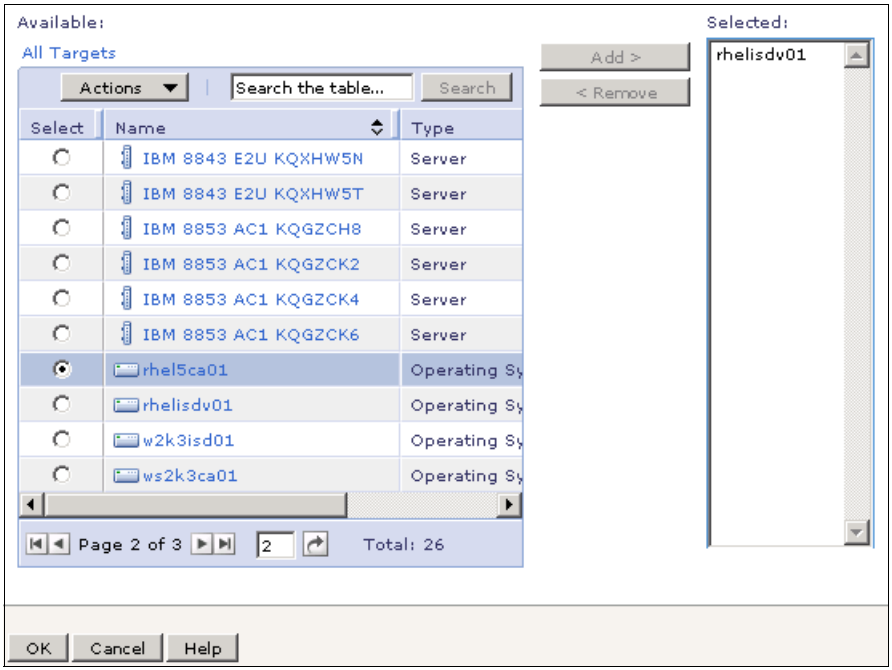


Figure 11-32 Target selection window for remote control function with Linux operating system selected

A dialog box opens asking how to treat the VNC file that has been received from the management server. The name of the file is in the format *ipaddress*.vnc, where *ipaddress* is the IP address of the target system.

If running Firefox on the client, you might need to specify the application that should be used to open the VNC file. Select **Open with** and check the **Do this automatically for files like this from now on** box to avoid having to take this step for subsequent sessions. Figure 11-33 shows this window.

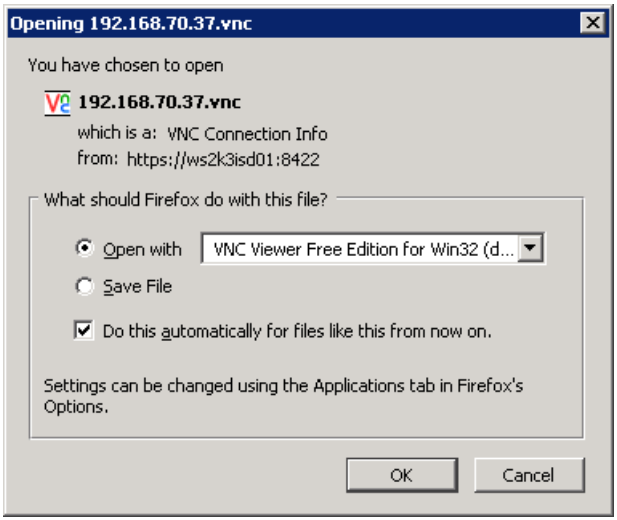


Figure 11-33 Firefox dialog box ready to launch VNC Viewer against a Linux target

Click **OK** to launch the VNC Viewer application and begin a remote control session with the target system.

If running Internet Explorer, the window will look a bit different, as shown in Figure 11-34.

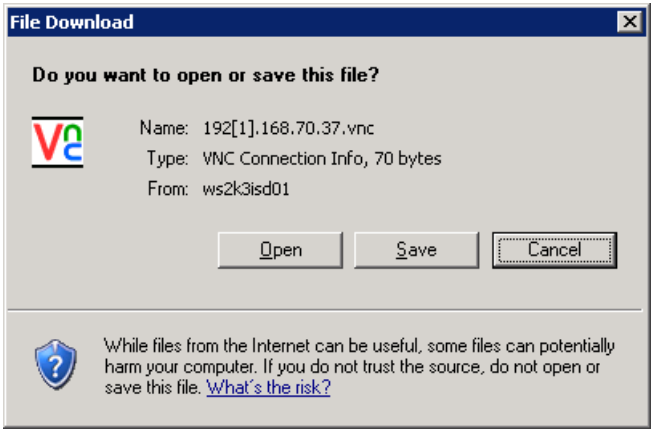


Figure 11-34 Internet Explorer dialog box ready to launch VNC Viewer against a Linux target

Click **Open** to launch the VNC Viewer application and begin a remote control session with the target system. If you have specified the use of **vncpassword** per our recommendation above, a small window opens asking for the VNC password, as shown in Figure 11-35.

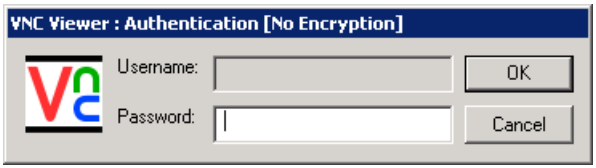


Figure 11-35 VNC Viewer password request window

If this window opens, enter the password specified by **vncpassword** and click **OK** to open a remote control session against the target using the VNC protocol, as shown in Figure 11-36.

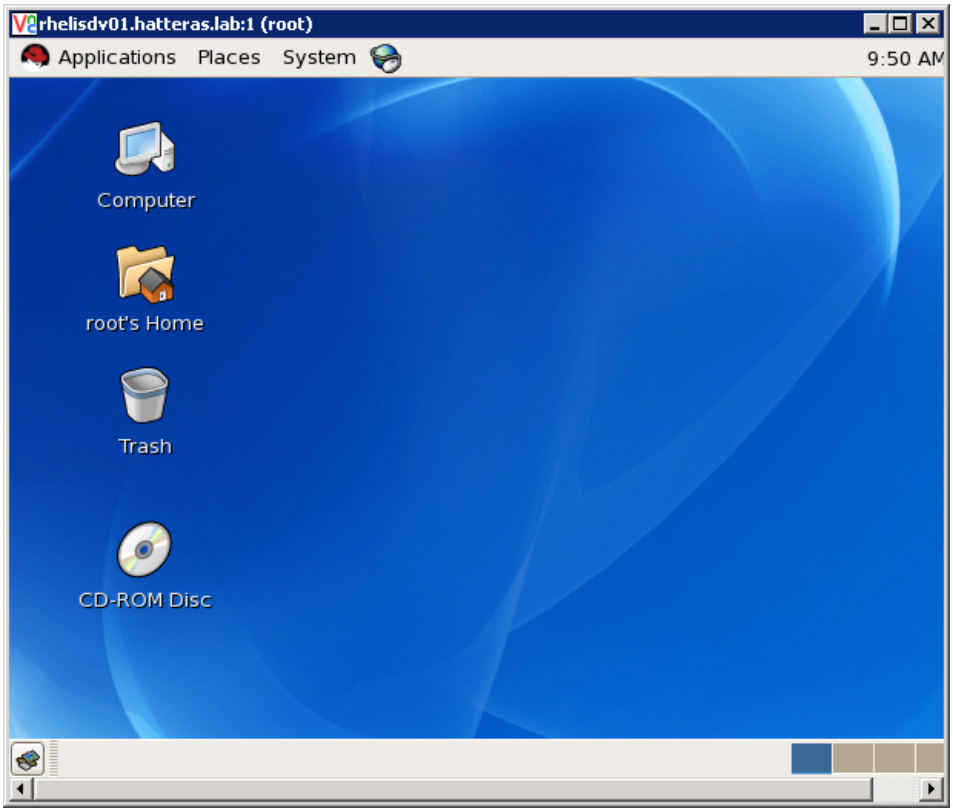


Figure 11-36 Remote control session with Linux managed system from Windows client

What happens in the background in this case is that a VNC file is downloaded from the management server to the system on which the Web console is running. This file is opened by the client-side application (VNC Viewer for Windows and **`tsclient`** for AIX or Linux), establishing the remote control session against the target using the VNC protocol.

12

Virtualization Manager

IBM Systems Director 6.1 has a solution to virtualized infrastructures with Virtualization Manager. The underlying technical differences across different hardware and software virtual solutions are hidden, allowing administrators to manage the overall virtualized infrastructure as a unified whole. You can use Virtualization Manager to provide various views of your environment and monitor the status and performance of virtual and physical machines.

In this chapter we discuss our experience using Virtualization Manager with our VMware, Xen, and Power Platform manager environment. We managed physical and virtual machines running Windows and Linux operating systems.

This chapter contains the following topics:

12.1 Overview

Virtualization Manager is part of the base suite of tools, as seen in Figure 12-1, to support discovery, health, and life-cycle tasks. This plug-in allows you to visualize and manage physical and virtual systems from a single console.

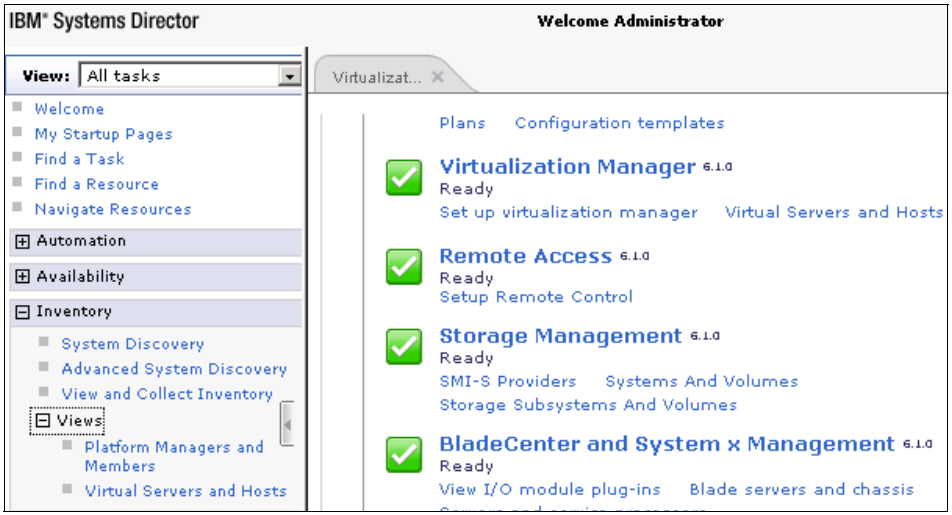


Figure 12-1 Launching Virtualization Manager from the Web console

Virtualization Manager includes support for several virtualized environments:

- Hardware Management Console (HMC)
- Integrated Virtualization Manager (IVM)
- Microsoft Virtual Server
- Virtual I/O Server
- VMware ESX Server
- VMware ESXi
- VMware VirtualCenter
- Xen virtualization
- z/VM virtualization

For specific details concerning the configuration, operation system support, and requirements refer to the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.plan_6.1/fqm0_r_operating_system_and_software_requirements.html

Figure 12-2 shows the main Virtualization Manager interface.

Figure 12-2 The new Virtualization Manager interface

Note: The terminology applied to the resources of different virtualization environments varies by vendor. Virtualization Manager uses the term *farm* to refer to a container of hosts and their associated virtual servers within which you can perform migration tasks. The VMware term *cluster* now encompasses the Virtualization Manager notion of a farm.

Features

Features and benefits of Virtualization Manager include:

- Consolidated management for different virtualized environments and tools, including HMC, IVM, Microsoft Virtual Server, VMware, and Xen virtualization.
- A topology viewer to relate the connection between physical and virtual resources, which can change dynamically across time. Two examples include:
  - A BladeCenter chassis with two ESX blades that are hosting virtual servers with Systems Director's Common Agent.
  - A Platform manager environment with the Power Server hosting virtual servers with Systems Director's Common Agent. You can see how this is shown in the topology in Figure 12-18.
- Tracking of alerts and system status for virtual resources to help isolate problems that affect them.
- Creation of automation plans based on events and actions from virtual and physical resources, such as relocating a virtual server based on critical hardware alerts.
- Life-cycle management tasks, such as creating additional virtual servers, editing virtual server resources, or relocating virtual servers to alternate physical hosts.

12.2 Components required for supported environments

This section describes other Virtualization Manager components and vendor software that must be installed for each supported virtualization environment. Prerequisites include the typical IBM Systems Director components Common Agent or Platform Agent. These are described in 1.3.2, "IBM Systems Director components" on page 11.

In this section we discuss the following topics:

Note: Microsoft Hyper-V is not supported in IBM Systems Director 6.1. The list of virtualization products supported by Virtualization Manager in the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.plan_6.1/fqm0_r_supported_virt_software_versions.html

12.2.1 VMware VirtualCenter

If you want to use Virtualization Manager to manage a VMware VirtualCenter environment, you must install the following on each VMware VirtualCenter system.

- Common Agent
- Virtualization Manager subagent for VMware VirtualCenter Server

The VMware VirtualCenter client should also be installed on any management console from which an administrator will remotely access the management server and perform Virtualization Manager tasks. This allows IBM Systems Director to open the VirtualCenter management interface to perform tasks that cannot be performed from within IBM Systems Director Console. Figure 12-3 shows how a Virtual Center environment is represented in the topology view.

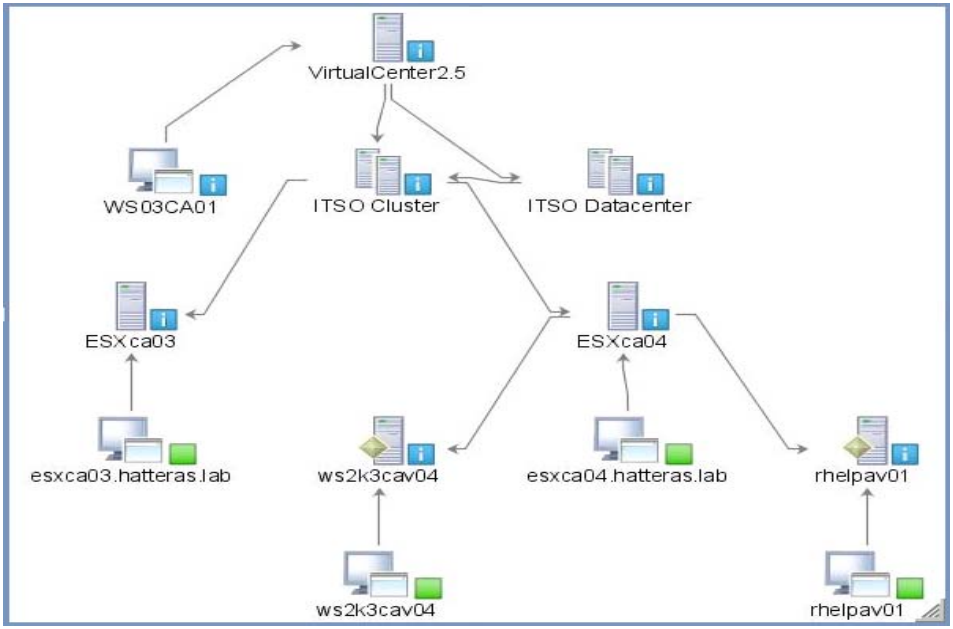


Figure 12-3 VirtualCenter, ESX, and guest OS represented in IBM Systems Director

For each VMware ESX server managed by VirtualCenter, install IBM Systems Director Common Agent. Figure 12-4 shows what components must be installed and where.

Note: For any VirtualCenter Server Version 2.x instances in your environment, you must install VMware VirtualCenter Web Services prior to installing the Virtualization Manager Agent.

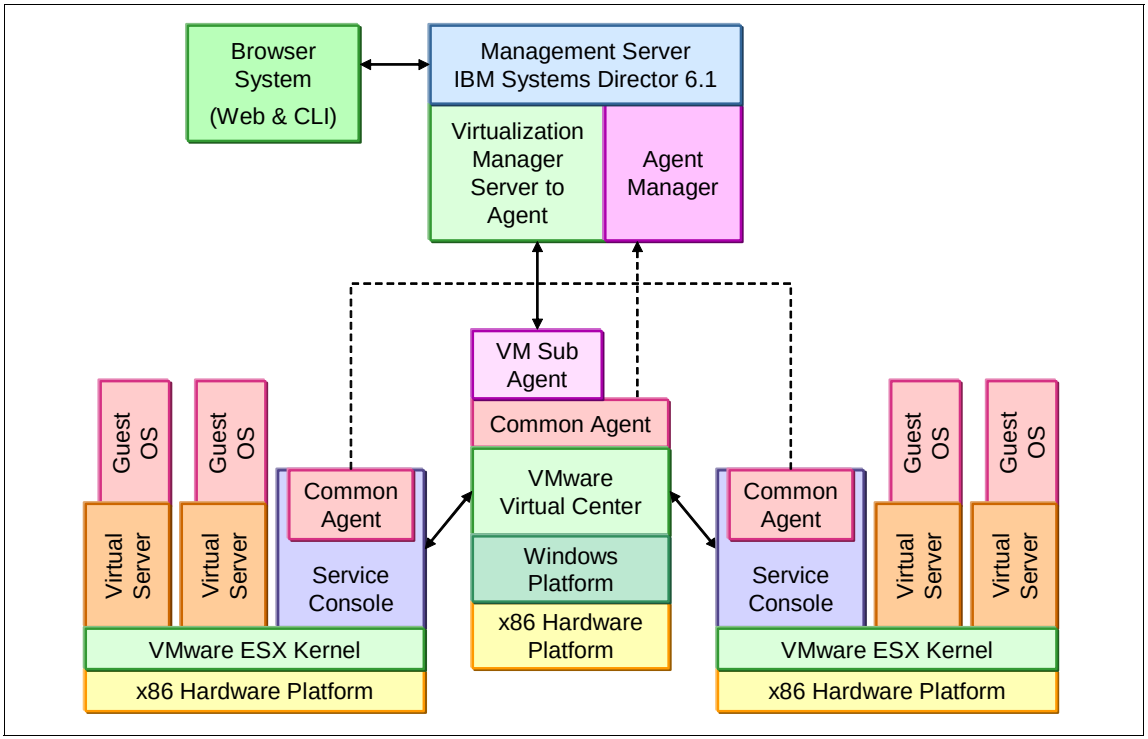


Figure 12-4 ESX and VirtualCenter configurations and the IBM products installed on each machine

Note: For VMware ESX environments, we recommend that you do *not* install the Virtualization Manager Agent on the ESX servers. Management is performed through VirtualCenter and not directly against the hosts.

VMware ESXi

VMware ESXi is only managed by VirtualCenter, since ESXi does not have an interactive console. You therefore cannot install any Common Agent or

Virtualization Manager component on these systems. Figure 12-5 shows what components must be installed when managing VMware ESXi hosts.

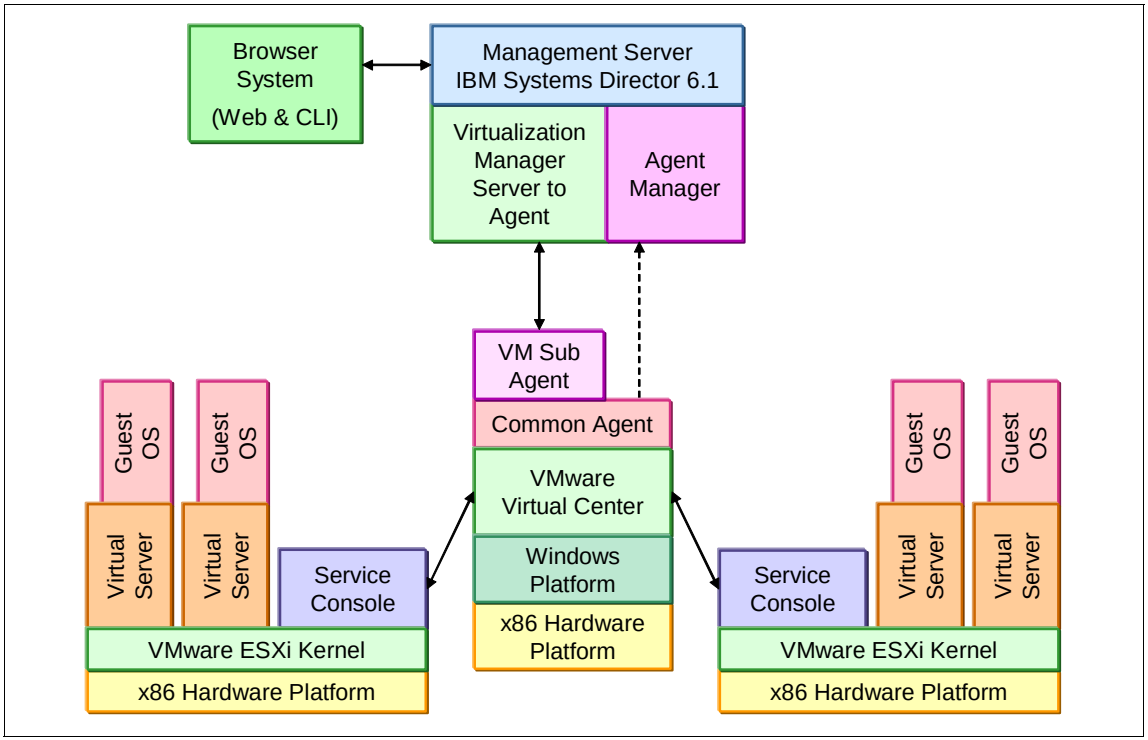


Figure 12-5 VMware ESXi with VirtualCenter managed by IBM Systems Director

Note: ESXi is only managed via VirtualCenter. IBM Systems Director does not install any Director Agent code in there. But hardware alerting can be reported from service processors devices to extend the high-availability process.

12.2.2 VMware ESX

If you want to use Virtualization Manager to manage a stand alone VMware ESX server environment (which means that you will not try to manage the ESX from a VirtualCenter), you must install the following on each VMware ESX Server system to be managed:

- Common Agent
- Virtualization Manager subagent for VMware ESX Server

No additional components must be installed. Figure 12-6 gives an example of how a VMware ESX server looks in the Virtual Servers and Hosts view.

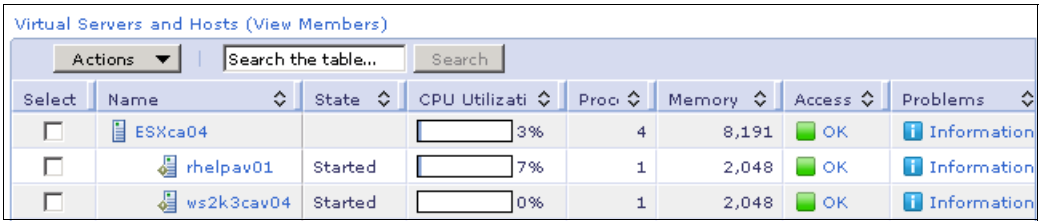


Figure 12-6 ESX stand alone with guest operating systems

Figure 12-7 shows what components must be installed and where they must be installed.

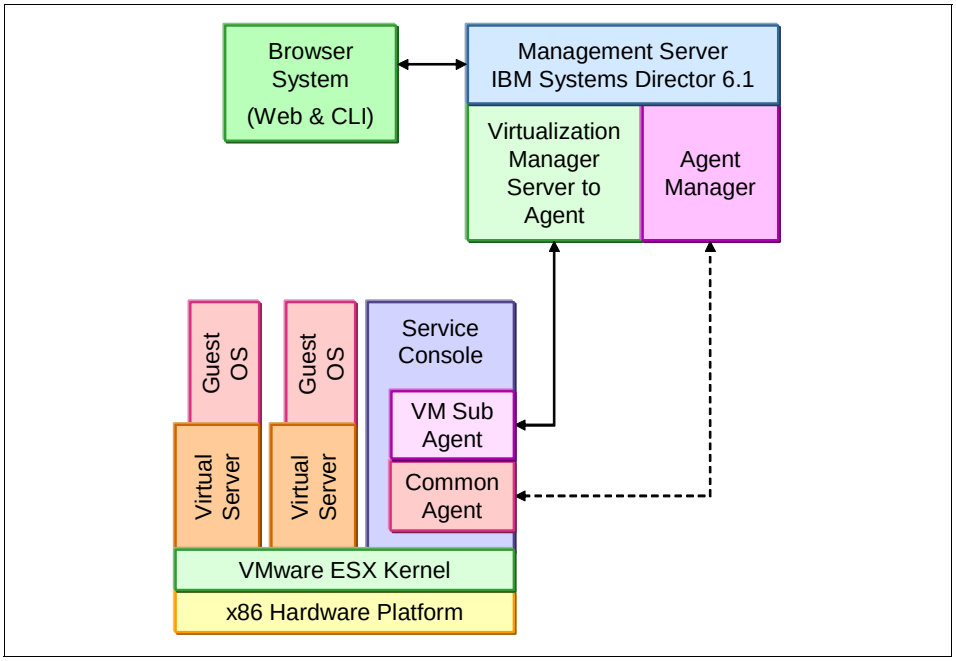


Figure 12-7 VMware ESX stand alone configuration

Note: Only the ESX servers not managed by VirtualCenter need the Virtualization Manager subagent. If you want to have the ESX server managed by VMware VirtualCenter only install the Common Agent in the ESX Service Console.

12.2.3 Microsoft Virtual Server

If you want to use Virtualization Manager to manage a Microsoft Virtual Server environment, you must install the following on each Microsoft Virtual Server system to be managed:

- Common Agent
- Virtualization Manager subagent for Microsoft Virtual Server

No additional components must be installed. Figure 12-8 shows what components must be installed on the different systems.

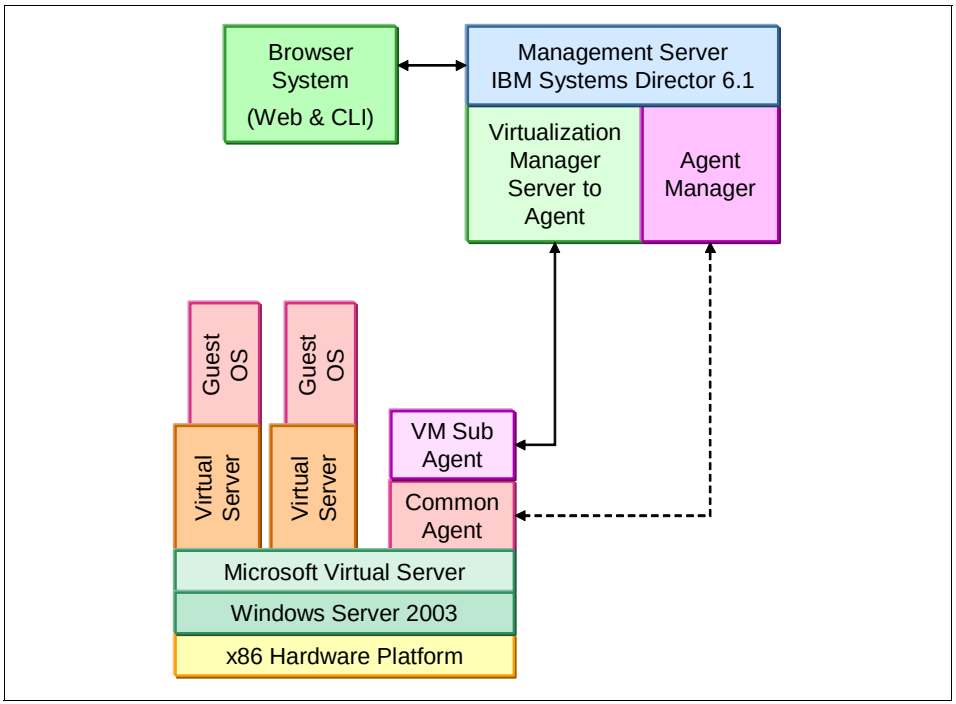


Figure 12-8 Common Agent and subagent installed in a Microsoft Virtual Server environment

12.2.4 Xen virtualization

If you want to use Virtualization Manager to manage a Xen virtualization environment, you must install Platform Agent on each managed system running Xen virtualization. (The full Common Agent is not required.)

The Platform Agent installer (dir5.20.31_coreservices_linux.sh) includes the Xen Common Information Model (CIM) provider code. There is no need to install two

products. However, if you uninstall the software, you must use two uninstall scripts: Virtualization Manager and then the IBM Systems Director Platform Agent uninstallers.

If you install a Platform Agent in a system without Xen installed, Platform Agent determines that the Xen CIM providers are not required and so does not install them. If you later install Xen, then we recommend that you uninstall Platform Agent and reinstall it to let the installer detect the Xen services and correctly install the Xen CIM providers.

No additional components must be installed. Figure 12-9 shows what components must be installed on the different systems.

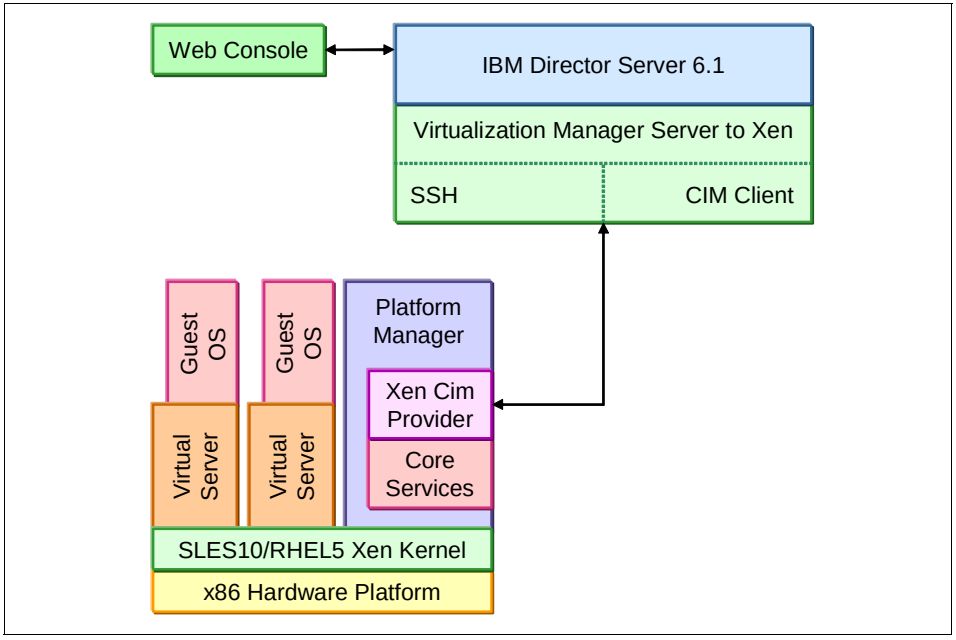


Figure 12-9 Platform Agent installed over Xen systems

The Xen resource feature in IBM Systems Director 6.1 provides an implementation of the new IBM Systems Director 6.1 inventory functions—farm and relocation extensions provided by the common infrastructure model for the Xen supported platforms. Other Xen features are mostly a port from Director 5.x functionality.

Figure 12-10 shows an example of an Xen SLES 10 system with its virtual servers, as seen in IBM Systems Director 6.1.

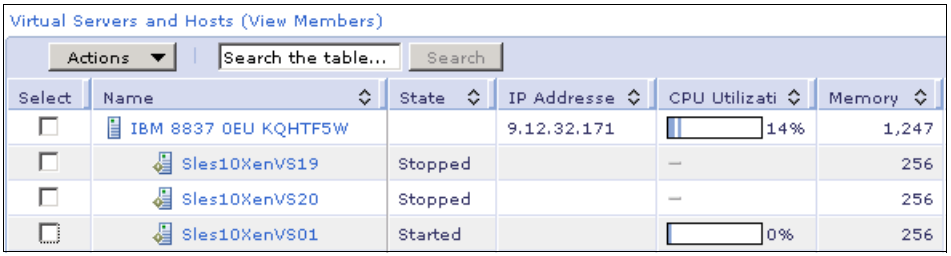


Figure 12-10 A Xen host with its virtual servers, managed by IBM Systems Director

12.2.5 IBM Power Systems virtualization

The IBM Power Systems resource feature provides the implementation for life-cycle tasks on virtual servers on a given host for HMC and IVM environments.

The IBM Power Systems resource feature uses a combination of CIM interfaces and proprietary command-line interfaces (HMC, IVM, and Virtual I/O Server (VIOS)) over a Secure Shell (SSH) access point to perform the systems management functions. The IBM Power Systems resource feature uses the Common CIM agent embedded (neither Common Agent nor Platform Agent) in the Director 6.1 time frame to orchestrate relocation for the relocation services only.

You can use the plug-in to:

- Manage the following Power Systems environments that might include IBM Power System5 and IBM Power System6 processor-based servers running AIX, IBM i, or Linux:
  - Power Systems managed by the Hardware Management Console
  - Power Systems managed by the Integrated Virtualization Manager
  - A Power Systems server with a single image
  - A Power Architecture BladeCenter server under the control of a BladeCenter management module
- Perform management tasks on systems that are under the control of the IBM Power Systems Platform managers, including managing power, creating virtual servers, editing virtual server resources, and relocating virtual servers between host systems.

- Perform operating system-specific management tasks that are available from the Systems Director Console for AIX and IBM i.
- Collect inventory of virtual storage and associated storage pools hosted by IBM i and used by client Power LPARs and iSCSI-attached BladeCenter blade and System x servers, providing intuitive viewing and management of those hosted servers.

The HMC configuration with Systems Director is represented in Figure 12-11

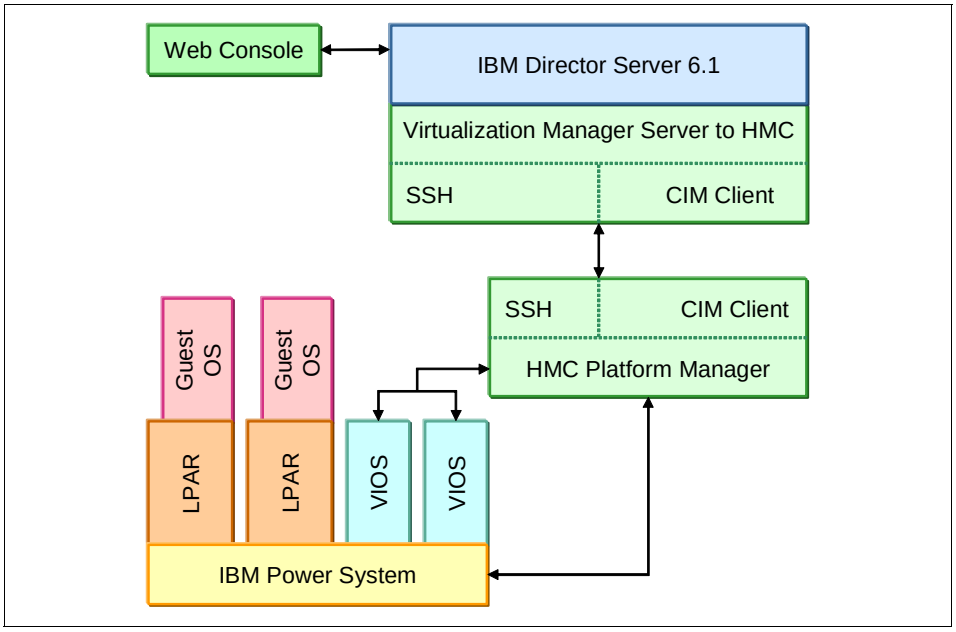


Figure 12-11 IBM Systems Director managing a HMC platform manager

In addition, each resource feature includes some form of extended discovery to discover additional physical and virtual resources.

IBM Systems Director 6.1 basic discovery will discover HMC, IVM, hosts (central electronic complexes (CECs)), and virtual servers (logical partitions (LPARs), including VIOS LPARs). The VSM IBM Power Systems resource feature extended discovery function interrogates the endpoint to discover additional physical and virtual resources managed by HMC or IVM, as shown in Figure 12-12.

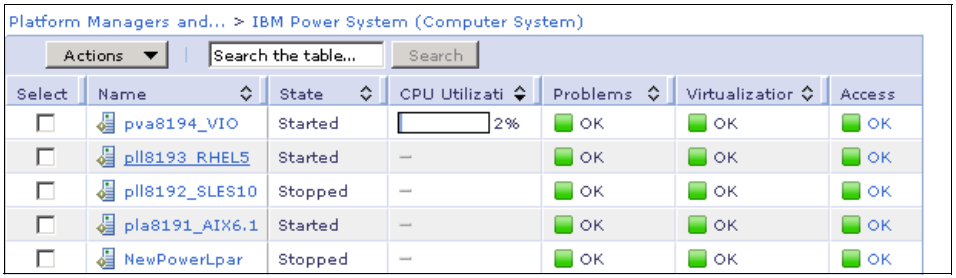


Figure 12-12 Automatic logical partitions discoveries

The IVM configuration with Systems Director is represented in Figure 12-13.

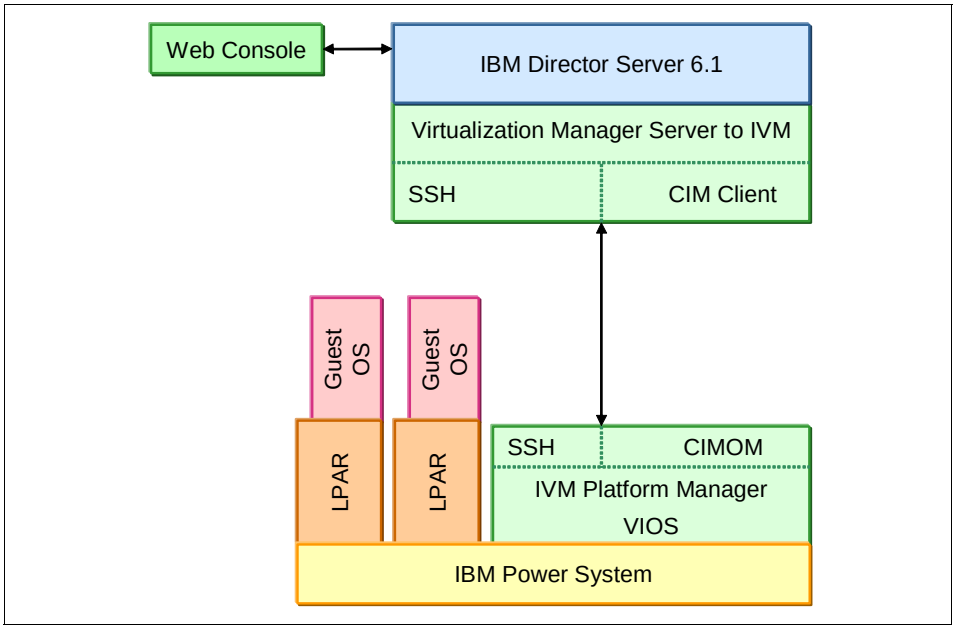


Figure 12-13 IBM Systems Director managing an IVM platform Manager

Additional functions provided by the Power resource feature include:

- A query function that is designed to keep the IBM Systems Director and Virtualization Manager inventory for the managed endpoints current by automatically discovering changes to the endpoints.
- The collection and graphic rendering of metrics via IBM Systems Director's resource monitoring live data metrics framework. Metrics retrieved from the Power hypervisor are displayed on the virtual servers and hosts view and are available in the Virtualization Metrics category of the resource monitor.
- Collection of virtualization properties from Power endpoints.
- Collection and correlation of virtual status on the virtual servers and hosts view.
- Support for display of the virtualization problems category on the virtual servers and hosts view.

Configuring the Hardware Management Console

If you want to use the Virtualization Manager to manage System i or System p servers under the control of a Hardware Management Console, perform the configuration steps detailed below.

Set up user access to the HMC

Create users on the Hardware Management Console with the required authorities, listed below, to ensure that users can request access to an HMC from IBM Systems Director and perform tasks for managing the HMC. There are three HMC user roles that you can create:

- hmcsuperadmin
- hmcoperator
- hmcviewer

To request access to an HMC from IBM Systems Director, you must have a user account on the HMC. When you request access using an HMC user ID and password, the role associated with the HMC user determines the tasks that are available in IBM Systems Director for all IBM Systems Director users.

Refer to the following link to find additional information about how to create this and what properties have a role:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.virtual_6.1/eica7_t_setting_up_user_access_hmc.html

Enabling the HMC for remote command execution

Before IBM Systems Director can communicate with the HMC and issue remote commands, the connectivity must first be enabled. Only users in the following categories can enable this connectivity:

- Super administrator
- Service representative

To enable the HMC for remote command execution:

1. Open the HMC Web interface.
2. Click **HMC Management** in the left-hand navigation area.
3. Click **Remote Command Execution**, as highlighted in Figure 12-14.

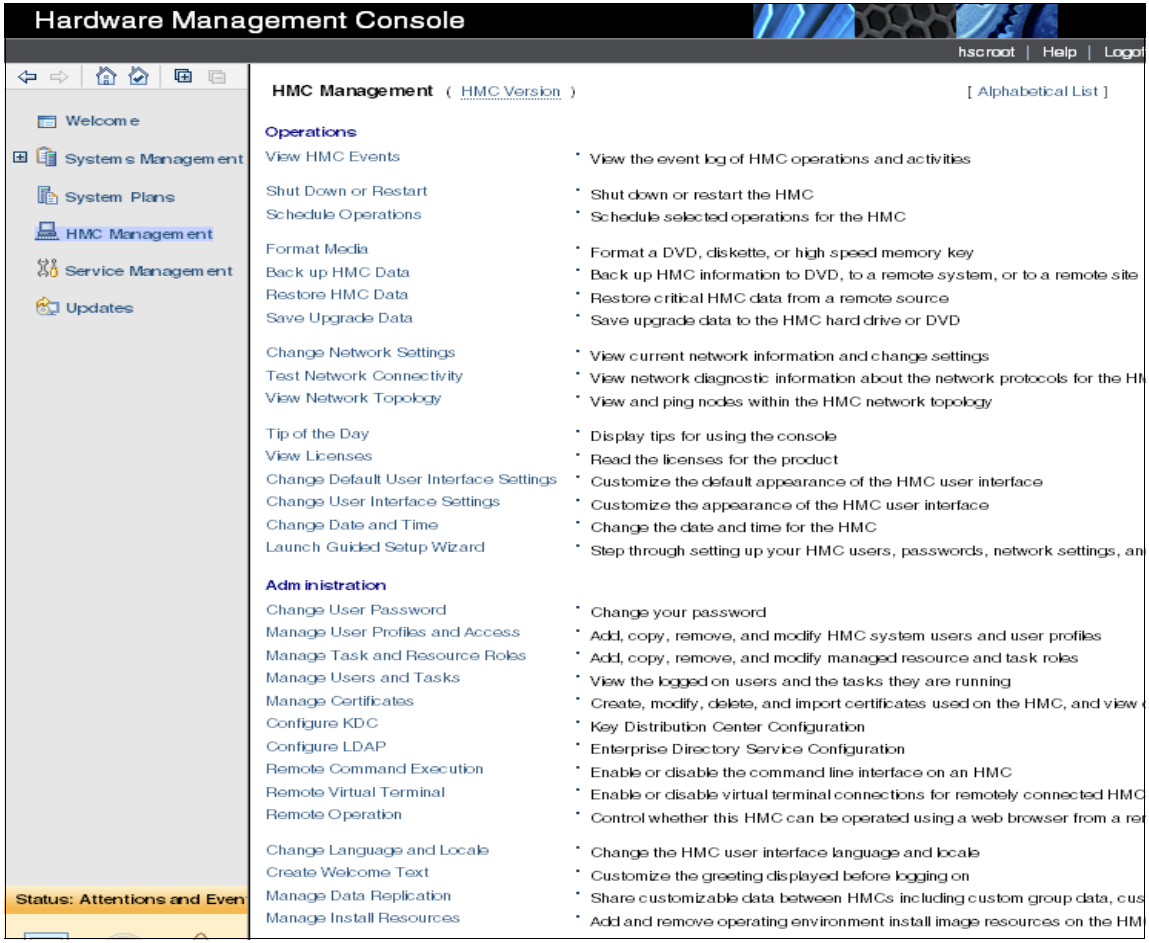


Figure 12-14 Hardware Management Console Web interface

4. From the Remote Command Execution window, select **Enable remote command execution using the ssh facility**, as seen in Figure 12-15 and click **OK**.

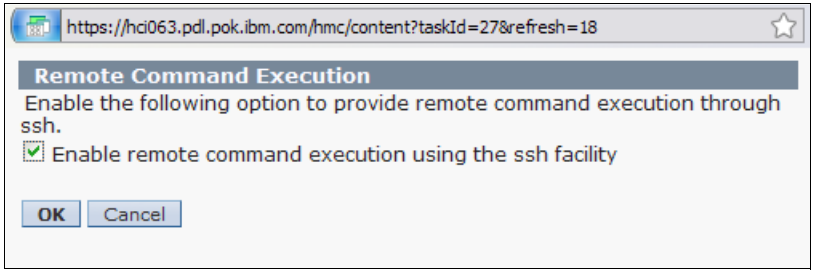


Figure 12-15 Enabling the remote command execution through SSH

Setting the HMC to collect resource utilization data

Use this procedure to set the Hardware Management Console to collect resource utilization data for any of the managed systems that it manages.

To set the HMC to collect resource utilization data, you must be either of the following user classes:

- Super administrator
- Operator

When you set the HMC to collect resource utilization data for a managed system, the HMC collects utilization data for memory and processor resources. The HMC collects utilization data into records called *events*. Events are created at the following times:

- At periodic intervals that you set
- When you make system-level and partition-level state and configuration changes that affect resource utilization
- When you start up, shut down, and change the local time on the HMC

To set the HMC to collect resource utilization data:

1. In the navigation area of the HMC Web interface, expand **Systems Management** and click **Servers**.
2. In the corresponding systems table, select the servers that you want to enable for collecting utilization data.

3. In the task area underneath the table, expand **Operations** → **Utilization Data** and click **Change Sampling Rate**, as seen in Figure 12-16.

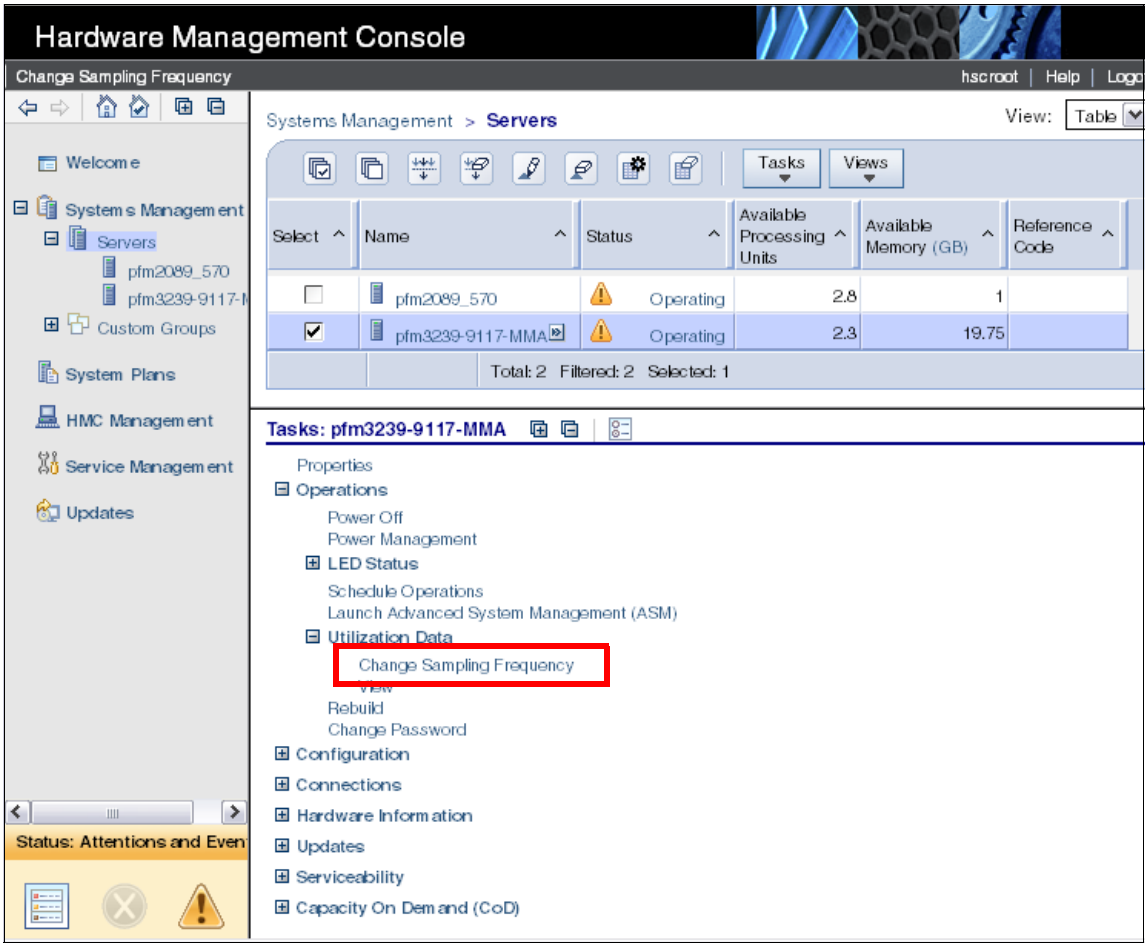


Figure 12-16 Change the sample frequency of the utilization data

4. In the Change Sampling Rate window that appears, select the sampling rate that you want to use for the systems that you selected, as shown in Figure 12-17. Click **OK** and the HMC is now ready to work with IBM Systems Director 6.1.

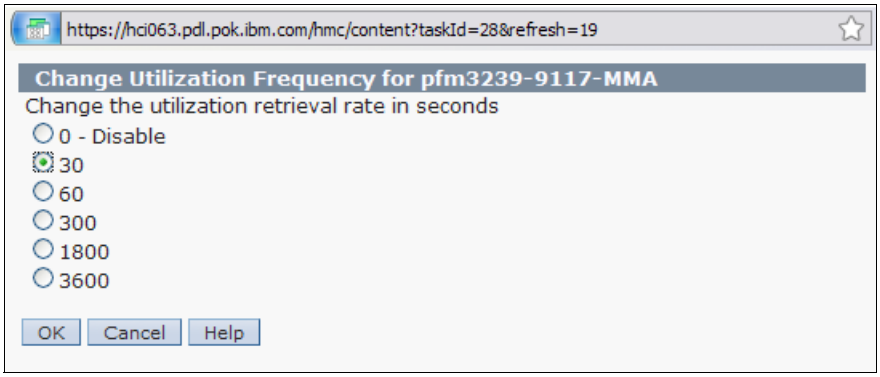


Figure 12-17 Select the sample rate for the specific IBM Power Systems

Figure 12-18 shows an example of HMC 7.3.3 managing an IBM Power Systems server with several logical partitions.

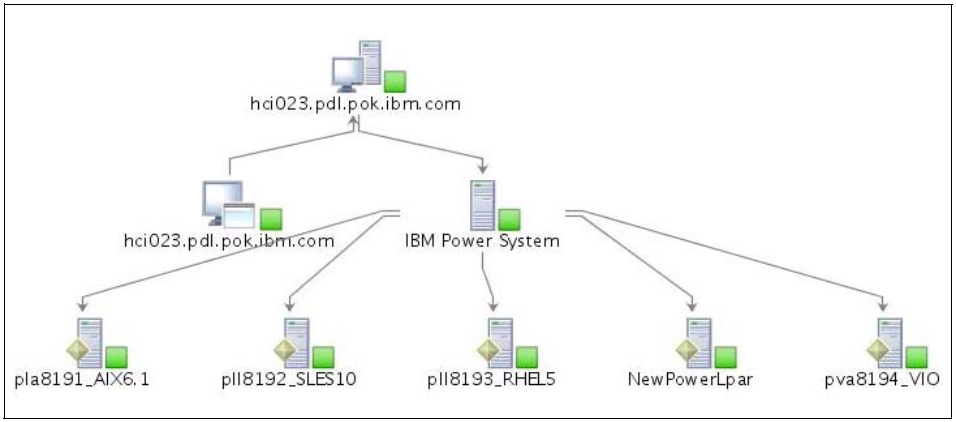


Figure 12-18 HMC managing a IBM Power Systems and its LPARs

Configuring Integrated Virtualization Manager (IVM)

To manage System p servers running on blades under the control of a Integrated Virtualization Manager, perform the configuration steps detailed below on the Integrated Virtualization Manager.

Set up user access to the IVM

Create users on the Integrated Virtualization Manager with the required authorities to ensure that users can request access to an IVM from Systems Director and perform tasks for managing the IVM. There are three IVM user roles that you can create:

- padmin
- View/modify
- View only

To request access to an IVM from IBM Systems Director, you must have a user account on the IVM. When you request access using an IVM user ID and password, the role associated with the IVM user determines the tasks that are available in IBM Systems Director for all IBM Systems Director users.

Additional information can be found in the IBM Systems Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.virtual_6.1/eica7_t_setting_up_user_access_ivm.html

Enabling IVM for remote command execution

Enable Integrated Virtualization Manager for remote command execution by setting the secure shell to start. The SSH service is subsequently started whenever you reboot the IVM.

To enable the IVM for remote command execution:

1. Connect to the IVM using Telnet or another application.
2. Use the default user ID **padmin** to log into the IVM.
3. Determine whether the IVM is enabled for remote command execution by default by entering the following command on the Virtual I/O Server command line:

   ```
   lsnetsvc ssh
   ```

If remote command (sshd) execution is active, as shown in the Example 12-1, then the task is complete.

Example 12-1 Remote execution enabled in the IVM

```
$ lsnetsvc ssh
Subsystem         Group            PID          Status
 sshd             ssh              94310        active
```

If remote command execution is not enabled, continue with the next step.

4. Type the following command:

   ```
   ioscli startnetsvc ssh
   ```

   After you start the SSH service it will continue running until you issue a command to stop it.

Example 12-2 SSH running in IVM

```
$ ioscli startnetsvc ssh
0513-029 The sshd Subsystem is already active.
Multiple instances are not supported.
```

Figure 12-19 is an example of an IVM 1.5.2.1 managing an IBM Power Systems server with several logical partitions. Figure 12-19 shows the IVM platform manager operating system and virtual server representation from left to right, the server in the middle, and the logical partitions on the right.

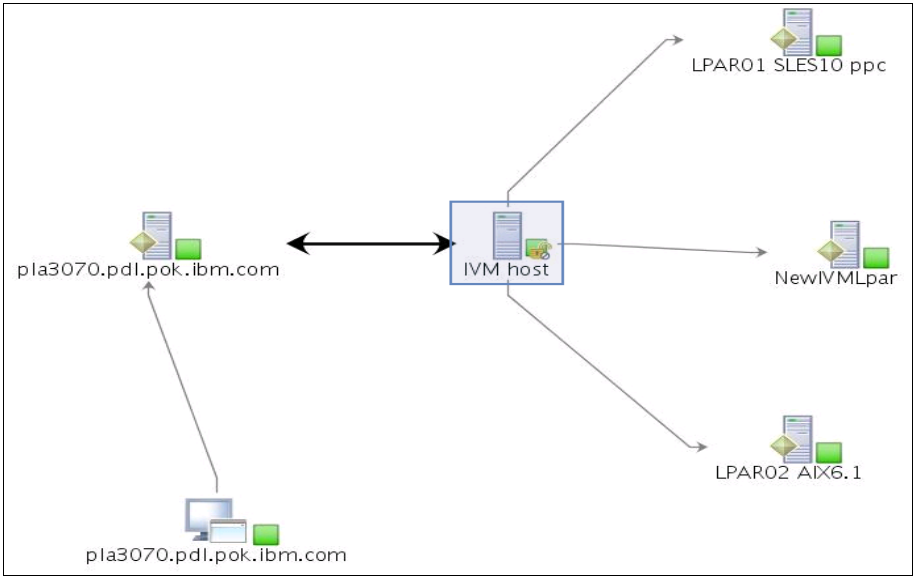


Figure 12-19 IVM managing an IBM Power host

Starting Common Information Model server on the IVM

Start the cimserver service one time. The cimserver service is subsequently started whenever you reboot the Integrated Virtualization Manager managed object.

To start the cimserver service on the IVM:

1. Connect to the IVM using Telnet or SSH.
2. Use the default user ID padmin to log into the IVM.
3. On the Virtual I/O Server command line, type the following command:

```
ioscli startnetsvc cimserver
```

After you start the cimserver service, it will continue running until you issue a command to stop it. CIM is very important to IBM Systems Director Server in order to have all the system-managed data updated.

Configuring credentials for the FSP CIM Proxy

To enable power-on and power-off tasks for an IVM-managed Power Systems server or a standalone Power Systems server, you must configure credentials for the Flexible Service Processor (FSP) Common Information Model Proxy.

Ensure that you have installed the FSP Proxy extension and the IBM Cluster Systems Management utilities.

To configure the FSP CIM Proxy and enable power-on and power-off tasks for the Power Systems server, refer to the following link:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.virtual_6.1/fqm0_t_vm_configuring_credentials_fsp_cim_proxy.html

12.3 Installing Virtualization Manager subagents

Virtualization Manager subagents are installed using the IBM Systems Director installation wizard. A Common Agent must be installed on the system where you plan to install the IBM Systems Director Virtualization Manager subagent.

Note: Xen hosts do not require a Virtualization Manager subagent to be installed. All Xen virtual server management capabilities are provided through the Xen CIM Provider.

To install the IBM Systems Director Virtualization Manager subagent on the host system using the installation wizard:

1. In the IBM Systems Director navigation pane, expand **Release management**, as shown in Figure 12-20. You can launch the context menu over the host to be installed.

Figure 12-20 Release management function from the main panel

2. Click **Agents**.
3. On the Agents page, click **Common Agent Subagent Packages**, as seen in Figure 12-21.

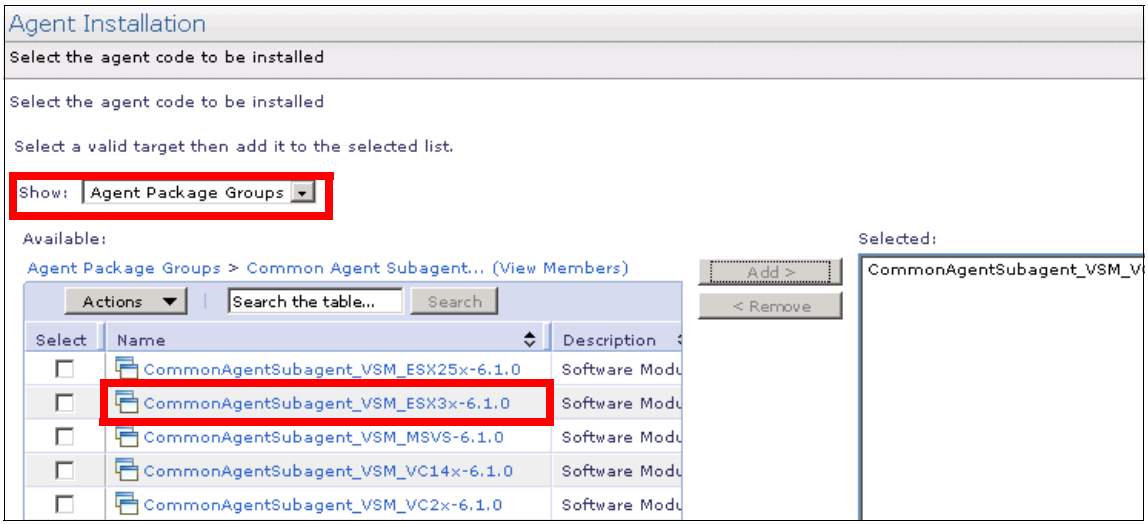


Figure 12-21 Selecting an ESX3x Common Agent package to be installed

4. From the Common Agent Subagent Packages view, select the subagent that you want to install. You can choose from the list of subagent packages provided in Table 12-1.

Table 12-1 Common Agent Subagent Packages

Subagent	Package to install
Subagent for VMware ESX Server 3.x and 3.5.x	CommonAgentSubagent_VSM_ESX3x-6.1.0
Subagent for Microsoft Virtual Server	CommonAgentSubagent_VSM_MSVS-6.1.0
Subagent for VMware VirtualCenter 1.4.x	CommonAgentSubagent_VSM_VC14x-6.1.0
Subagent for VMware VirtualCenter 2.x and 2.5.x	CommonAgentSubagent_VSM_VC2x-6.1.0

5. When you have selected the subagent that you want to install, click **Actions** from the menu bar and select **Release Management** → **Install Agent**.
6. Complete the instructions in the installation wizard to install the appropriate Virtualization Manager subagent on your host system, as shown in Figure 12-22. Verify that the installation summary is correct and click **Next**.

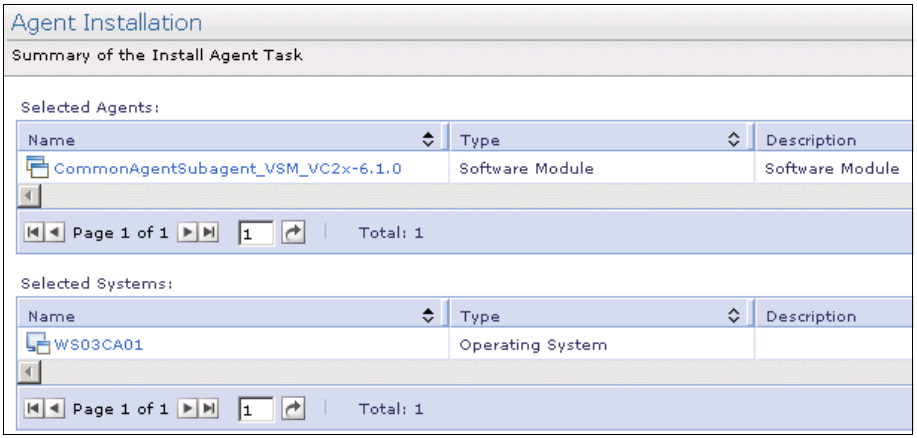


Figure 12-22 Install subagent summary after selecting package and target system

7. Verify that the installation has been completed in the Active and Scheduled Jobs view, as shown in the Figure 12-23.

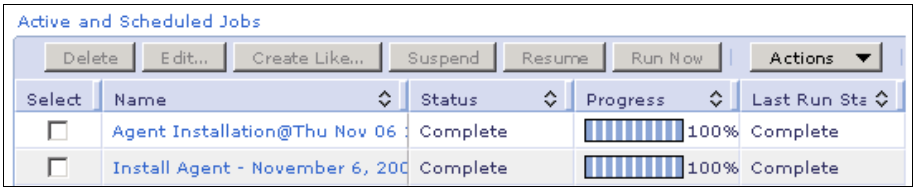


Figure 12-23 Agent installation jobs are completed without errors

8. When the installation is complete, right-click the host system in Navigate Resources and select **Security** → **Verify Connection**, as seen in Figure 12-24. When this task is complete, you can access Virtualization Manager tasks.

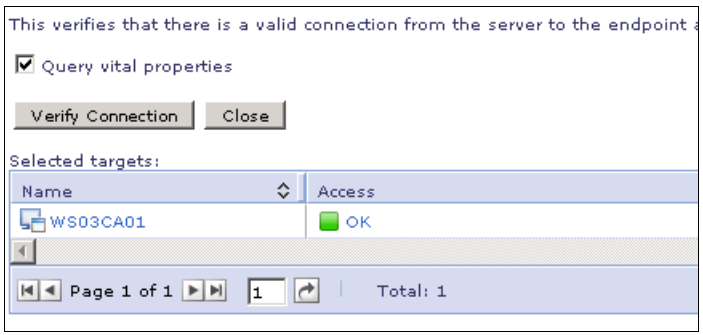


Figure 12-24 'The agent connection is verified

9. Virtualization is now enabled. Verify that properties in the VirtualCenter Server (not in the operation system object) and check that your system already has additional properties, as shown in Figure 12-25.

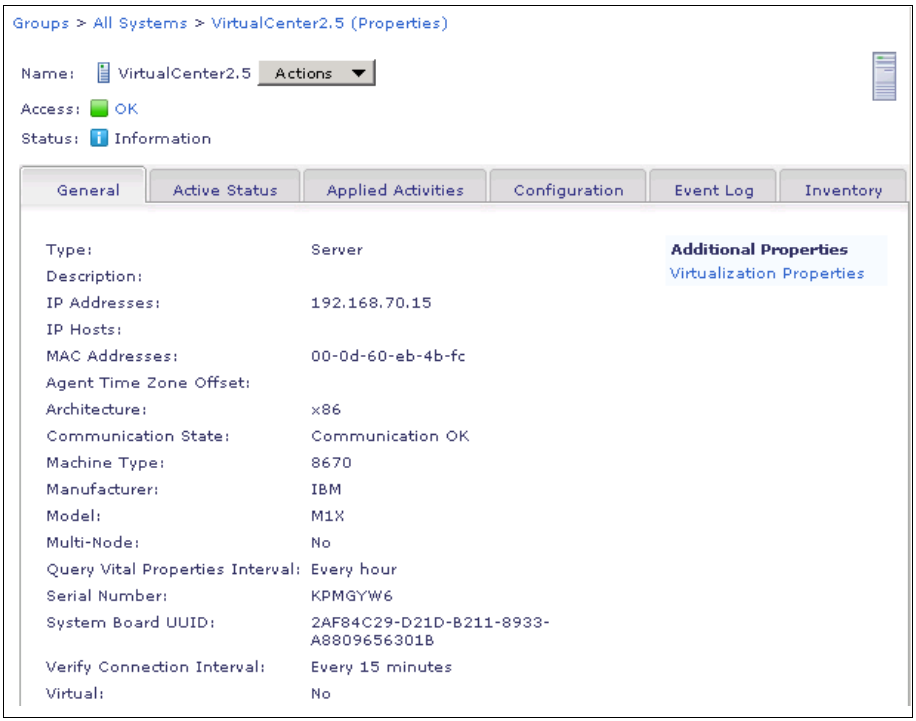


Figure 12-25 VirtualCenter Server endpoint properties now have virtualization properties

10. Click **Virtualization Properties** to see more information, as shown in Figure 12-26.

Figure 12-26 VirtualCenter Virtualization Properties

11. For VirtualCenter, once you have the ESX hosts added to VirtualCenter you must connect to the Web service from IBM Systems Director. Right-click **VirtualCenter** and click **Security** → **Connect**, as shown in Figure 12-27.

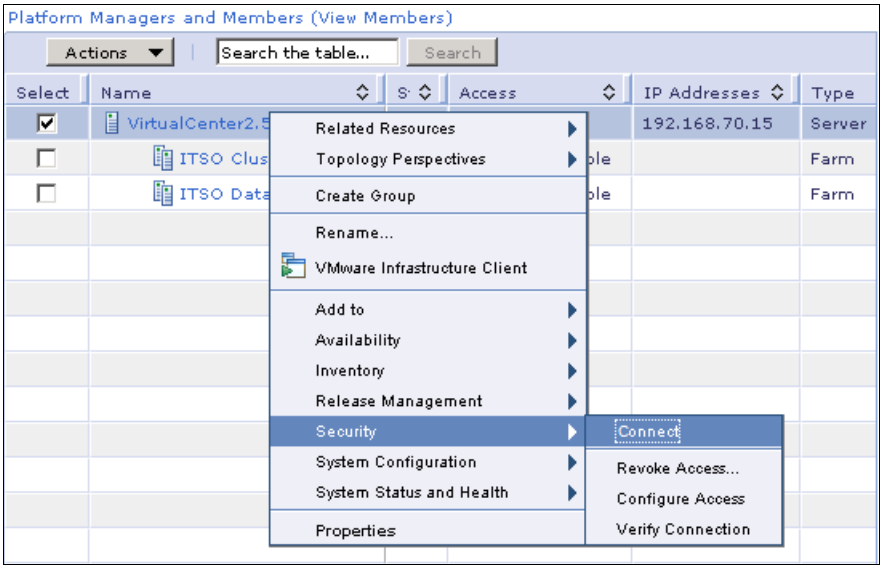


Figure 12-27 Connecting the Virtual Center to the ESX hosts

12. Enter the appropriate user ID and password, as shown in Figure 12-28. This then allows the server to manage the ESX hosts through the subagent in the VirtualCenter.

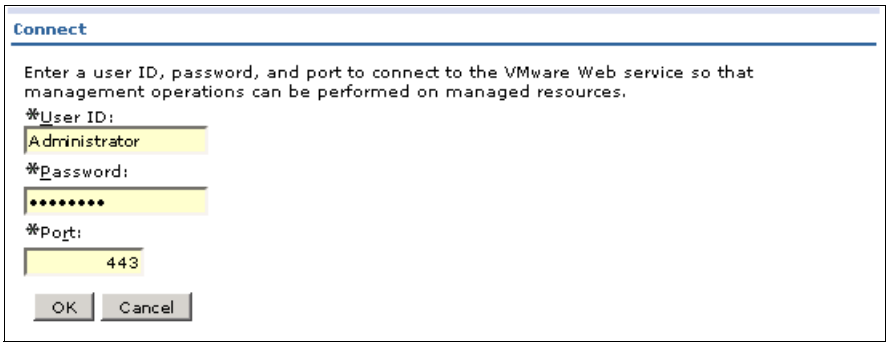


Figure 12-28 Connecting to the VMware Web service

Even though the ESX hosts do not have a Virtualization Manager subagent, after connecting they will have Virtualization Properties, as shown in Figure 12-29.

Virtualization Properties

Category	Property Name	Property Value
Vendor Information		
	Vendor:	VMware ESX
	Version:	3.5.0
	Vendor URL:	C:\Program Files\VMware\Infrastructure\Virtual Infrastructure Client\Launcher\VpxClient.exe
	Virtualization Parent:	/ITSO Datacenter/host/ITSO Cluster
Processor		
	Physical CPU Count:	4
Memory		
	Memory (MB):	8191
Disk		
	VMFS Volume Labels:	hatteras:storage1
	VMFS Volume Labels:	esxgenstore-3
	VMFS Volume Labels:	esxgenstore-2
	VMFS Volume Labels:	esxgenstore
Network		
	Network Labels:	VM Network
Additional Information		
	Virtual Server Count:	0
	Maintenance Mode:	Off
	Dynamic Relocation Enabled:	true
	Relocation IP Address:	10.1.1.3
	Relocation Gateway:	255.255.255.0
	Relocation Network Label:	VMotion

Figure 12-29 ESX Virtualization Properties in the server endpoint

12.4 Virtual systems

This topic provides an overview of the different types of systems that you can manage using IBM Systems Director Virtualization Manager.

12.4.1 Platform managers

Platform managers manage one or more host systems and their associated virtual servers and operating systems.

Examples of platform managers are:

- IBM Hardware Management Console
- IBM Integrated Virtualization Manager
- VMware VirtualCenter

IBM Systems Director does not recognize a managed system as a platform manager until the server has access to the managed system. To request access to the managed system, right-click the it and click **Request Access**. By providing a valid user name that has local administrative rights to that managed system and its password, you can access the system.

Note: Before you can manage a VMware VirtualCenter platform manager, you must enter credentials to log in to VMware VirtualCenter server. You can do this by using the connect task, as seen in Figure 12-27.

12.4.2 Virtual farms

A virtual farm logically groups like hosts and facilitates the relocation task, moving a virtual server from one host to another host within the virtual farm. A virtual farm can contain multiple hosts and their associated virtual servers. A VMware VirtualCenter virtual farm can contain only hosts that are being managed with the same type of Virtualization Manager subagent. For example, a virtual farm that contains a host running a Virtualization Manager subagent for the VMware ESX Server can contain only other hosts that are also running a Virtualization Manager subagent for the VMware ESX Server. When a virtual farm is configured, you can relocate virtual servers between hosts in the farm.

You use the Create Virtual Farm wizard to group hosts together and enable specialized capabilities for the virtual servers running on the hosts. You can enable capabilities such as high availability, workload management, live relocation, and static relocation. Not all capabilities are supported on all platforms.

Farms in a VMware VirtualCenter environment

During discovery, IBM Systems Director identifies a system that is running VMware VirtualCenter server as a platform manager. The Virtualization Manager subagent continues the discovery process to identify farms that are in a VMware VirtualCenter environment. If necessary, you can manually request the discovery of IBM Systems Director farms after the server has discovered a platform manager, as seen in Figure 12-30. Alternatively, you can create IBM Systems Director farms for a platform manager.

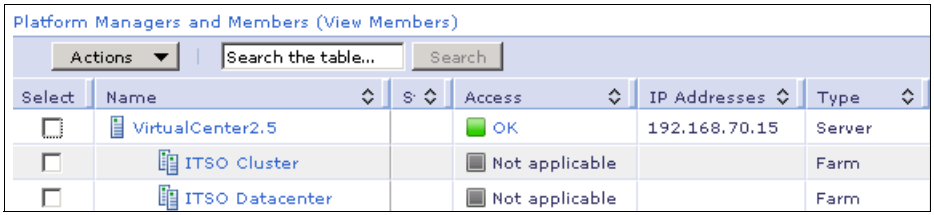


Figure 12-30 Platform managers and the auto discovered farms in a VirtualCenter environment

IBM Systems Director farms are not identical to farms in VMware VirtualCenter because IBM Systems Director does not use the hierarchical model that VMware VirtualCenter uses. VMware VirtualCenter supports collections of farms, which are referred to as *farm groups*. This concept enables VMware VirtualCenter to present farms in hierarchical groups within the VMware VirtualCenter client.

However, IBM Systems Director does not have a farm group concept and does not support displaying the farm groups in the same type of farm hierarchy. When the Virtualization Manager subagent creates an IBM Systems Director farm for a VMware VirtualCenter farm that is a member of one or more farm groups, the name of the IBM Systems Director farm is displayed, but the hierarchy is not. You can find the full path that VMware VirtualCenter uses in the Virtualization Properties (Vendor identifier field).

Note: If a farm that is contained within a farm group is discovered and later that farm group is renamed in VMware VirtualCenter, unexpected behavior can occur with the IBM Systems Director farm. This unexpected behavior for the IBM Systems Director farm occurs for all instances of IBM Systems Director Server that are tracking activity on that IBM Systems Director farm. After a farm group is renamed, you should disconnect from the platform manager that contains the IBM Systems Director farm and then connect again.

Farms in other virtualization environments

You can create IBM Systems Director farms for use with other supported virtualization environments. These IBM Systems Director farms are not defined in any virtualization application, but exist only in IBM Systems Director.

The farm type of a IBM Systems Director farm is undefined until you add a host to it. Then the farm type becomes one of the following values:

- HMC
- IVM
- Microsoft Virtual Server
- VMware ESX
- VMware ESX 3.0 or later
- Xen

12.4.3 Hosts

In an IBM Systems Director environment, a host is a system that contains resources from which virtual servers are constructed. Hosts can be any of the following systems that are configured for the IBM Systems Director environment:

- A Microsoft Virtual Server.
- IBM Power Systems that are under the control of an IBM Hardware Management Console
- An IBM Power Systems server that is under the control of IBM Integrated Virtualization Manager
- A VMware ESX server
- A VMware ESX server that is under the control of VMware VirtualCenter
- A Xen virtualization server on a supported Linux operating system

A host can manage multiple virtual servers and their guest operating systems.

Hosts that are in a VMware VirtualCenter environment

After you connect to a VMware VirtualCenter platform manager, IBM Systems Director creates a virtual farm to represent any farm that exists in the VMware VirtualCenter environment. IBM Systems Director attempts to match each host that is managed by a VMware VirtualCenter farm to systems that are currently being managed by IBM Systems Director. If the host is not already being managed by IBM Systems Director, it will not be added to the managed inventory, and will not be displayed as a member of the virtual farm in IBM Systems Director.

When a host is running VMware ESX Server in a VMware VirtualCenter environment, you can perform IBM Systems Director operations on that host whether it is *locked or unlocked*. IBM Systems Director communicates through the Virtual Center with this system. Figure 12-31 shows two ESX hosts able to be operated and reporting status to IBM Systems Director.

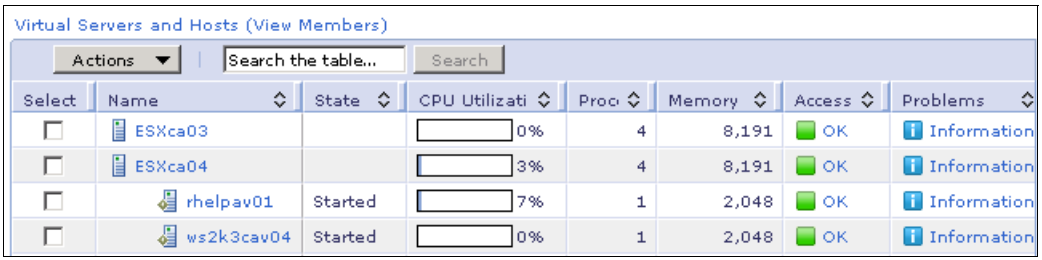


Figure 12-31 Two ESX hosts with two virtual servers

If the hosts are added through VirtualCenter, IBM Systems Director supports only those hosts that are connected to a system that is running VMware VirtualCenter server. If a VMware VirtualCenter host is disconnected, IBM Systems Director removes the host and generates two events:

- A Virtualization Manager farm removed event
- A host removed event

IBM Systems Director does not discover hosts that are disconnected from a system that is running VMware VirtualCenter server.

To launch in context the VMware VirtualCenter from IBM Systems Director, you must have this VMware client installed on the system on which the IBM Systems Director Web console is being executed.

Hosts that are in other virtualization environments

A managed system that is running the VMware ESX Server stand alone, Microsoft Virtual Server, HMC, IVM, or Xen is not recognized as a host when it is *locked*. To request access to the host, right-click the managed system and click **Request Access**. By providing a valid user name that has local administrative rights to that managed system and its password, you can access the system.

Note: (VMware ESX Server 3.0 only) The VMware Virtual Infrastructure Client 2.0 must be installed on the system where IBM Systems Director is installed.

12.4.4 Virtual servers

A virtual server is associated with a host system. The host must be part of a virtualization environment that is supported in IBM Systems Director.

A virtual server is the logical equivalent of a physical platform. After IBM Systems Director discovers a host, it continues the discovery process for all the virtual servers that are associated with the host. When virtual servers are discovered, they can be powered on and turned off through IBM Systems Director. In addition, you can edit resources that are assigned to virtual servers and relocate a virtual server from one host to another. You can also create additional virtual servers to meet your needs.

You can use IBM Systems Director Virtualization Manager to manage virtual servers that are configured with one or more virtual disks. IBM Systems Director provides support for several types of virtual disks, including undoable disks. For more information about this topic refer to the following link:

http://publib.boulder.ibm.com/infocenter/systems/topic/eica7/eica7_concept_undoable_disks.html

An undoable disk is a type of virtual disk that saves changes to a temporary file instead of to the virtual disk itself. Changes can be committed when the virtual machine is turned off.

Notes: (VMware VirtualCenter only) IBM Systems Director does not support or display virtual server groups, which are collections of virtual servers supported by VMware VirtualCenter. When the Virtualization Manager subagent creates a virtual server that is a member of one or more virtual server groups, the name of the virtual server group is ignored and not included in the name of the virtual server.

Microsoft Virtual Server has a virtual server status called *save state*. IBM Systems Director refers to this feature as suspending a virtual server. For information about the save state, see the documentation included with Microsoft Virtual Server.

12.4.5 Guest operating systems

A *guest operating system* object in IBM Systems Director represents an operating system that is running on a virtual server on which a Common Agent is installed. It appears in the view as shown in Figure 12-32.

Figure 12-32 Guest Operating Systems view listing Common Agent running in virtual servers

The standard IBM Systems Director discovery process for managed systems can discover guest operating systems. However, if a guest operating system is not running Common Agent, it is not recognized as a guest operating system object in IBM Systems Director, so make sure that you have installed Common Agent in the virtual servers to be able to discover them as guest operating systems.

12.5 Virtual resources views

There are several views in IBM Systems Director that you can use to have different perspectives of your environment. You can perform the same supported tasks defined in IBM Systems Director 6.1: create, delete, edit, and relocate virtual servers, as well as resume and suspend virtual servers from this view.

12.5.1 Resources in the Platform Managers and Members view

You can use the Platform Managers and Members view to see a variety of information about your platform managers and the hosts or farms that are controlled by the platform managers. You can view details such as status, IP address, and descriptions.

Open the Platform Managers and Members view in one of the following ways:

- In the IBM Systems Director navigation area, click **Inventory** → **Views** → **Platform Managers and Members**, as shown in Figure 12-33.
- In the IBM Systems Director navigation area, click **Navigate Resources** → **Virtualization Groups** → **Platform Managers and Members**.

Figure 12-33 Inventory views to access the Virtualization Manager navigation area

12.5.2 Viewing resources in the Virtual Servers and Hosts view

You can use the Virtual Servers and Hosts view to see a variety of information about your virtual servers and hosts, such as status, IP address, and a description. You can also view CPU utilization for the host or virtual server, as well as the number of processors and amount of memory that is allocated to your virtual servers or hosts.

Open the Virtual Servers and Hosts view in one of the following ways:

- In the IBM Systems Director navigation area, click **Inventory** → **Views** → **Virtual Servers and Hosts**.
- In the IBM Systems Director navigation area, click **Navigate Resources** → **Virtualization Groups** → **Virtual Servers and Hosts**, as shown in Figure 12-34.

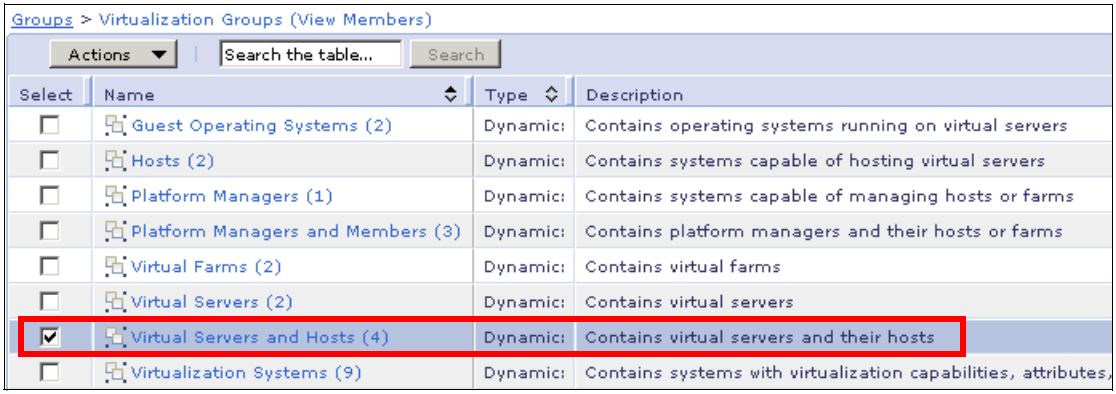


Figure 12-34 Virtualization Groups view members from the Navigate Resources view

In addition to the columns that are displayed by default in the Virtual Servers and Hosts view or in the Navigate Resources view, you might be able to select additional columns depending on your virtualization environment, as shown in Figure 12-35. You can see the Virtualization Manager State and Virtualization Status column added to the All system View members view.

Tip: If you want to focus on the virtualization environment to have a better understanding of the machine's states at a glance in the **Navigate Resources Groups** → **All Systems** (View Members) view you may want to add these columns:

- State
- Problems
- Virtualization Status

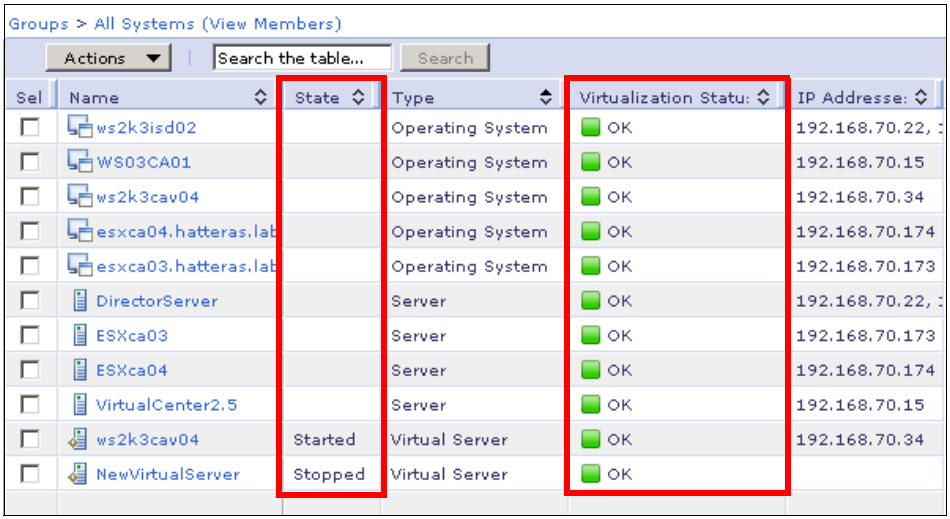


Figure 12-35 Additional columns can be added to identify virtual resource properties

Tip: A good recommendation when working with virtual resources and hosts is to add the Virtualization Status column to any of the most used groups in IBM Systems Director. This column is helpful for realizing new host states and any other important virtualization alerts.

12.5.3 Viewing virtualization properties

In addition to viewing the properties listed in the main properties view for a selected resource, you can see additional properties that are specific to virtual resources.

To see virtualization properties:

1. Navigate to a resource whose properties you want to see and select it.
2. Click **Actions** → **Properties**.
3. On the General page, click **Virtualization Properties** (under Additional Properties) in the upper-right corner of the page, as seen in Figure 12-36.

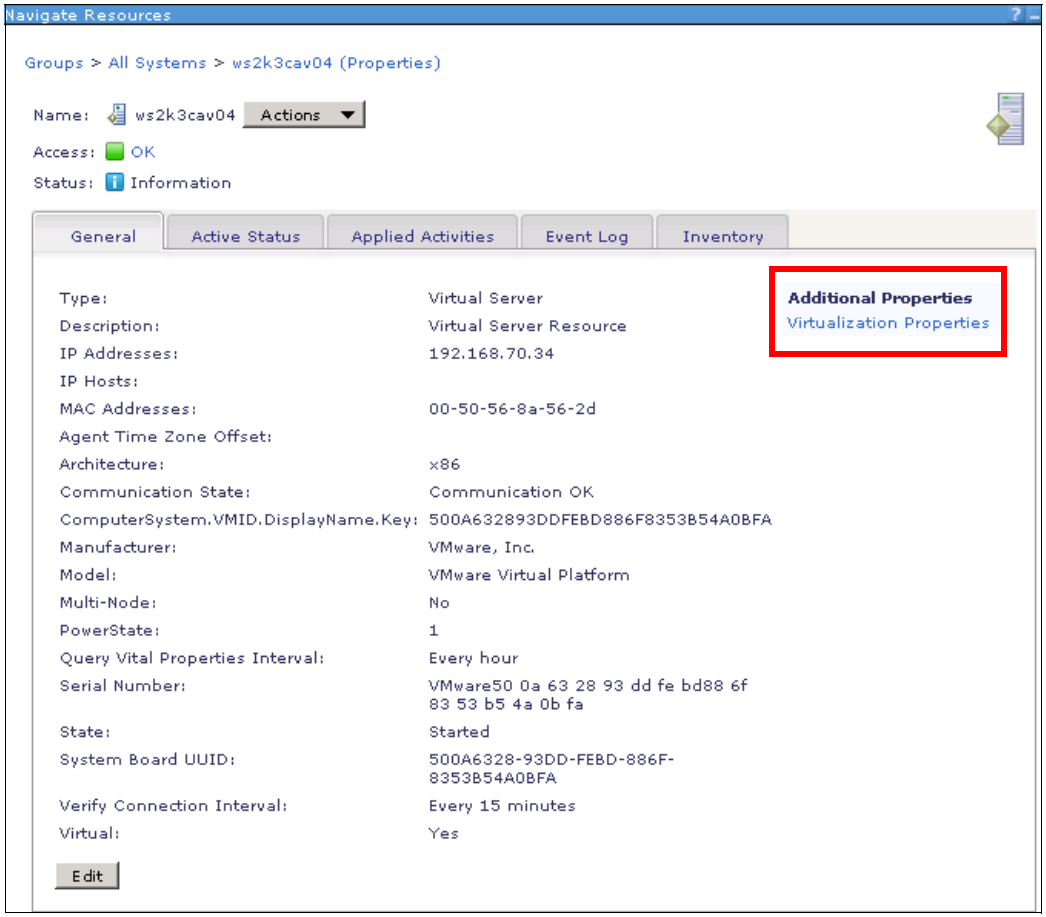
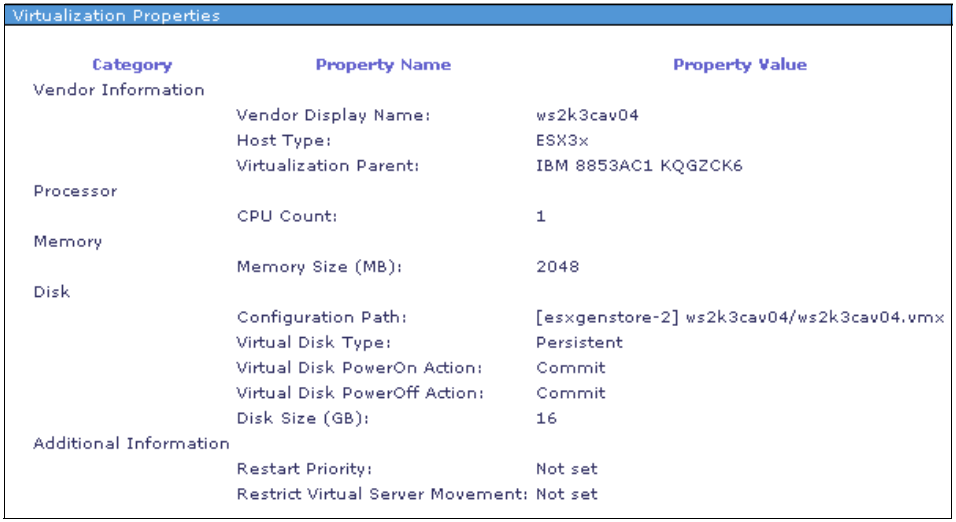


Figure 12-36 Resource with virtual properties

Note: Virtualization properties are displayed only for resources that provide virtualization services.

The virtualization properties displayed vary, depending on the resource that you selected.

The Virtualization Properties page lists properties for virtual resources in the categories shown in Figure 12-37.


Virtualization Properties

Category	Property Name	Property Value
Vendor Information		
	Vendor Display Name:	ws2k3cav04
	Host Type:	ESX3x
	Virtualization Parent:	IBM 8853AC1 KQGZCK6
Processor		
	CPU Count:	1
Memory		
	Memory Size (MB):	2048
Disk		
	Configuration Path:	[esxgenstore-2] ws2k3cav04/ws2k3cav04.vmx
	Virtual Disk Type:	Persistent
	Virtual Disk PowerOn Action:	Commit
	Virtual Disk PowerOff Action:	Commit
	Disk Size (GB):	16
Additional Information		
	Restart Priority:	Not set
	Restrict Virtual Server Movement:	Not set

Figure 12-37 Virtualization properties

12.5.4 Viewing resources in topology virtualization perspectives

You can use basic topology perspectives to view virtual resources. However, you can use the Virtualization Basic, Virtualization Common, and Virtualization Details perspectives to isolate virtual resources and drill down further to view additional details about relationships between virtual resources.

In the Virtualization Basic topology perspective

You can use the Virtualization Basic perspective to view the same resources found in the Virtualization Systems group, along with the operating systems running on the systems and the relationships between the resources. This is the most useful cases with which to represent the Virtualization Manager simple topology.

To view resources in the Virtualization Basic perspective:

1. Navigate to a resource whose relationships you want to see in a topology map view and select it.
2. Click **Actions** → **Topology Perspectives** → **Virtualization Basic**, as seen in Figure 12-38.

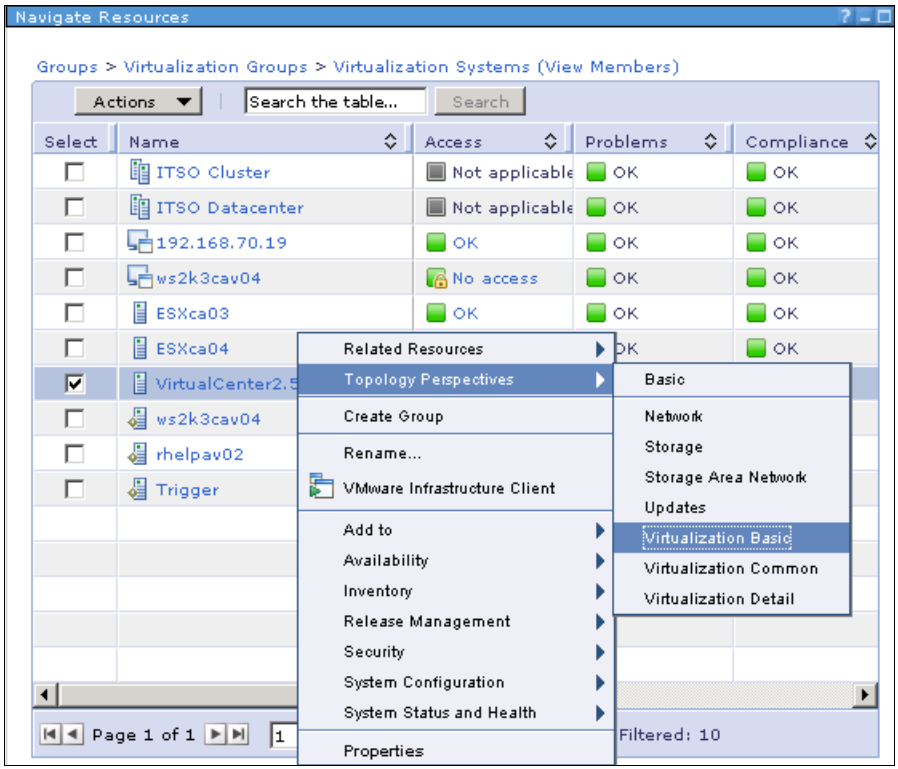


Figure 12-38 Launching Virtualization Basic perspective from a VMware Virtual Center

Tip: Once you have launched the topology perspective desired, Click **Actions** → **Layout Tree** to change the default radial layout if it does not suit your purposes, as shown in Figure 12-39.

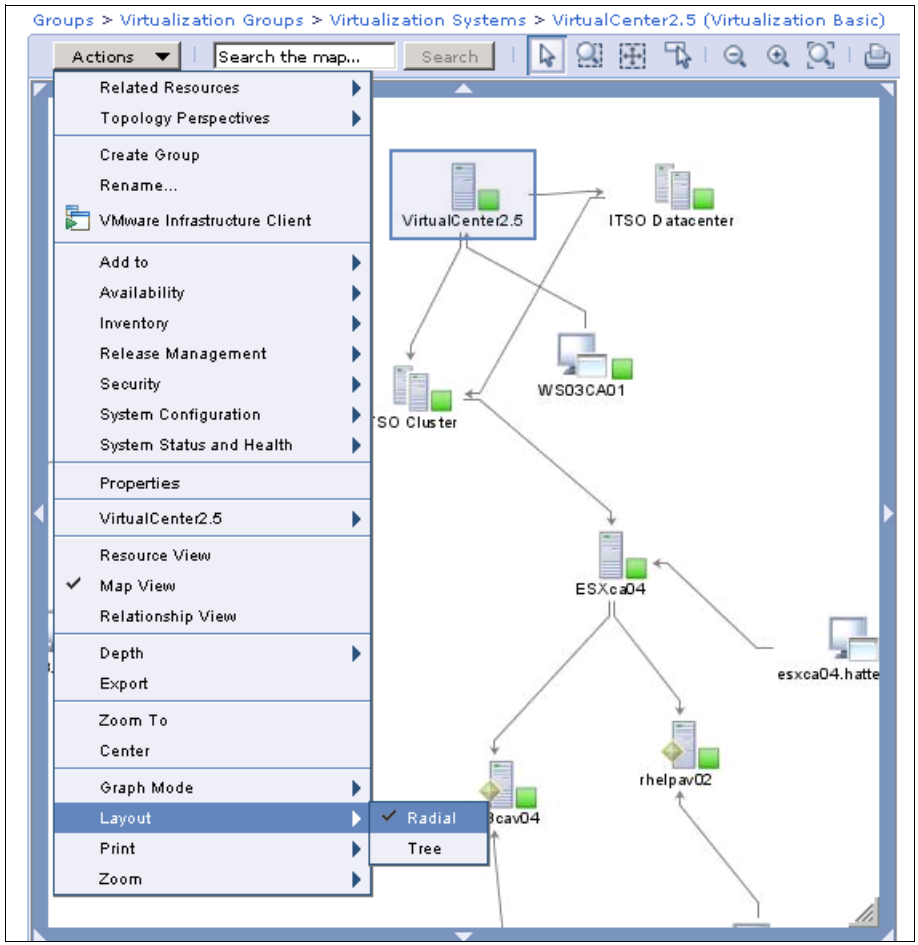


Figure 12-39 Switching from radial layout to tree layout in Virtualization perspectives

An example of the output for a VMware environment detailed in the Virtualization Basic perspective is shown in Figure 12-40.

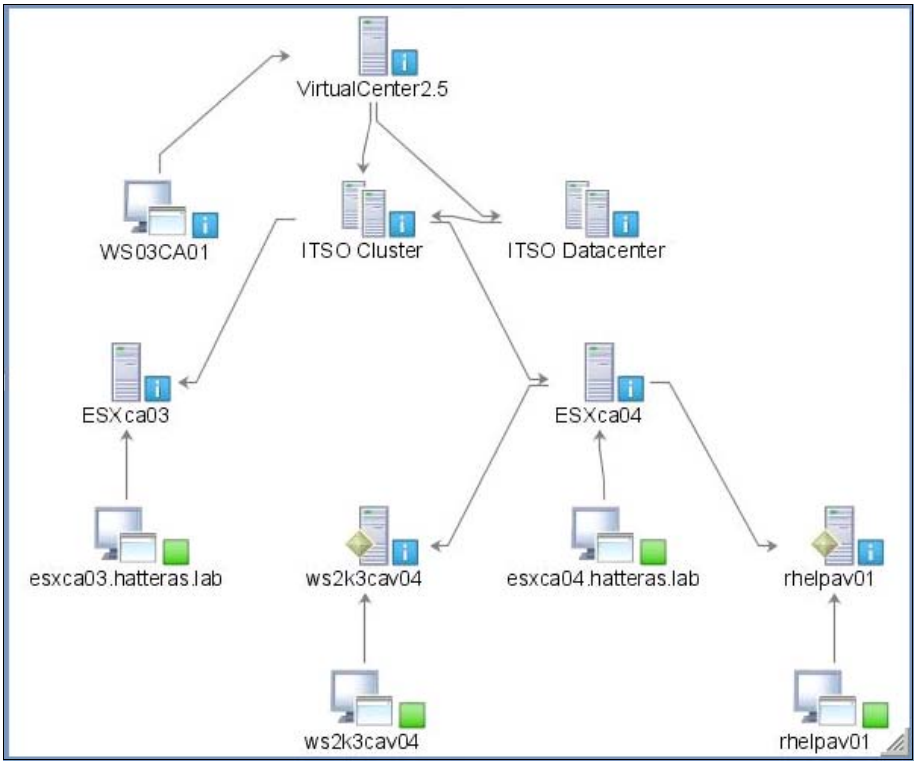


Figure 12-40 Virtualization basic map view: Tree layout for a ESX with VirtualCenter environment

You can switch to the relationship view shown in Figure 12-41 by clicking **Actions** → **Relationship View**.

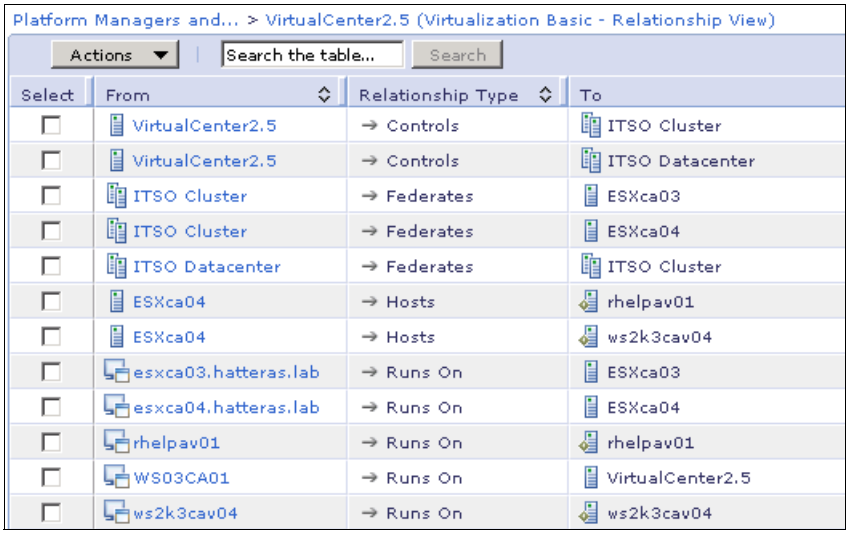


Figure 12-41 virtualization basic: Relationship view

To switch to the Resources view shown in Figure 12-42 click **Actions** → **Resource View**.

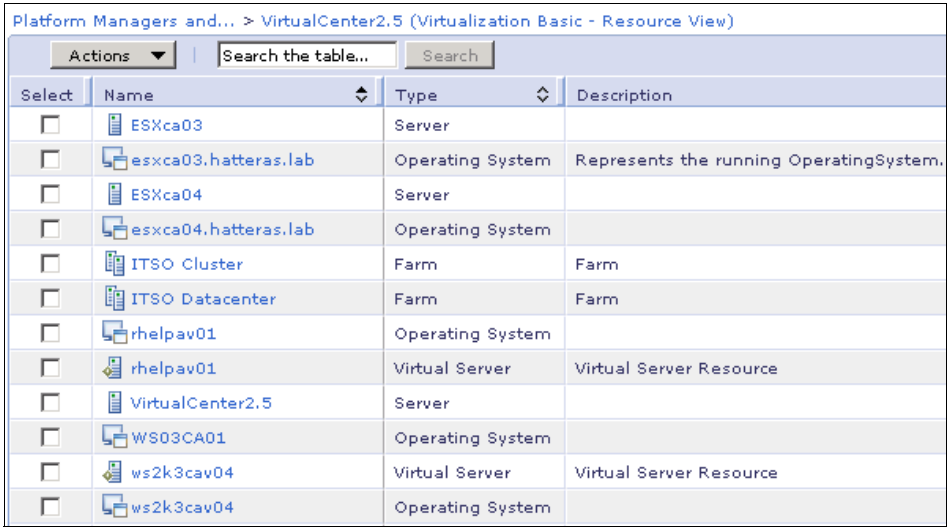


Figure 12-42 Virtualization basic: Resource view

Virtualization Common perspective

You can use the Virtualization Common perspective to view a common subset of resources, such as storage pools and network endpoints, along with the basic resources.

To view resources in the Virtualization Common perspective:

1. Navigate to a resource whose relationships you want to see in a topology map view and select it.
2. Click **Actions** → **Topology Perspectives** → **Virtualization Common**. The output is shown in Figure 12-43.

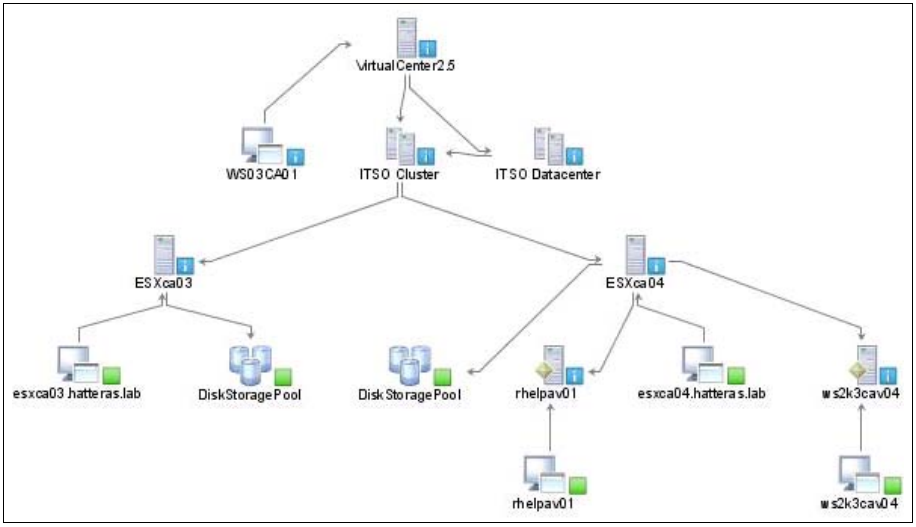


Figure 12-43 Virtualization Common perspective, tree layout, depth 6

You can switch to the Relationship View shown in Figure 12-44 by clicking **Actions → Relationship View**.

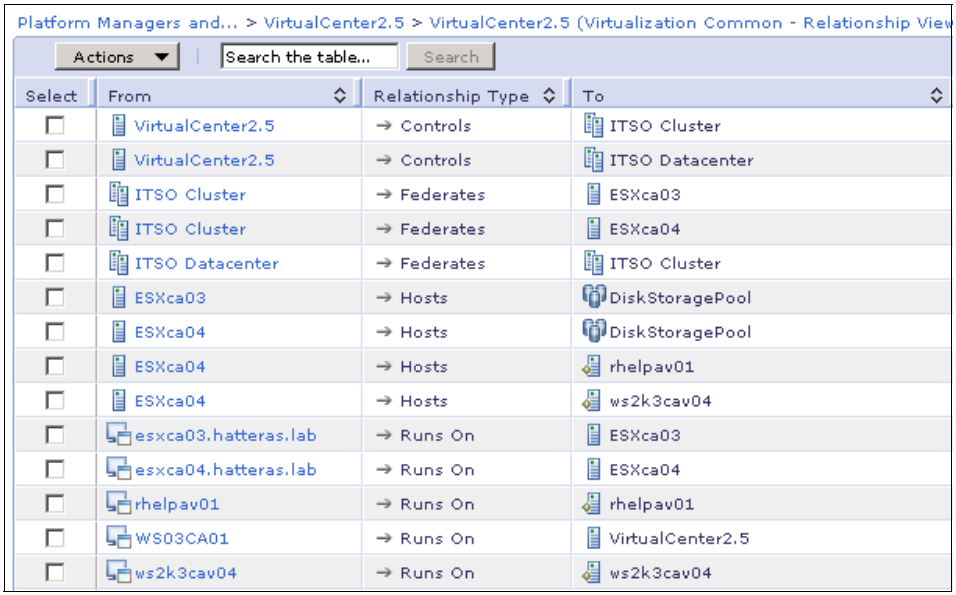


Figure 12-44 Virtualization Common perspective: Relationship View

To switch to the Resource View shown in Figure 12-45 click **Actions** → **Resource View**.

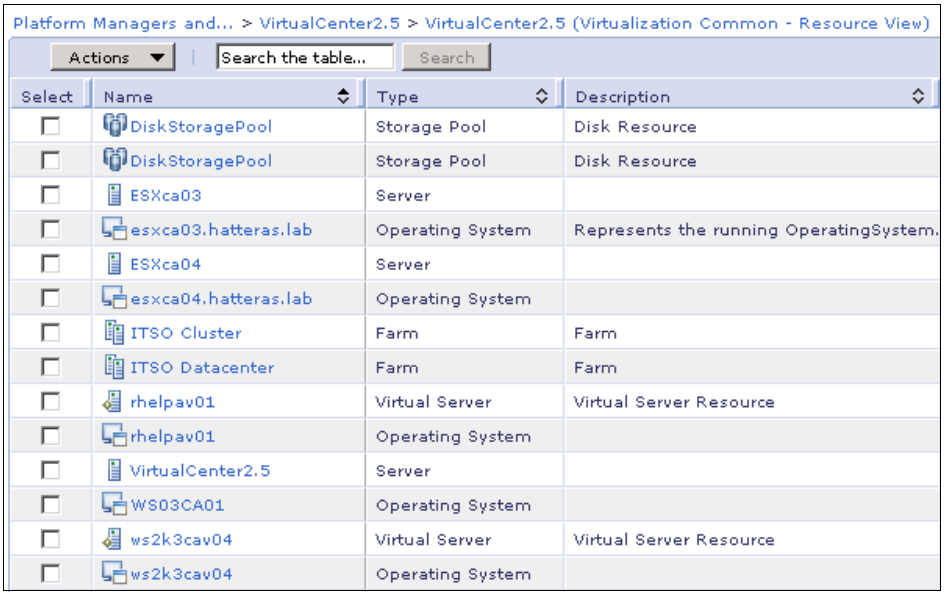


Figure 12-45 Virtualization Common perspective: Resource View

Virtualization Detail perspective

You can use the Virtualization Detail perspective to view details such as settings, allocations, and other resources, along with the basic and common resources.

To view resources in the Virtualization Detail perspective:

1. Navigate to a resource whose relationships you want to see in a topology map view and select it.
2. Click **Actions** → **Topology Perspectives** → **Virtualization Detail**. An example of this view is shown in Figure 12-46. Now you can see many details, such as virtual server, storage, and the available connections.

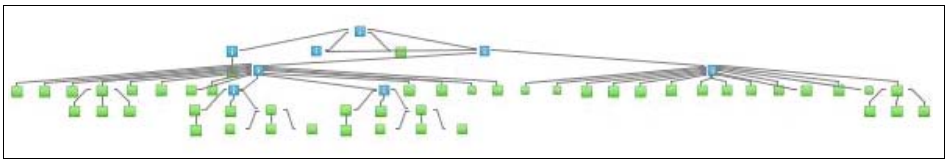


Figure 12-46 Virtualization details showing many specific details for each host

You can switch to the relationship view shown in Figure 12-47 by clicking **Actions** → **Relationship View**.

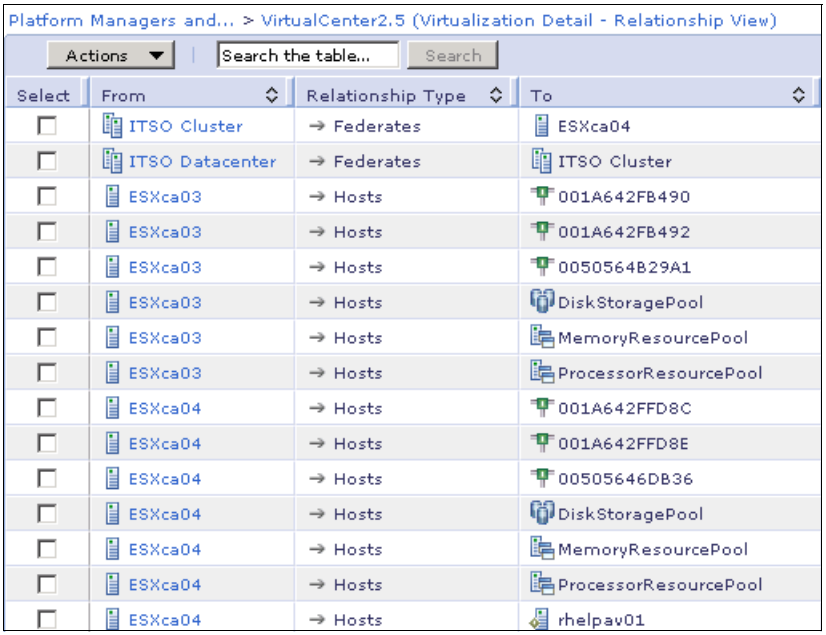


Figure 12-47 One of several pages displayed in the Virtualization Detail perspective

In the Relationship View, processors, memory, disks, and local area network (LAN) connections are detailed.

To switch to the resources view shown in Figure 12-48 click **Actions** → **Resource View**.

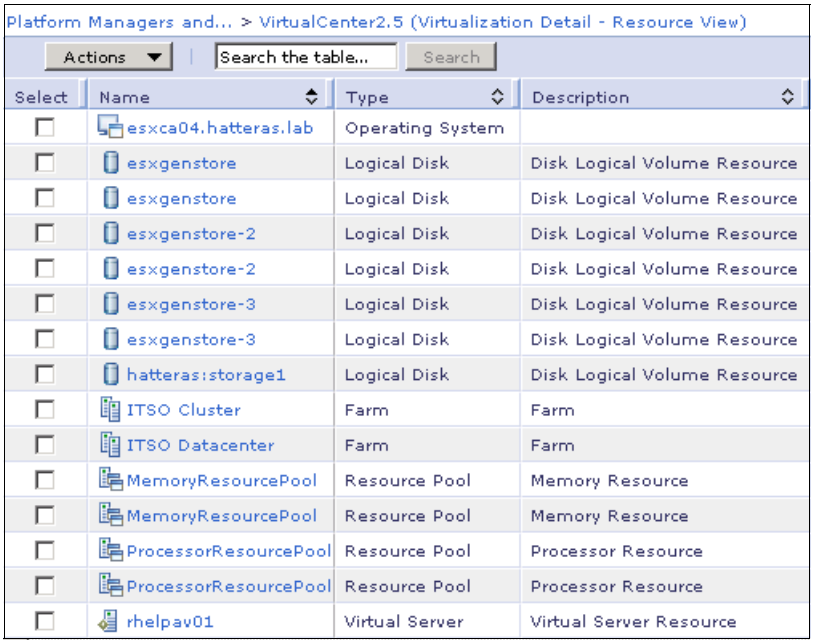


Figure 12-48 Virtualization Detail perspective showing one of the resource view pages

12.6 Managing host systems

You can use IBM Systems Director to run the Enter Maintenance Mode and Exit Maintenance Mode tasks on your VMware ESX host systems. You can also start and stop the virtualization service on a host in a Microsoft Virtual Server virtual farm.

12.6.1 Entering maintenance mode

You can specify that certain hosts be in maintenance mode so that you can perform service tasks on the host.

Note: For VMware ESX hosts managed by VMware VirtualCenter 2.x, all virtual servers on the host must be powered off to access the maintenance mode task.

VMware ESX hosts that are in maintenance mode cannot be targeted with tasks such as Create Virtual Server, Power On, or Relocate Virtual Server.

To change a host to maintenance mode:

1. In the IBM Systems Director navigation pane, click **Navigate Resources** to locate the host.
2. Select the host, click **Actions** from the menu bar, and select **Availability** → **Enter Maintenance Mode**, as seen in Figure 12-49.

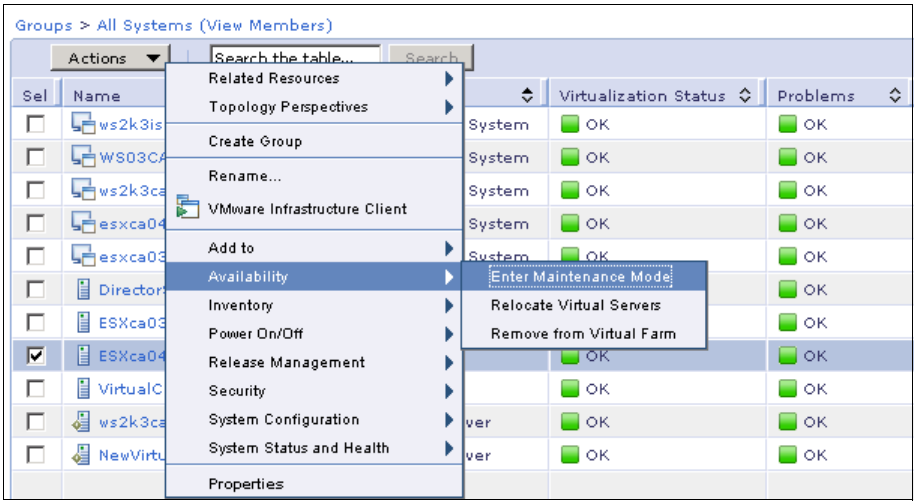


Figure 12-49 Entering maintenance mode from All Systems view in Navigate Resources

3. In the scheduler window, click **OK** to run the task immediately. You also can schedule to run this task at a later time.
4. As result you will see that a new event is logged in the Problems column and Virtualization Status column, as shown in Figure 12-50. There is no change in the ESX host icon, only the information event.

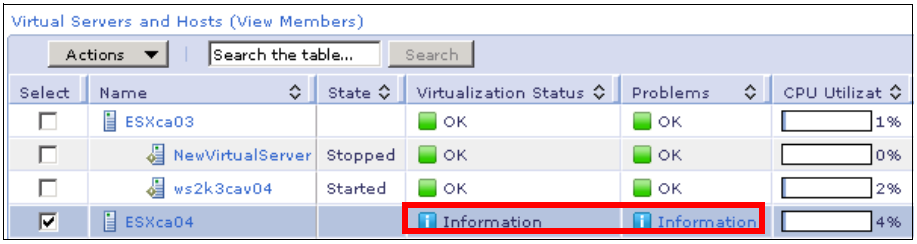


Figure 12-50 Virtualization Status and Problems column are reporting new information in the ESX host targeted

5. You can verify the information event in the problem column by clicking the **Information** link under the Problem column, as shown in Figure 12-51.

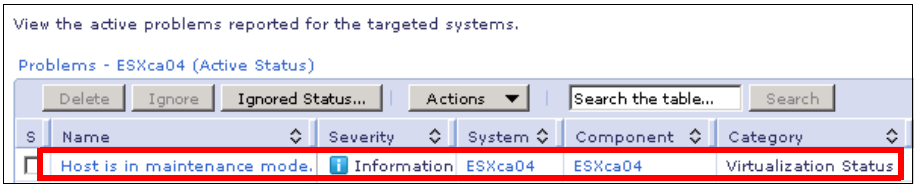


Figure 12-51 The ESX host state is notified in the Problems Active Status report

12.6.2 Exiting from maintenance mode

You can use the Exit Maintenance Mode task to enable VMware ESX Server hosts that are managed by VMware VirtualCenter 2.x to once again be targeted by tasks such as Create Virtual Server, Power On, or Relocate Virtual Server.

When the service tasks are complete, you can return the host to a fully functional state. To exit from maintenance mode:

1. In the IBM Systems Director navigation pane, click **Navigate Resources** to locate the host.
2. Select the host. Click **Actions** from the menu bar or click over the selected host and select **Availability** → **Exit Maintenance Mode**, as shown in Figure 12-52.

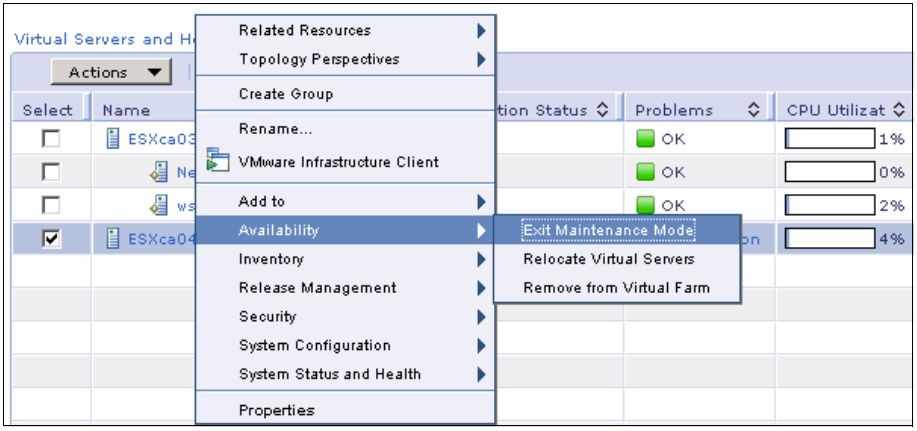


Figure 12-52 Exiting maintenance mode from the Virtual Servers and Host view

3. In the scheduler window, click **OK** to run the task immediately. You also can schedule to run this task at a later time. A job created message appears, as shown in Figure 12-53.

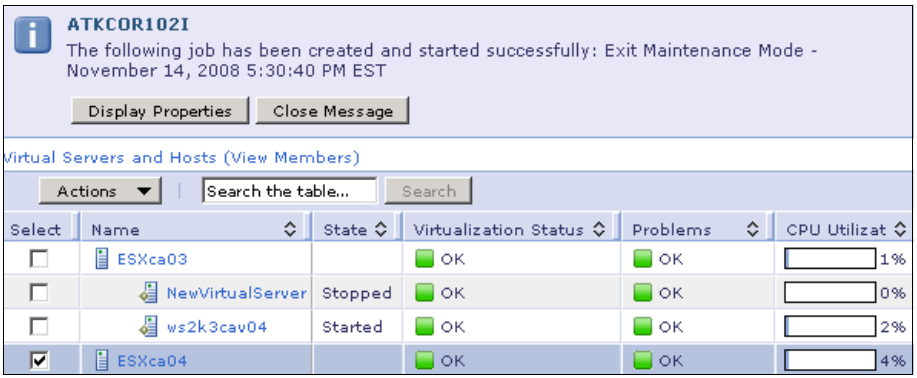


Figure 12-53 The job is sent and the host is changing its state

The host has exited maintenance mode.

12.7 Managing virtual servers

You can use IBM Systems Director to create, delete, edit, and relocate virtual servers, as well as resume and suspend virtual servers. In addition, you can perform power operations tasks such as powering on and off virtual servers.

For more information about how to manage virtual servers go to the Information Center at:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.virtual_6.1/fqm0_t_vm_managing_virtual_servers.html

The topics in this section are:

12.7.1 Connecting to a platform manager

Before you can use IBM Systems Director to perform management operations on systems that are under the control of VMware VirtualCenter or VMware ESX Server 3.x, you must be connected to the platform manager. The Connect operation is shown in Figure 12-54.

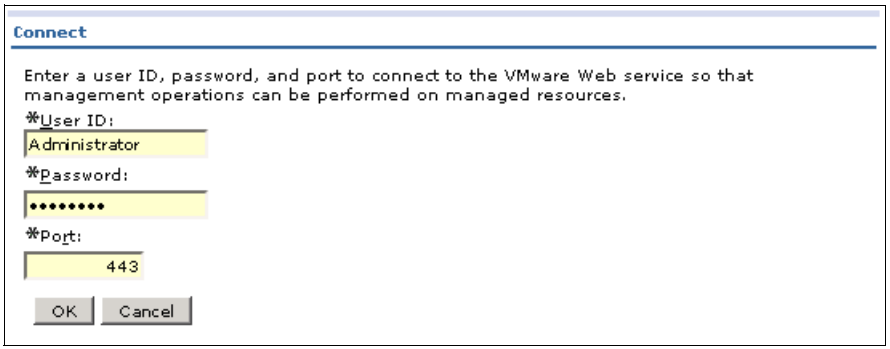


Figure 12-54 Connecting to the Virtual Center

Connect to the VMware Web services to be able to perform management operation in the ESX or ESXi servers.

To connect to a platform manager:

1. In the IBM Systems Director navigation pane, click **Navigate Resources** to locate the platform manager to which you want to connect.
2. Select the platform manager, click **Actions** from the menu bar, and select **Security** → **Connect**.
3. In the scheduler window, click **OK** to run the task immediately. You also can schedule to run this task at a later time.

12.7.2 Disconnecting from a platform manager

When you are connected to a VMware VirtualCenter platform manager or a VMware ESX Server 3.x platform manager, you can use IBM Systems Director to perform management operations on systems that are under the control of that platform manager. If you want to ensure that IBM Systems Director users cannot access VMware VirtualCenter tasks or VMware ESX Server 3.x tasks, you must disconnect from the respective platform manager.

When you disconnect from the platform manager, IBM Systems Director deletes the saved credentials for the platform manager from IBM Systems Director Server.

To disconnect a platform manager from the VMware management interface for the system:

1. In the IBM Systems Director navigation pane, click **Navigate Resources** to locate the platform manager that you want to disconnect.
2. Select the platform manager, click **Actions** from the menu bar, and select **Security** → **Disconnect**.
3. In the scheduler window, click **OK** to run the task immediately. You also can schedule to run this task at a later time. The task status appears in the Active and Scheduled Jobs panel, as shown in the Figure 12-55.

Figure 12-55 The disconnect job status

12.7.3 Creating virtual servers

Virtualization Manager includes the ability to create virtual servers on your host systems by using the Create Virtual Server wizard.

The Create Virtual Server task is available on systems running in the following virtualization environments:

- Hardware Management Console
- Integrated Virtualization Manager
- Microsoft Virtual Server
- VMware ESX Server
- VMware ESX Server hosts that are under the control of VMware VirtualCenter
- Xen virtualization

We provide information about creating an ESX virtual server in the next section. Typically, the Create Virtual Server task does not install an operating system. You install the appropriate operating system after the virtual server is created.

In the Xen virtualization environment, a prerequisite to using the Create Virtual Server wizard is to create an image to be used when the virtual server is created. Then when the Xen virtual server creation is completed, the new virtual server is ready to use.

For more information about how to create specific virtual servers go to the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/director.virtual_6.1/fqm0_c_vm_virtual_server_creation.html

12.7.4 Creating an ESX virtual server

When you create a virtual server on an ESX server, the wizard prompts you to provide information such as the name, processing units, memory, and storage to allocate to the virtual server. The information that it requests is specific to the virtualization environment in which the virtual server is being created, as shown in the Figure 12-56.

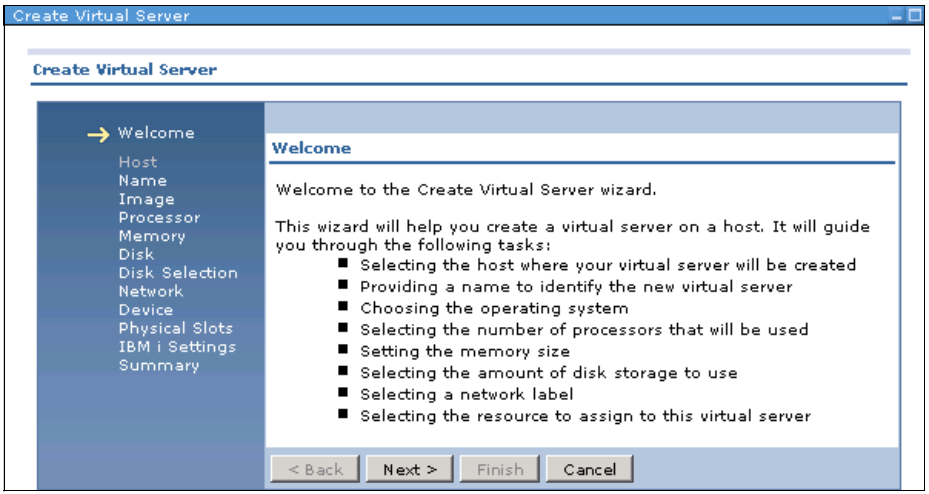


Figure 12-56 Welcome panel show the Wizard stages that the customer will set up

To create a virtual server:

1. In the IBM Systems Director navigation pane, click **Navigate Resources** to locate the host.
2. Select the host, click **Actions** from the menu bar, and click **System Configuration** → **Create Virtual Server**.
3. In the Scheduler window, click OK to run the task immediately. You also can schedule to run this task at a later time.

   The Create Virtual Server wizard now starts. Click **Next** to proceed past the welcome window. Some steps in the wizard will be greyed out because virtual server manipulation is virtualization software dependent. This means that if you are creating a virtual server in a System x environment using VMware

you will not need to assign physical slots or IBM i settings as you would if you were creating an IBM i partition or virtual server in a Power System environment. For additional information about the physical slots see:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.virtual_6.1/com/ibm/director/vsm/console/auiml/SetVSResources/PanelPhysicalSlotsHMC.html

For additional information about IBM i settings see:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.virtual_6.1/com/ibm/director/vsm/console/auiml/SetVSResources/Paneli5OSSpecificPower.html

4. Enter the name of the virtual server that you want to create (Figure 12-57).

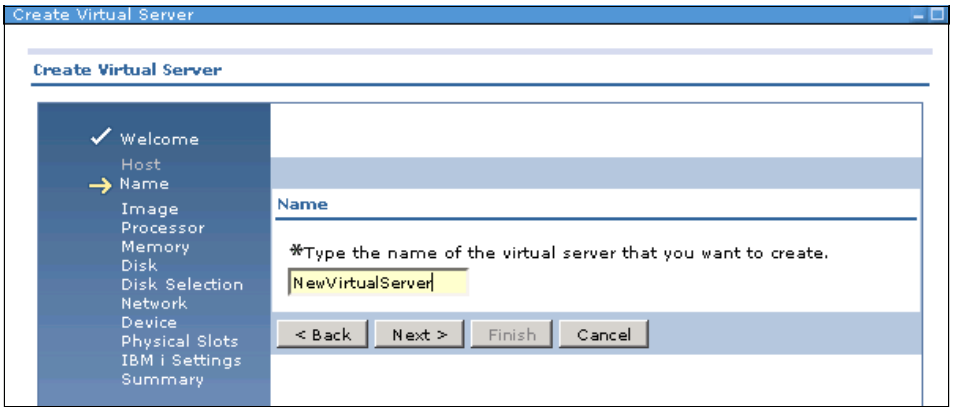


Figure 12-57 Name of the new virtual server to be created

5. Select the image that will be used as the basis of the new virtual server or, if none, specify the planned operating system to be used (Figure 12-58).

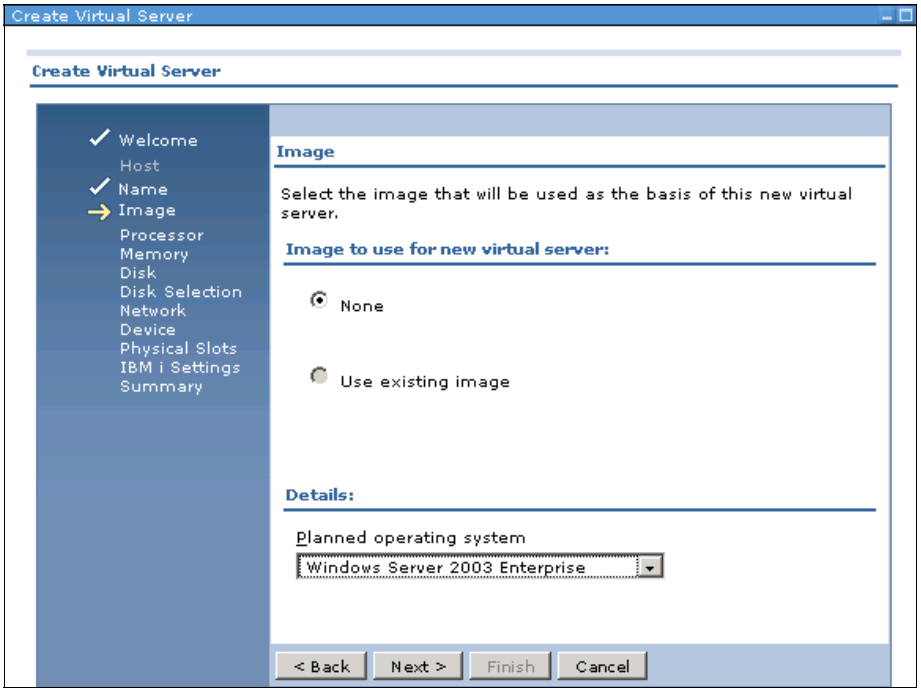


Figure 12-58 Select None or an image to be used and the planned operating system

6. Select the number of processors to be allocated to this virtual server (Figure 12-59).

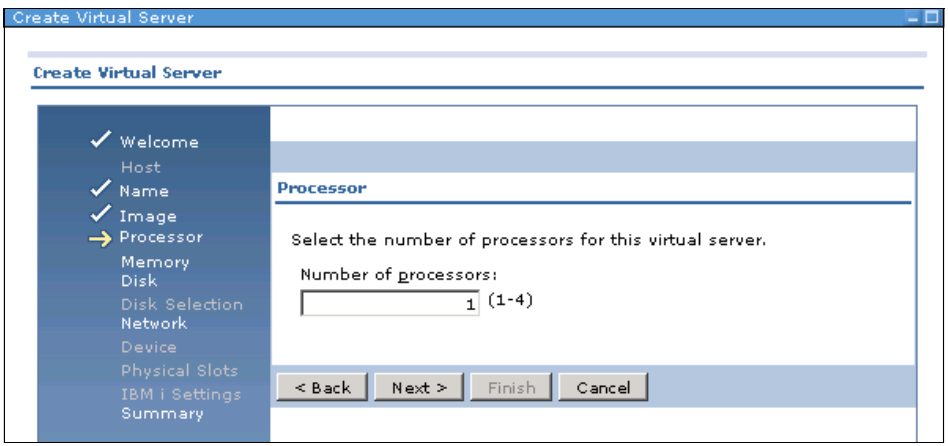


Figure 12-59 Number of processors to assign to the virtual server

7. Specify the amount of memory to be assigned to this virtual server (Figure 12-60).

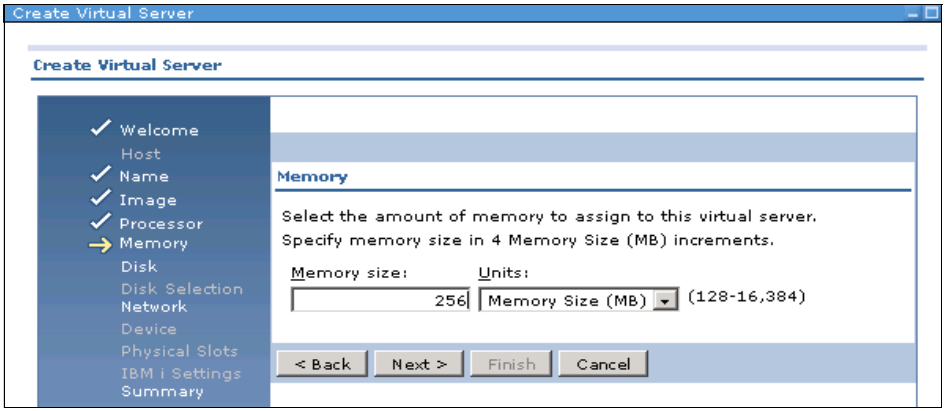


Figure 12-60 Amount of memory to be assigned to this virtual server

8. Specify the amount of disk space to be assigned to this virtual server (Figure 12-61).

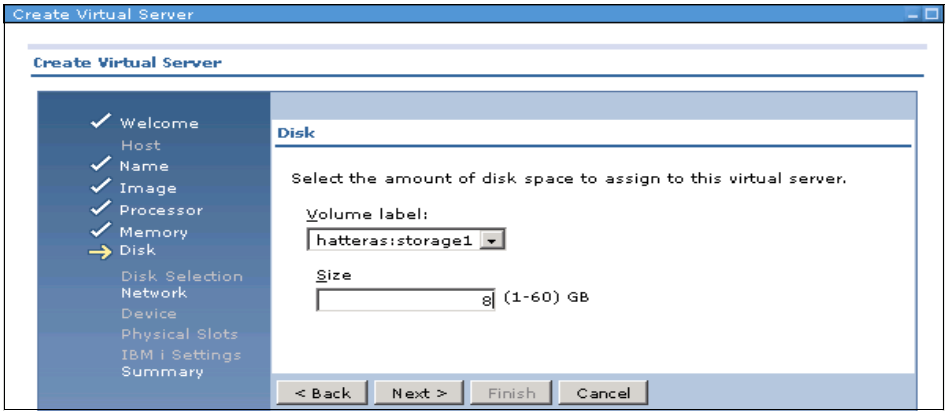


Figure 12-61 Amount of disk space to assign to the virtual server

When you create a virtual server in a Microsoft Virtual Server environment, the disk is created in the default location, `C:\Documents and Settings\All Users\Shared Documents\Shared Virtual Machines\`.

To create a virtual server in a location other than the default location, in the Virtual Server Name field, as shown in Figure 12-57, type the fully qualified path of the location where you want to create the virtual server. If the directory does not exist, it will be created.

This concept also applies to a shared storage location such as a storage area network (SAN). In this scenario the host system must have a shared drive associated with the storage location.

9. Select the network connection for use by this virtual server.

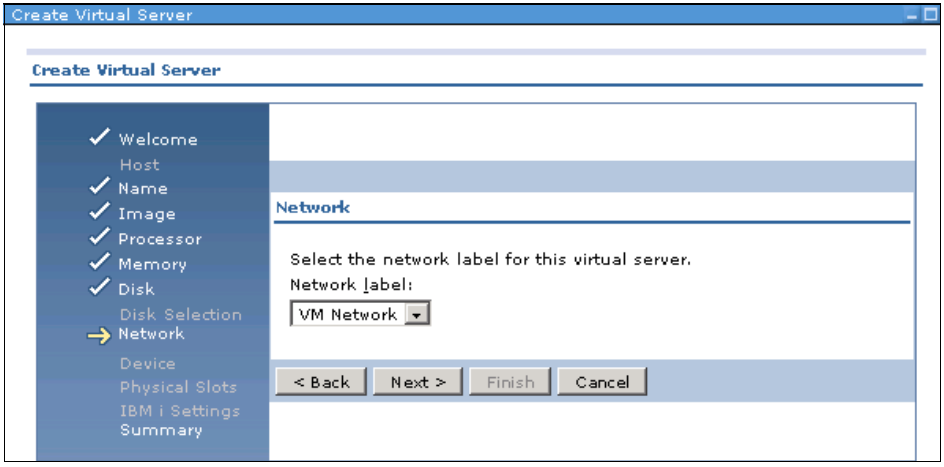


Figure 12-62 Network label for the virtual server

10. A summary page now appears. If the settings are correct, click **Finish** to create the virtual server.

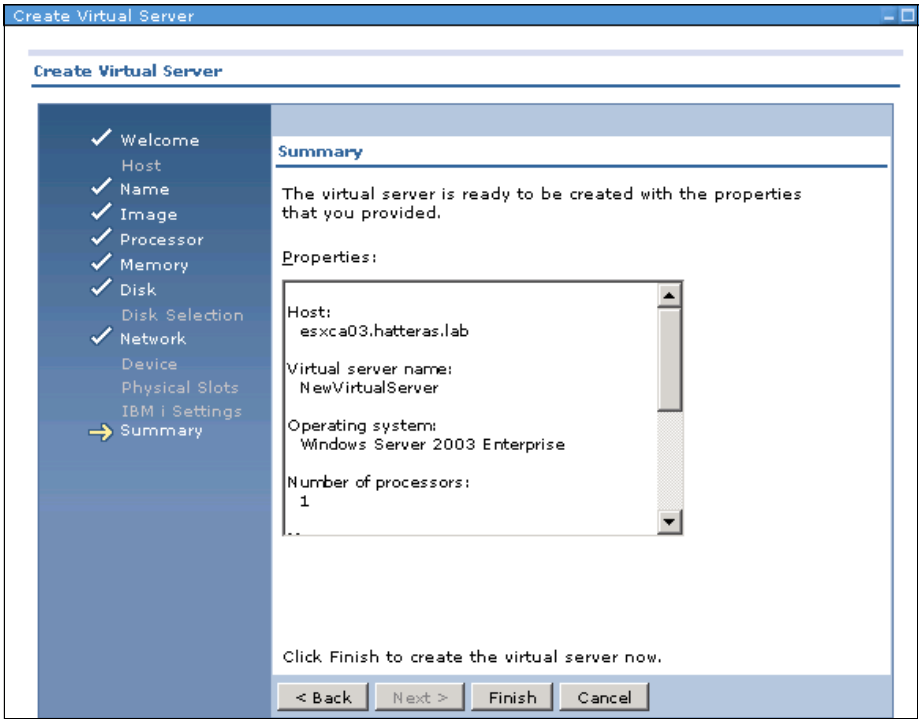


Figure 12-63 Summary, the virtual server is ready to be created

11. Choose whether to create the virtual server now or schedule it as a task to run later.

As you can see in Figure 12-64, the new virtual server is created and is ready to be loaded with the planned operating system.

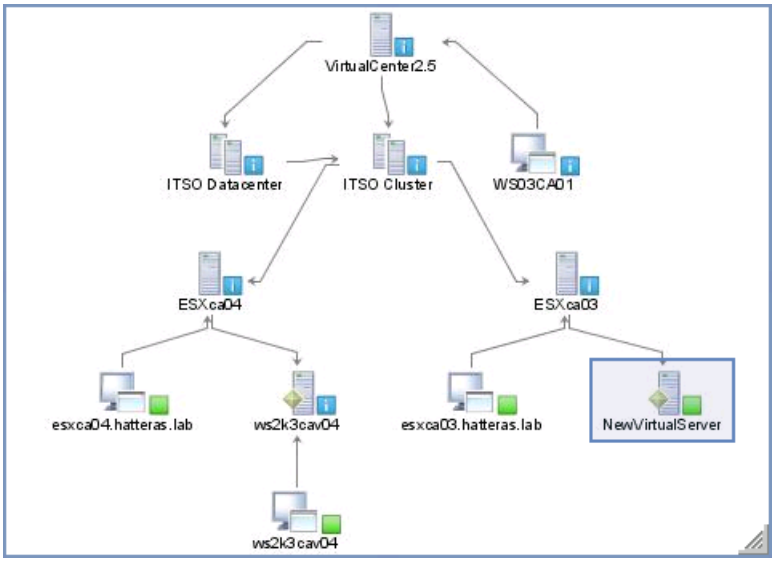


Figure 12-64 Topology showing the updated tree layout

12.7.5 Editing host resources

You can edit the virtual resources allocated to a virtual server. Depending on the platform, you can edit resources such as memory, processors, and virtual disks.

You can edit the resources for an ESX host that is under VMware VirtualCenter control to enable relocation for VMware VirtualCenter VMotion® (Figure 12-66).

You can also edit host resources for an IBM Power System. For Power Systems that are under the control of the Hardware Management Console or the Integrated Virtualization Manager you can edit disk resources for the host, as well as processor and memory allocations for the virtual servers that are running on the host.

Tips: The Edit Host Resources task might take several minutes to complete for Power Systems that are managed by the HMC or IVM. Results can be found in the job log associated with the request.

You can also automate this task using the systems management command-line interface (SMCLI). For more information, see 12.8, “Virtualization smcli commands” on page 634.

To edit host resources:

1. In the IBM Systems Director navigation area, click **Navigate Resources** to locate the host that you want to edit. Right-click over the target host as shown in Figure 12-65 and click **System Configuration** → **Edit Host**.

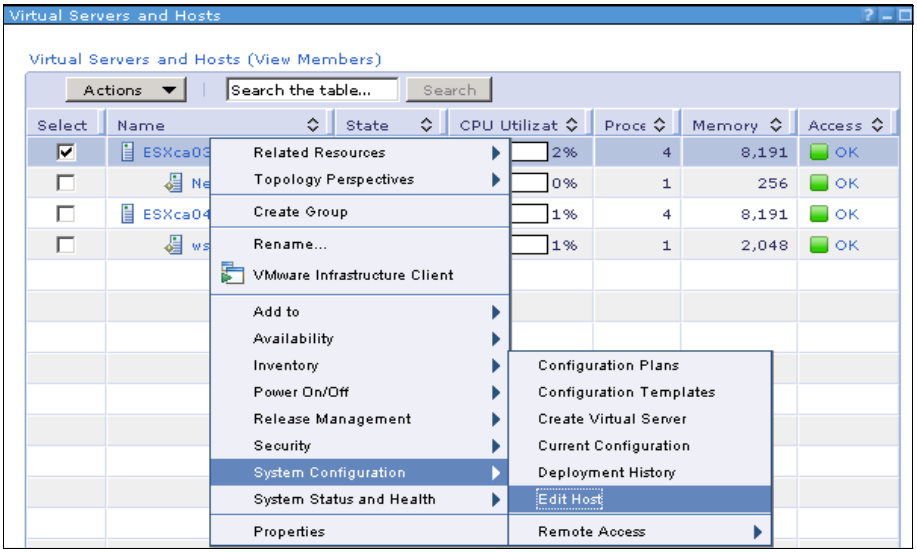


Figure 12-65 Editing a targeted host

The Edit Host Resources window opens (Figure 12-66).

2. Complete the changes that you want to make and click **OK**. A VMotion network example is shown in Figure 12-66.

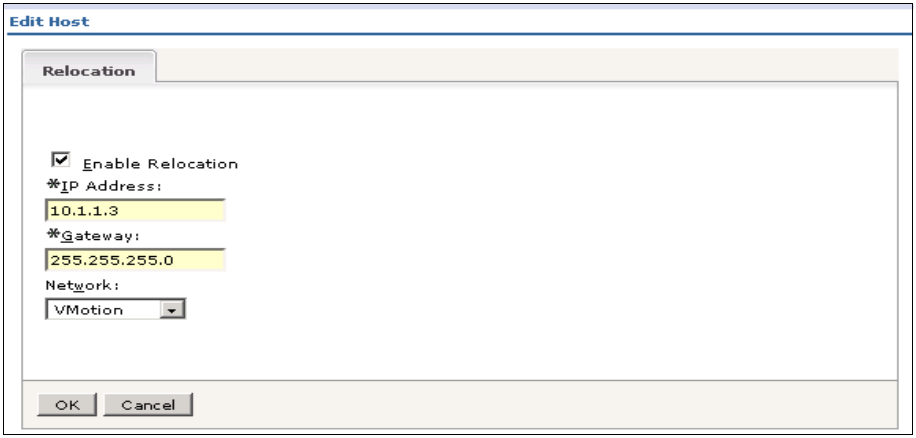


Figure 12-66 Editing ESX host relocation properties in VMware VirtualCenter environment

3. In the scheduler window, click **OK** to run the task immediately. You also can schedule to run this task at a later time.

12.7.6 Editing virtual servers

You can edit the virtual resources that are allocated to a virtual server. Depending on the platform, you can edit resources such as memory, processors, and virtual disks. To edit the virtual resources of a virtual server:

1. In the IBM Systems Director navigation area, click **Navigate Resources** to locate the virtual server that you want to edit.
2. Select the virtual server, click **Actions** from the menu bar, and select **System Configuration** → **Edit Virtual Server**, as shown in Figure 12-67.

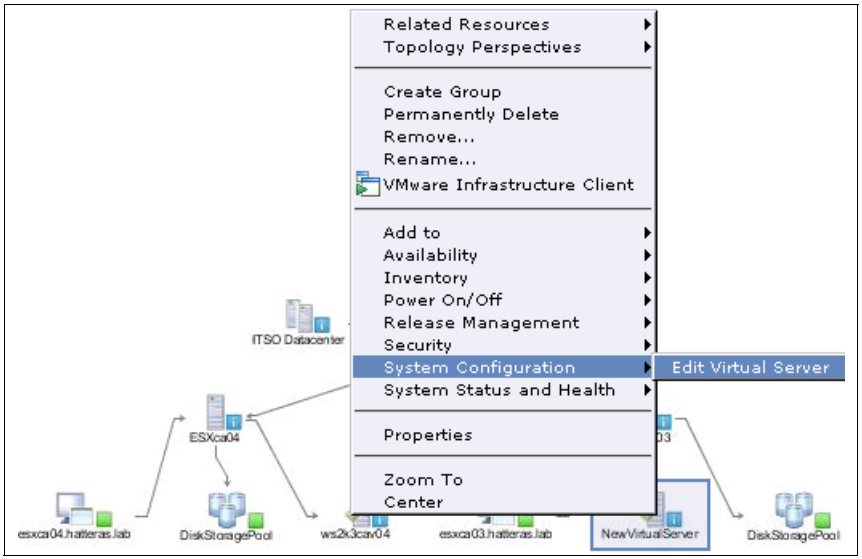


Figure 12-67 Editing a powered-off ESX virtual server

3. In the scheduler window, click **OK** to run the task immediately. You also can schedule to run this task at a later time.

You must power off a virtual server before you can change the values of most attributes. The following exceptions apply:

- For a VMware VirtualCenter or VMware ESX Server environment and Microsoft Virtual Server environment, the virtual server can be running when you change the value of the undoable disk attributes.
- In a Power Systems environment in which systems are managed by the Hardware Management Console or the Integrated Virtualization Manager, the

virtual server can be running when you edit memory and processor allocations.

The resources that you are able to edit vary by the type of virtual server to which the resources are allocated. These are outlined in the following subsections.

VMware VirtualCenter and VMware ESX Server

In a VMware VirtualCenter or VMware ESX Server environment, you can set the memory size, the number of virtual CPUs, the virtual disk type as shown in Figure 12-68, and the PowerON and PowerOFF action for undoable disks.

Note: The PowerOn and PowerOFF actions for undoable disks cannot be set for VMware ESX Server 3.0.

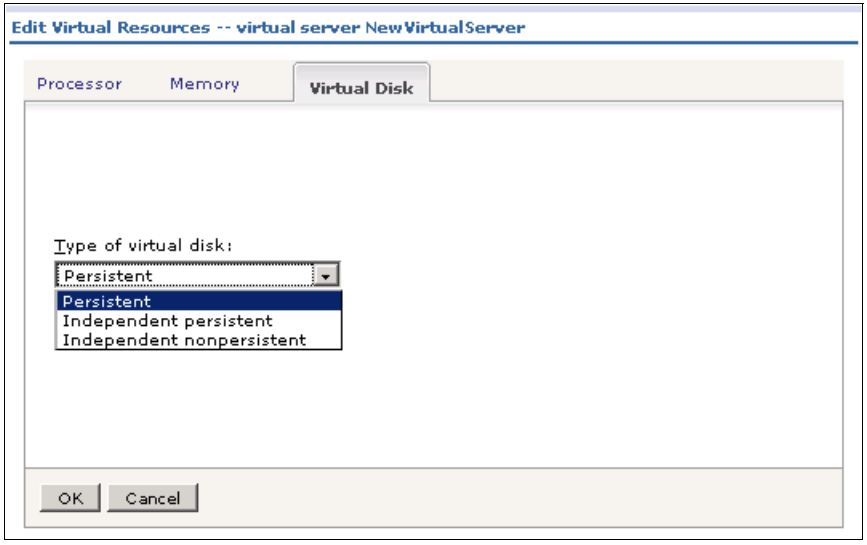


Figure 12-68 ESX virtual server Type of virtual disk

If VMware VirtualCenter is using VMware Distributed Resource Scheduler (DRS) you can choose whether a virtual server can move from its current host.

If VMware VirtualCenter is using VMware High Availability (HA) you can edit the restart priority.

Power Systems

In a Power Systems environment, you can edit the minimum, maximum, and assigned processors for virtual servers in both shared processor mode and dedicated processor mode, as shown in Figure 12-69, whether they are running or not.

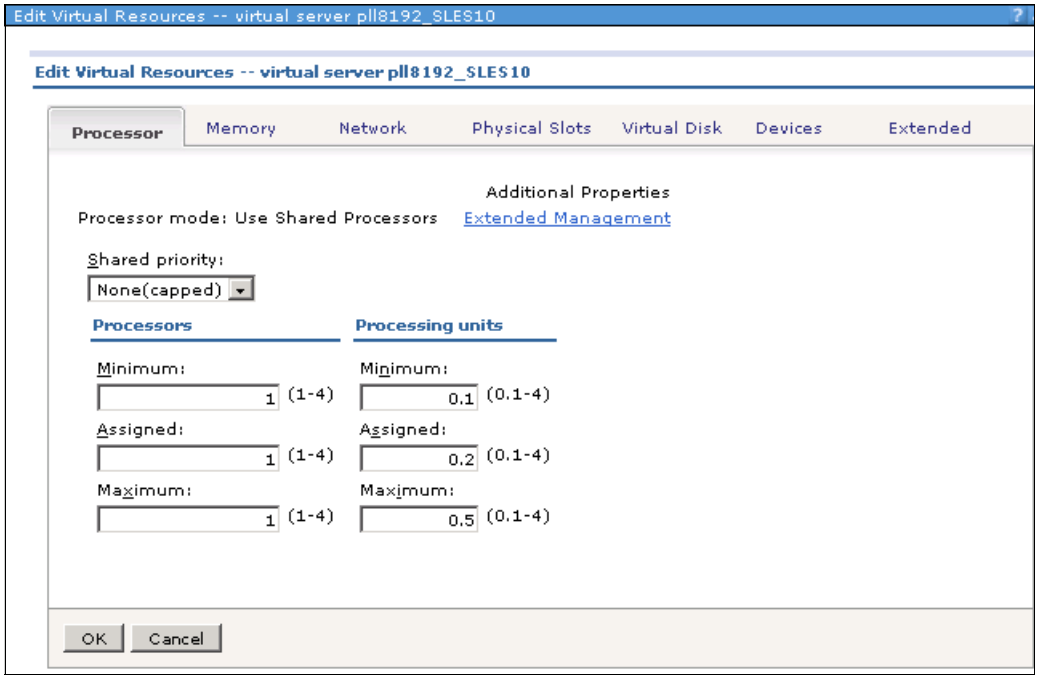


Figure 12-69 Editing processor mode and units

You can also edit the virtual or physical disks that are assigned, the minimum and maximum memory that are assigned, virtual Ethernet adapters, and the optical devices that are assigned to a virtual server, as seen in Figure 12-70 to Figure 12-76.

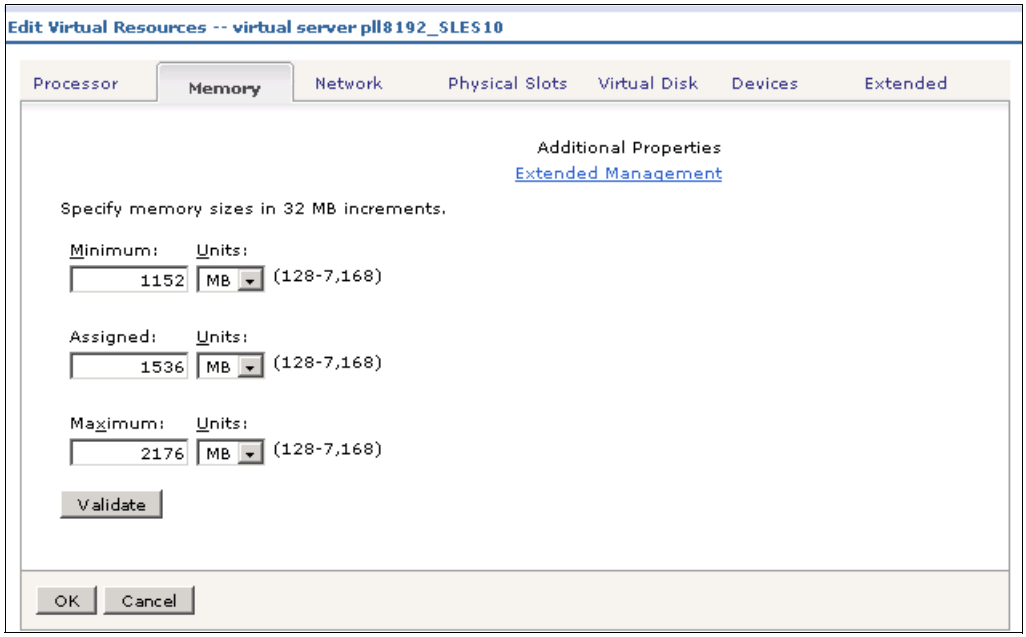


Figure 12-70 Specify memory size for the targeted LPAR

In the Processor and Memory panels there is a Extended Management additional properties link. If you click over the link, the message in Figure 12-71 is shown.

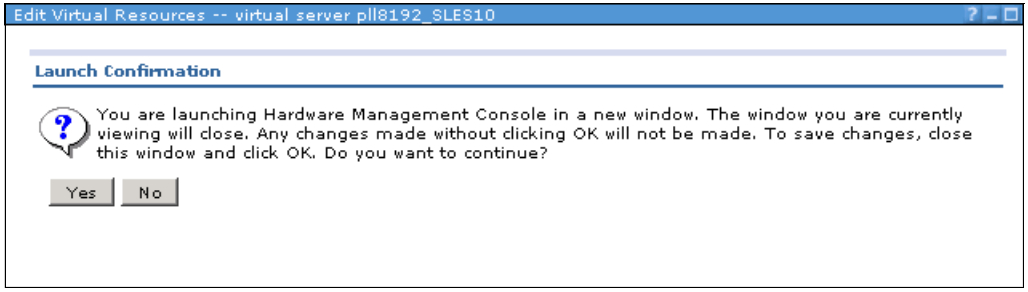


Figure 12-71 Launch confirmation to see additional properties

Clicking **Yes** launches in context to the original IVM of HMC management console, as shown in Figure 12-71.

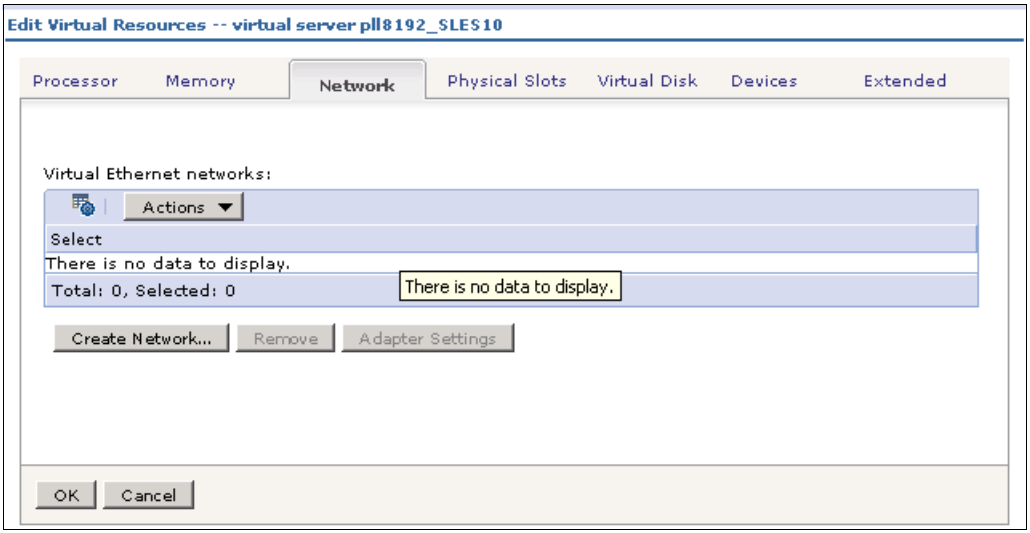


Figure 12-72 Network configuration panel

In a Power Systems environment that is managed by the HMC or the IVM, you can edit the physical I/O slots that are assigned to a virtual server so that you can assign non-virtualized I/O devices such as physical storage or Ethernet adapters. See Figure 12-73.

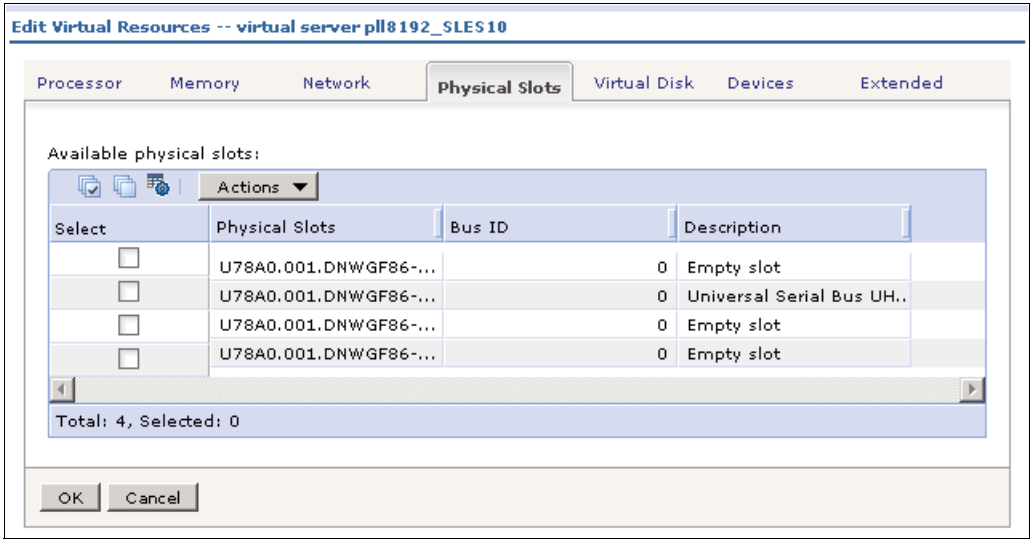


Figure 12-73 Configuring the Power physical slots

You can select the virtual disks and physical volumes that you want assigned to a specific virtual server, as shown in Figure 12-74.

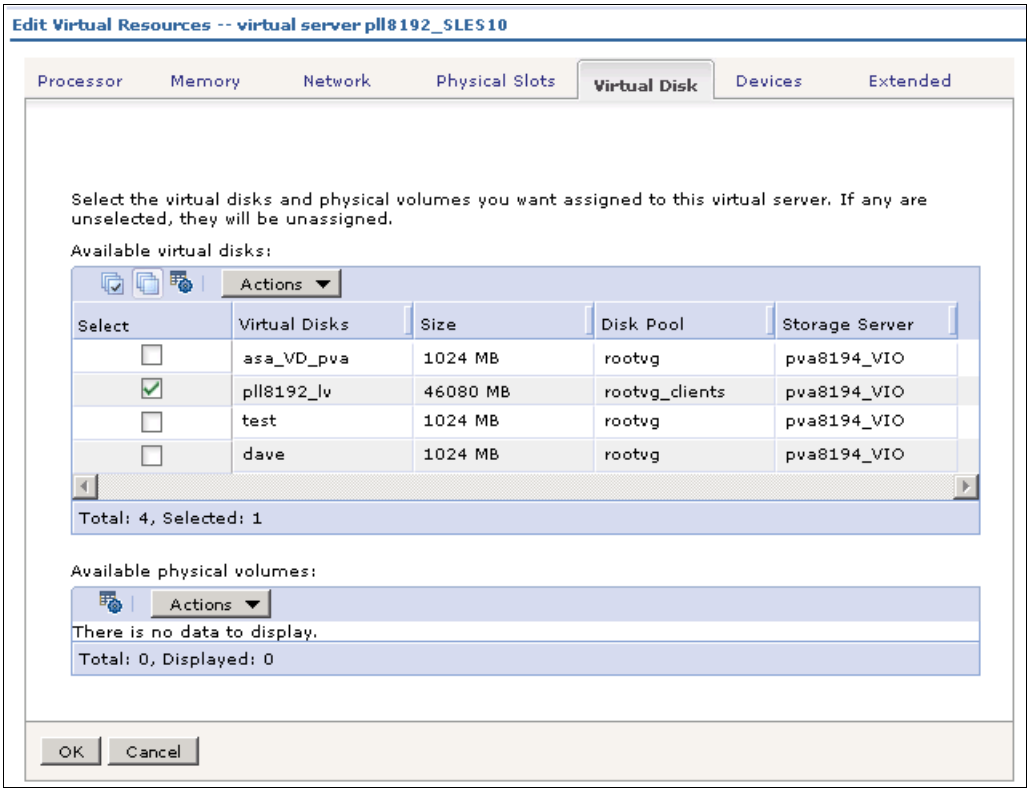


Figure 12-74 Available virtual disks and physical volumes

Note: The edit virtual resources task might take several minutes to complete for Power Systems that are managed by the HMC or the IVM. Check the job instance log for status.

Note: For a Virtual I/O Server partition in HMC as in IVM, you can edit only memory and processor resources.

You can select the available devices that you want assigned to a specific virtual server. In this case we have a SATA DVD drive able to be selected, as shown in Figure 12-75.

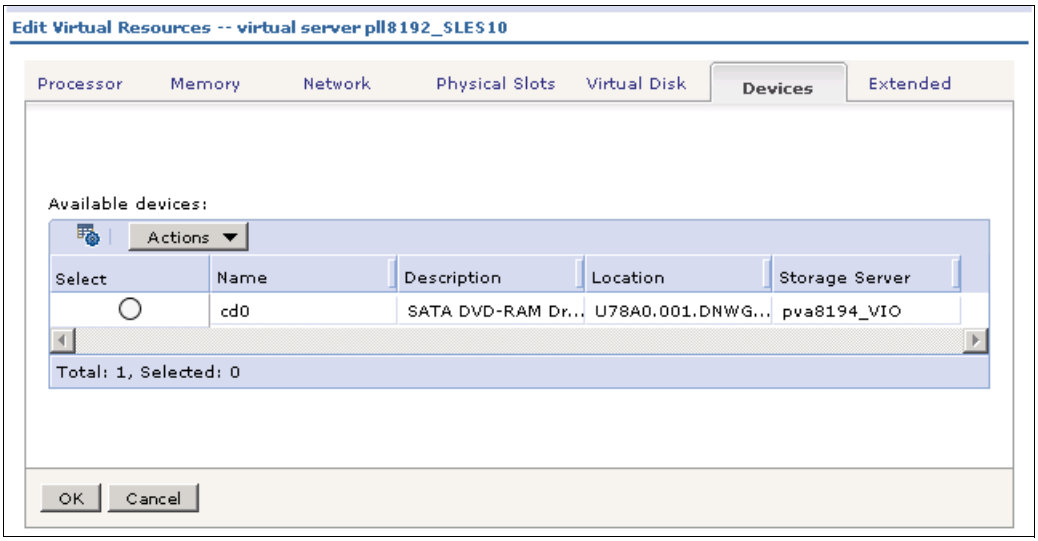


Figure 12-75 Editing physical devices, a DVD

You can Launch the Advanced Platform Manager in the last tab of the Edit virtual resources wizard if you must access any other function not supported for IBM Systems Director, as shown in Figure 12-76.

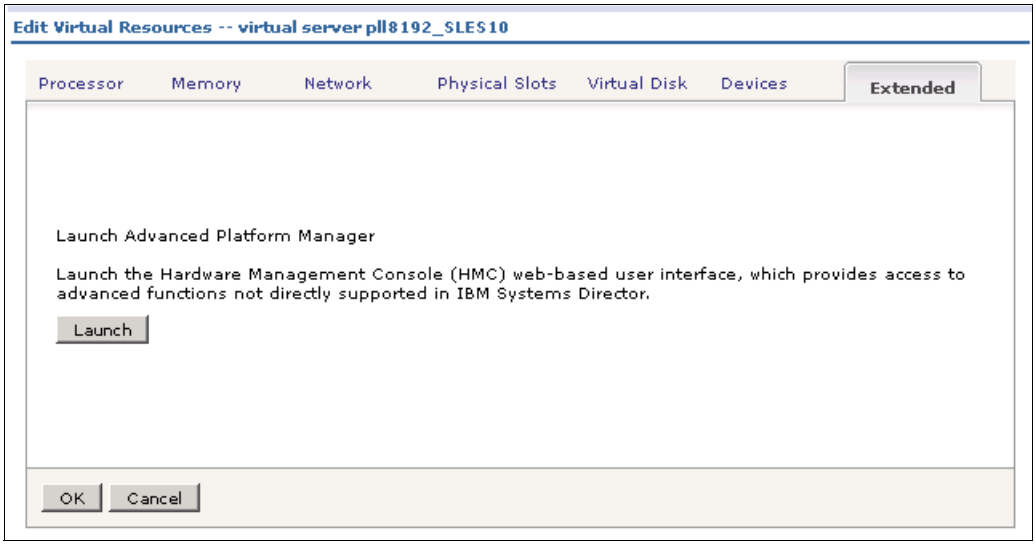


Figure 12-76 Launch Advanced Platform Manager

The options listed above to edit virtual resources apply for HMC and IVM in the same way for all the logical partitions.

For virtual servers that are powered on and managed by the HMC, you can choose to change virtual server settings temporarily or permanently. Temporary changes remain in effect only until you power off the virtual server.

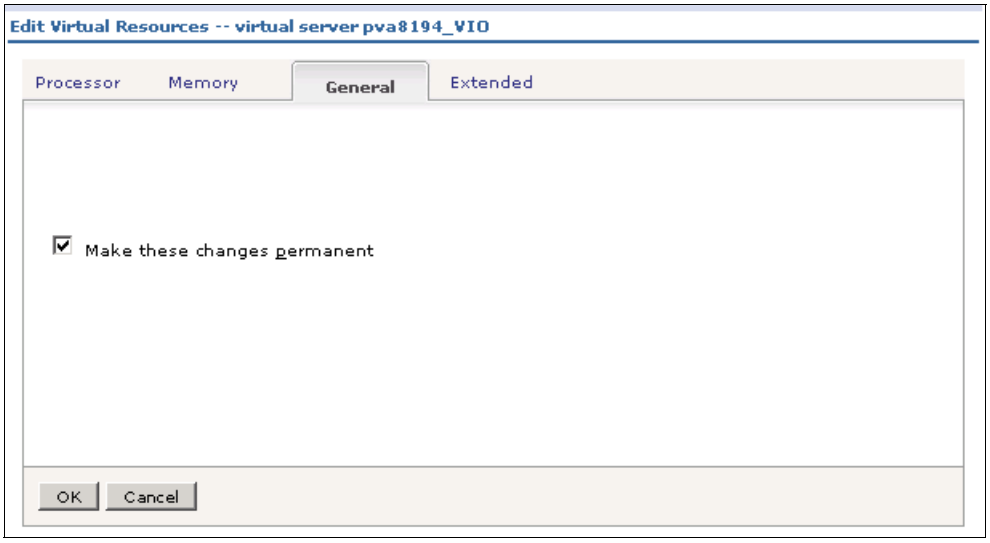


Figure 12-77 Editing the permanent changes properties (HMC)

IBM i

For virtual servers running the IBM i operating system, you can select a load source and an alternate restart device (Figure 12-78).

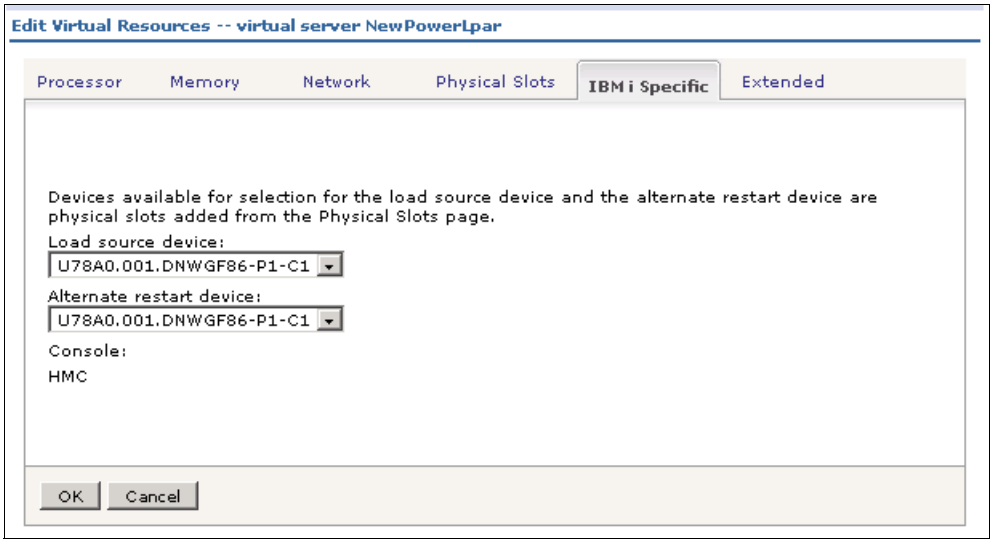


Figure 12-78 IBM i specific properties: Load source device and alternate restart device

Microsoft Virtual Server

In a Microsoft Virtual Server environment, you can set the memory size, the virtual disk mode, and the PowerOFF action for undoable disks.

Xen

In a Xen environment, you can edit the processors assigned to the virtual server, the minimum and maximum memory available, and the virtual disk assigned, as shown in Figure 12-79.

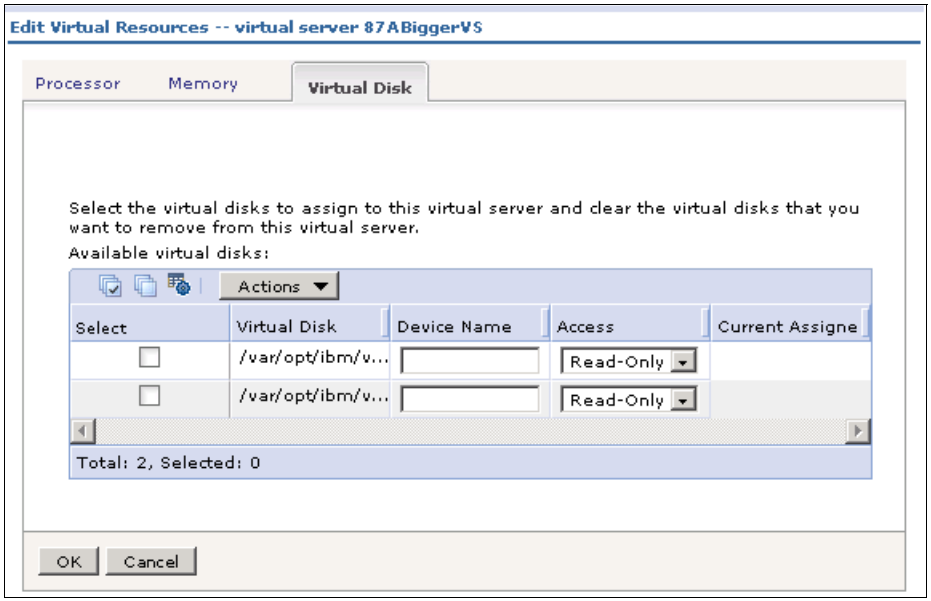


Figure 12-79 Editing virtual resources for a Xen Virtual server: Processor, memory, and virtual disk

To create a new virtual disk on the Xen host system when you want to assign additional virtual disks to your Xen virtual servers refer to the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.virtual_6.1/fqm0_t_vm_creating_a_virtual_disk_xen.html

After you have that done, you will be able to see the virtual disks listed in the Edit virtual resources for the Xen host field. This feature is only available for the Xen hypervisor.

12.7.7 Accessing the Xen remote console

Access the Xen console remotely for your Xen virtual servers and hosts by right-clicking the host, then clicking **System Configuration** → **Remote Access** → **Remote Xen Console**, as shown in Figure 12-80.

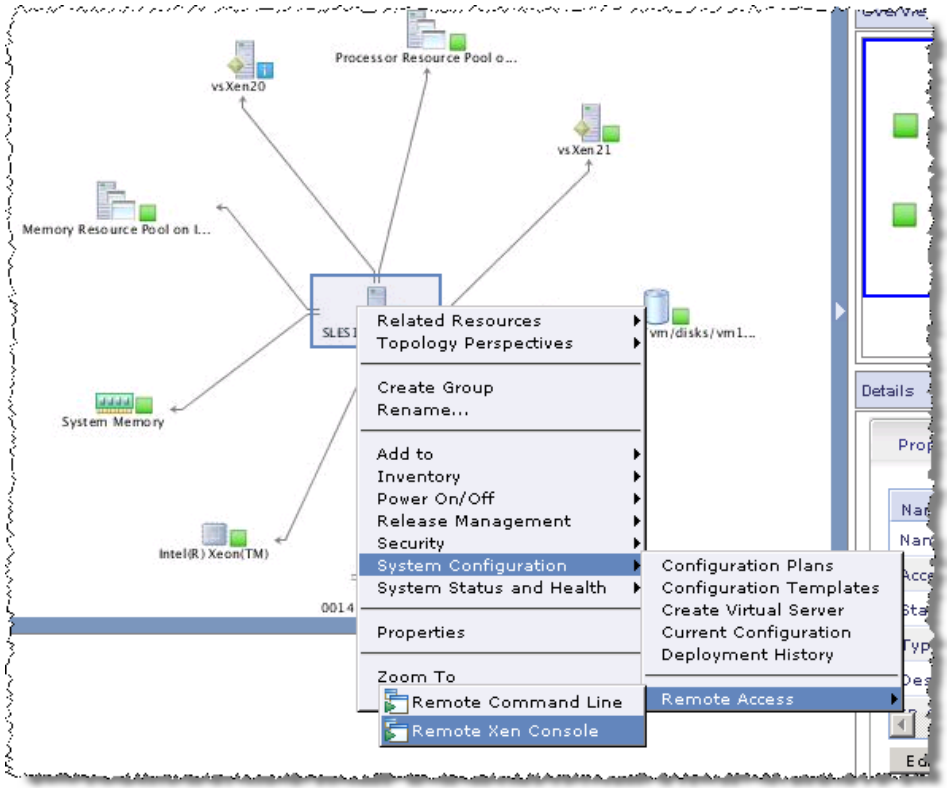


Figure 12-80 Launching the remote console from the Xen host Platform Agent

The remote console opens a terminal to the Platform Agent system, which in this case is the Xen host.

To access a Xen console remotely in a virtual server, in the IBM Systems Director navigation pane, click **Navigate Resources** from your topology view to locate the Xen virtual server that you want to access remotely. Select the virtual server, click **Actions** from the menu bar, and select **System Configuration** → **Remote Access** → **Launch Remote Console**, as shown in Figure 12-81.

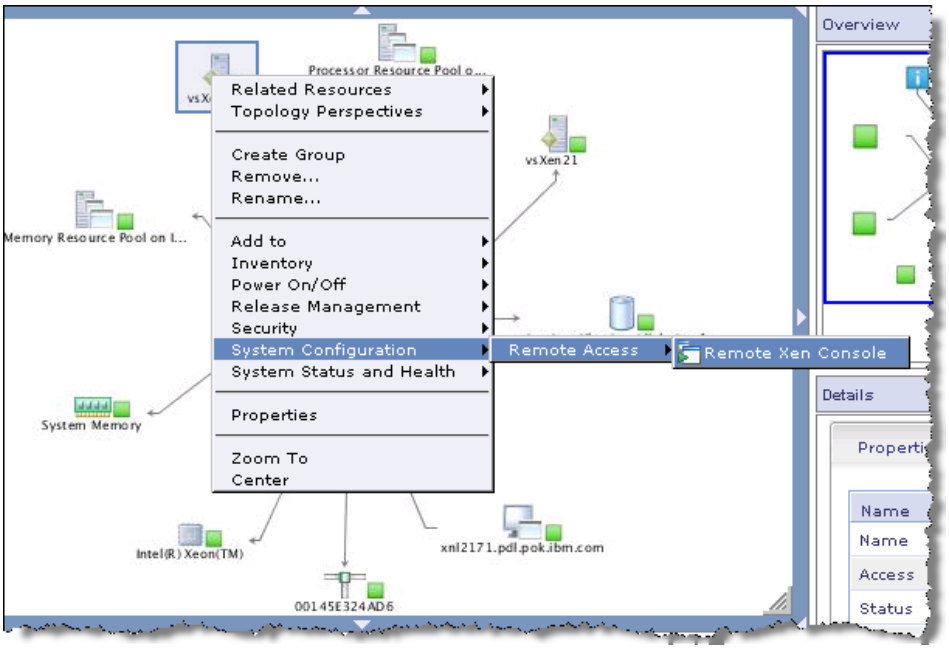


Figure 12-81 Virtual Server Remote Xen console

The Virtual Server console appears, as seen in Figure 12-82.

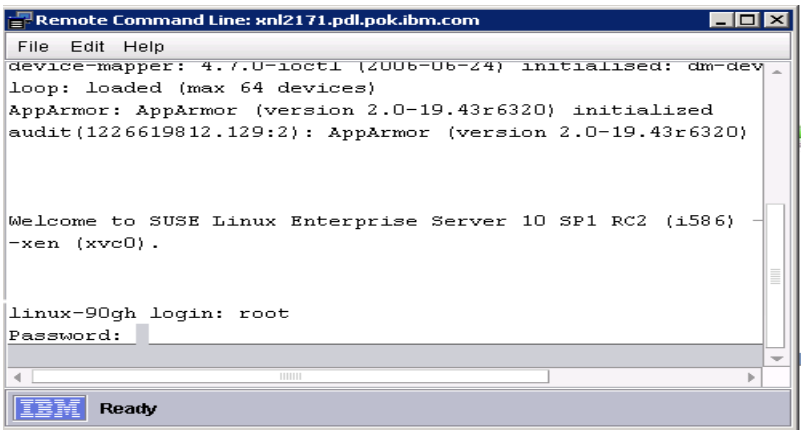


Figure 12-82 The Xen virtual server console comes up

12.7.8 Managing power operations on virtual servers

IBM Systems Director supports power operations that you can perform on virtual servers. You can complete the following tasks on individual virtual servers:

- Power On

  The virtual server is turned on.

- Restart Now

  The virtual server is restarted immediately, which means that it is restarted without an orderly shutdown of its guest operating system. This immediately stops all applications that are in use on that guest operating system.

- Power Off Now

  The virtual server is turned off without an orderly shutdown of its guest operating system. This immediately stops all applications that are in use on that guest operating system.

- Shutdown and Power Off
  - VMware VirtualCenter and VMware ESX Server

    If VMware Tools is installed on the guest operating system, this menu option performs an orderly shutdown of the guest operating system and then turns off the virtual server. However, if VMware Tools is not installed on the guest operating system, this menu option fails with the message:

    ```
    The operation Graceful power off virtual server task cannot be
    performed for system NewVirtualServer. The command to the Common
    Agent running on the system failed with a returned error message
    of Unable to perform this command without VMware tools installed.
    ```

  - Microsoft Virtual Server

    If the guest operating system is a Windows operating system and if Microsoft Virtual Machine Additions is installed on the guest operating system, this menu option performs an orderly shutdown of the guest operating system and then turns off the virtual server.

- Suspend

  The virtual server remains turned on but is suspended from use.

- Resume

  The virtual server resumes operation and is no longer suspended.

Restriction: Systems that are controlled by a Hardware Management Console do not have the following power options available:

- Shutdown and power off
- Suspend
- Resume

To perform a power management operation for a virtual server:

1. In the IBM Systems Director navigation pane, click **Navigate Resources** to locate the virtual server.
2. Select the virtual server, click **Actions** from the menu bar, and select **Power On/Off** and the power action that you want to perform. An example is shown in Figure 12-83.

   Only those operations that are applicable to the selected virtual server are available to perform. For example, if a virtual server is suspended, the only available power action is Resume.

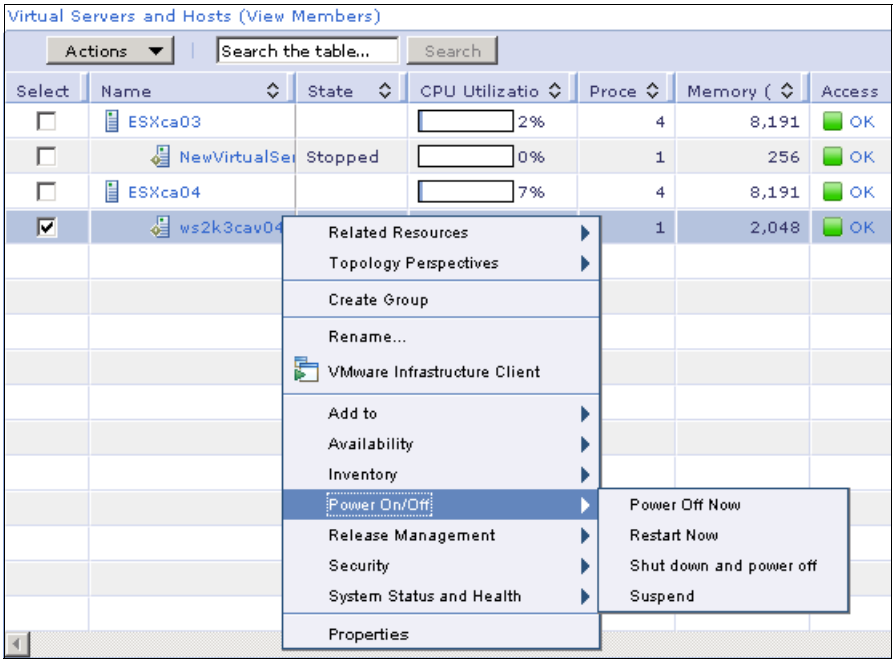


Figure 12-83 Power options in a powered on virtual server

3. In the scheduler window, click **OK** to run the task immediately. You also can schedule to run this task at a later time.

4. Verify the information on the Active and Scheduled Jobs panel each time that you perform a power task operation, as shown in Figure 12-84.

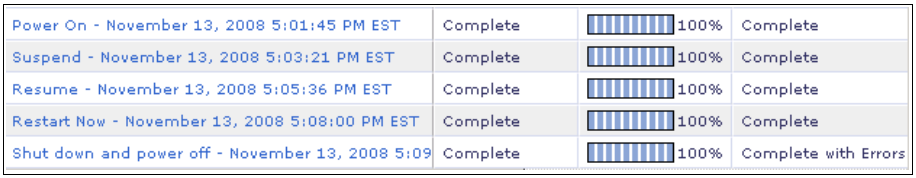


Figure 12-84 Active and Scheduled Jobs

Note: (Virtualization Manager subagent for VMware VirtualCenter only)

Without Virtualization Manager, a power operation for a virtual server is initiated through VMware VirtualCenter. VMware prompts the administrator with a question about whether you want to commit the changes in the ESX server with undoable disks. With Virtualization Manager, IBM Systems Director responds to these questions instead. This can be confusing because VMware VirtualCenter still reports that there are questions to answer, even though IBM Systems Director has already answered them.

You can disregard the questions that might appear in VMware VirtualCenter. This situation does not occur when using the Virtualization Manager Agents for VMware ESX Server.

Undoable disks

An undoable disk is a type of virtual disk that saves changes to a temporary file instead of to the virtual disk itself. Changes can be committed when the virtual machine is turned off.

IBM Systems Director creates virtual servers that contain undoable disks. You can create and view these virtual servers in IBM Systems Director, which supports power operations and relocation for virtual servers that contain undoable disks.

In IBM Systems Director, each virtual server that has undoable disks can have PowerON and PowerOFF actions that are used to answer questions from the associated virtualization application when that virtual server is turned on or turned off. The available actions vary, depending on which Virtualization Manager subagent is controlling the virtual server:

- Virtualization Manager subagent for VMware VirtualCenter and VMware ESX Server only

  By default, when a virtual server is turned off, changes are written immediately to disk, which is the PowerOFF Commit action. If you configure a PowerOFF action but do not configure a PowerON action, then by default changes saved in the redo log are applied to disk when the virtual server is turned on, which is the PowerON Commit action.

  Note: PowerON and PowerOFF actions are not supported on VMware ESX Server 3.0.

- Virtualization Manager subagent for Microsoft Virtual Server only

  IBM Systems Director provides PowerOFF actions only for virtual servers with undoable disks in Microsoft Virtual Server. To configure PowerON actions, you must use the Web interface to Microsoft Virtual Server. By default, when a virtual server is turned off, changes to the virtual disk are saved in a redo log, which is the PowerOFF Keep action.

For detailed information about the undoable disk implementation for a virtualization application, see its included documentation.

12.7.9 Relocating virtual servers

You can use Virtualization Manager to relocate a single virtual server or all of the virtual servers on a host. Virtual server relocation is the act of moving a virtual server from one host to another host. Two types of relocation exist:

- Live relocation
- Static relocation

The types of relocation that are available for a system are dependent on the virtualization environment.

Live relocation does not modify the power state of the virtual server throughout the relocation. For example, if a virtual server is powered on when the relocation begins, it remains powered on with guest operating systems available for use

throughout the relocation process. Live relocation is an option in the following virtualization environments:

- IBM Power Systems that are under the control of the HMC or the IVM
- VMware VirtualCenter with VMware ESX Server hosts
- Xen

If a virtual server is powered on during static relocation, the relocation operation powers off the virtual server at the beginning of the relocation process and powers on the virtual server again when the relocation is complete. Only static relocation can be used when you are running in one of the following virtualization environments:

- Microsoft Virtual Server
- VMware ESX Server (without VirtualCenter)

Relocation requirements

Before you start a virtual server relocation, ensure that the systems meet the relocation requirements:

- Relocation of virtual servers is possible only between hosts within the same virtual farm.
- Both the source and target host must have access to a shared storage area network (SAN).

  For Xen relocation, the virtual server image must be available on a shared storage volume, with that volume mounted by both the source and the target host.
- Both the source and target host must have access to a shared communications network.
- The target host must have enough memory to support the virtual server.

  Additionally, for Xen, the source host must have memory available that is equal to or greater than the virtual server or virtual servers that you want to relocate.
- The target host must support the configuration version of the virtual server.
- Relocation of clustered virtual servers is not supported.
- Relocation of virtual servers that are suspended or in a transition state is not supported.

  Additionally for Xen, the virtual server cannot be in an offline or paused state.
- Source and target hosts must have a virtual network device with the same label.

  For Xen, the bridge must have the same name on both the source and target hosts.

- Virtual servers to be relocated cannot be connected to a removable device such as a CD drive or diskette drive.
- The version of a configuration file for a virtual server must be supported by the virtualization application with which the Virtualization Manager subagent communicates.
- For IBM Power Systems, to relocate a virtual server ensure that you meet the minimum virtualization software requirements for the HMC and the IVM.

IBM Power Systems relocation leverages Live Partition Mobility functionality, a component of the PowerVM™ Enterprise Edition hardware feature. To use the relocation functionality in IBM Systems Director, you must meet the requirements described in the preparation sections in the “Moving the mobile partition using the HMC” or “Moving the mobile partition using the Integrated Virtualization Manager” topics in the IBM Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.virtual_6.1/fqm0_c_relocation_requirements.html

Live relocation

You can perform live relocation of virtual servers when using the Virtualization Manager subagent for VMware VirtualCenter and for Xen. You can also relocate a virtual server that is running on an IBM Power Systems that is under the control of the Hardware Management Console or the Integrated Virtualization Manager.

Live relocation in a VMware ESX environment

Live relocation for VMware VirtualCenter is supported only for hosts that are running VMware ESX Server in a VMware VirtualCenter environment. The guest operating systems on relocated virtual servers remain available for use. They are not shut down.

VMware VirtualCenter VMotion must be enabled on both the source host and target host, between which you want to perform a live relocation of virtual servers. You can use the VMware VirtualCenter client to enable VMotion for the applicable hosts. For information about VMware VirtualCenter VMotion requirements, see the documentation included with VMware VirtualCenter:

http://pubs.vmware.com/vi301/admin/wwhelp/wwhimpl/common/html/wwhelp.htm?context=admin&file=BSA_Migration.18.5.html

Note: Remember the following relocation concepts used with VMware:

- When using VMware VirtualCenter, you can use Virtualization Manager to set a host attribute that enables relocation.
- Live relocation is not supported for virtual servers that contain undoable disks with the PowerOFF action to keep (that is, save the changes in a redo log).
- During a live relocation, VMware VirtualCenter is sometimes unable to relocate a virtual server in an active state, as requested.
- In the VMware VirtualCenter documentation, live relocation is referred to as migration with VMotion.

Relocate Virtual Server wizard

You can relocate a single virtual server or all virtual servers on any kind of host by running the relocation wizard. You can also create a relocation plan to facilitate relocation. You can run the relocation plan immediately or save the plan to run later. The Relocate Virtual Server wizard gives you the following options:

- Relocate and save plan.
- Save plan only.
- Relocate only.

Note: With the relocate only option, the relocation job is run directly.

To relocate one or more virtual servers using the Relocate Virtual Server wizard:

1. From the navigation area, expand **Availability**, as shown in Figure 12-85, and click **Relocate**. The relocation wizard starts.

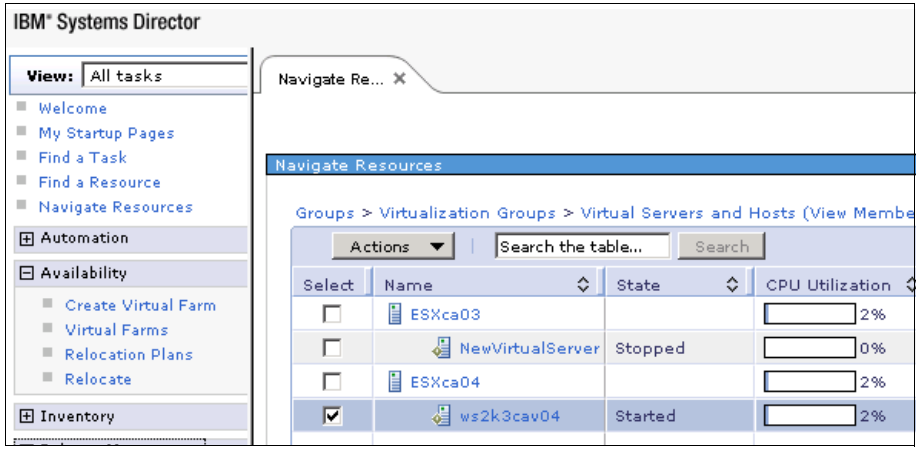


Figure 12-85 Availability panel to start relocate or relocation plans

2. Select a host to relocate its virtual servers. This could be all the virtual servers in a specific host or only one virtual server, as shown in Figure 12-86. Click **Next** to continue.

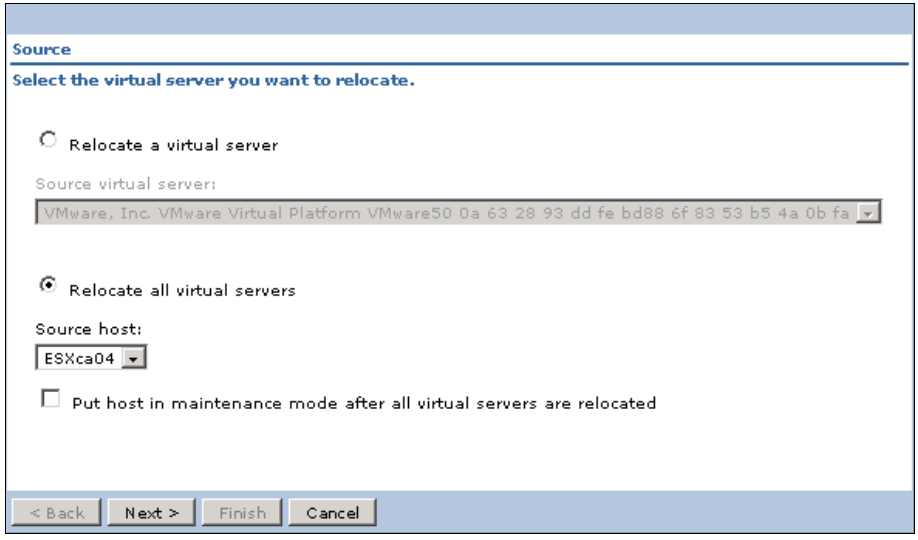


Figure 12-86 Select the virtual server that you want to relocate

3. Select the target host to which the virtual server will be relocated, as shown in Figure 12-87.

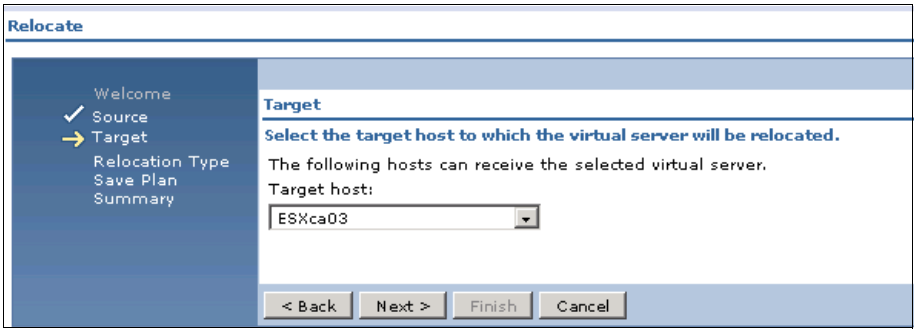


Figure 12-87 Selecting the target host to which the virtual server will be relocated

4. Select whether you want to save this as a relocation plan and whether you want to relocate now. You will have the option to schedule the relocation when you click finish, as shown in Figure 12-88.

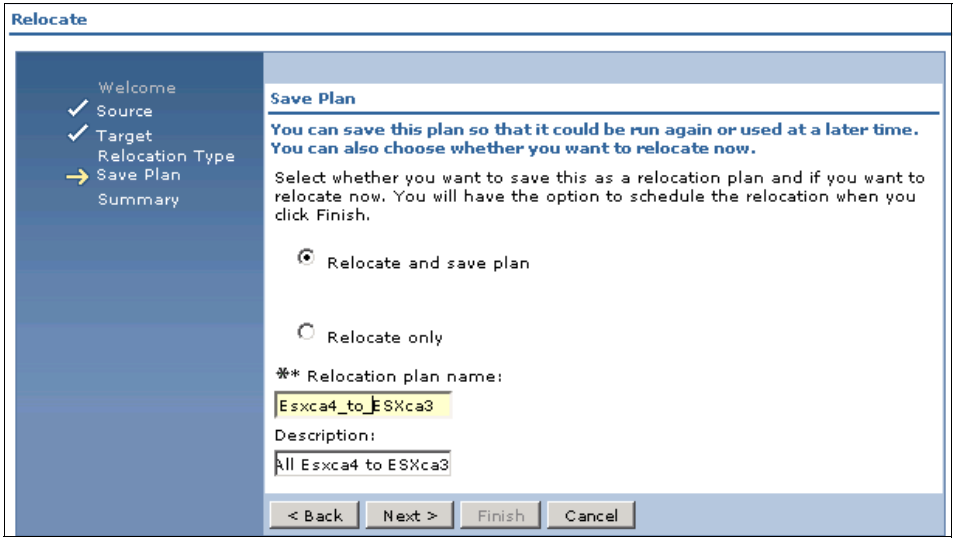


Figure 12-88 Save the relocation plan or relocate now

5. The last step in the Relocation wizard shows a summary of all the details selected and is ready to finish the process, as seen in Figure 12-89.

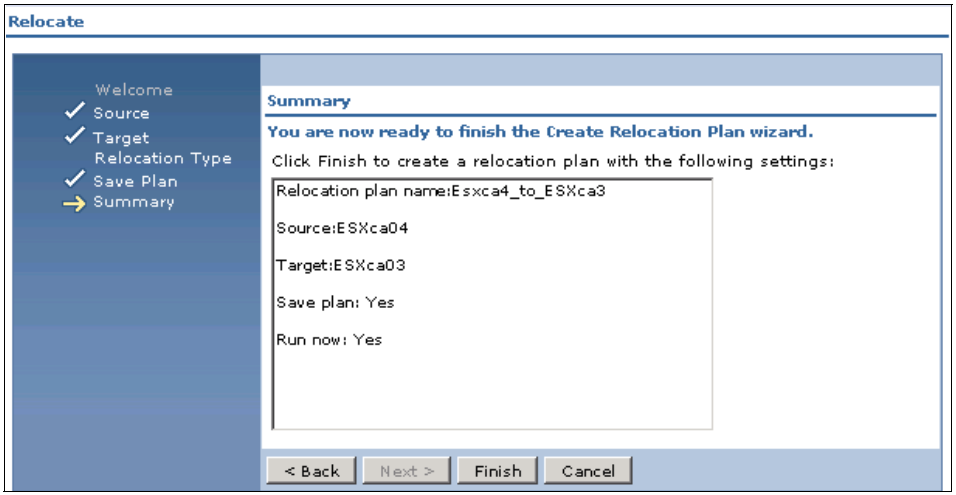


Figure 12-89 Verifying that all the information is accurate in the summary

6. As soon as the job is finished the virtual server will be relocated and will appear under the new host, as shown in Figure 12-90.

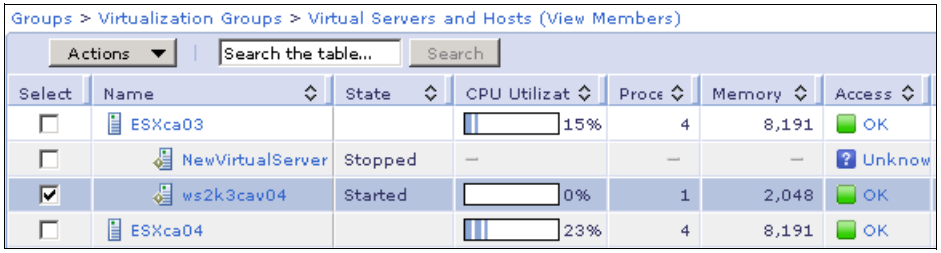


Figure 12-90 The powered on virtual server is relocated to the targeted host

7. The relocation job issued by the relocation wizard can be verified in the Active and Scheduled Jobs window, as seen in Figure 12-91.

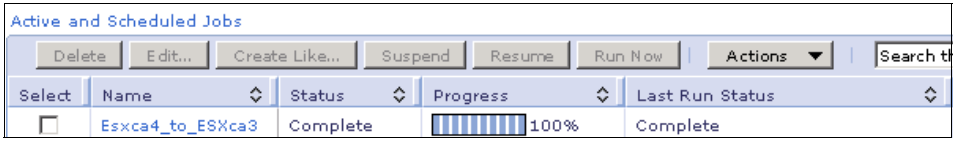


Figure 12-91 In the Active and Scheduled Jobs window you can verify that task is complete

Create Relocation Plan wizard

The Relocation Plans page displays the relocation plans that have been created and saved. You can use the plans to schedule a relocation task or to incorporate them into an automation plan. For additional information about this topic refer to:

http://publib.boulder.ibm.com/infocenter/systems/topic/director.virtual_6.1/fqm0_r_panel_vm_relocation_plans.html

To create a relocation plan using the Create Relocation Plan wizard:

1. From the navigation area, expand **Availability**.
2. Click **Relocation Plans**. The window in Figure 12-92 appears.

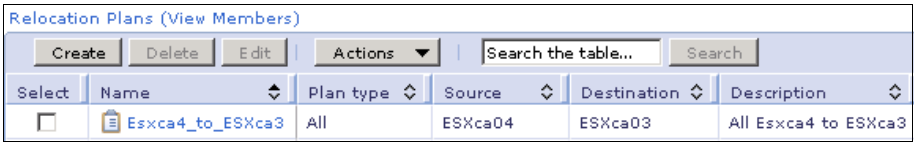


Figure 12-92 An already created relocation plan: Create new relocation plan button

3. Click **Create**. The wizard begins as shown in Figure 12-93.

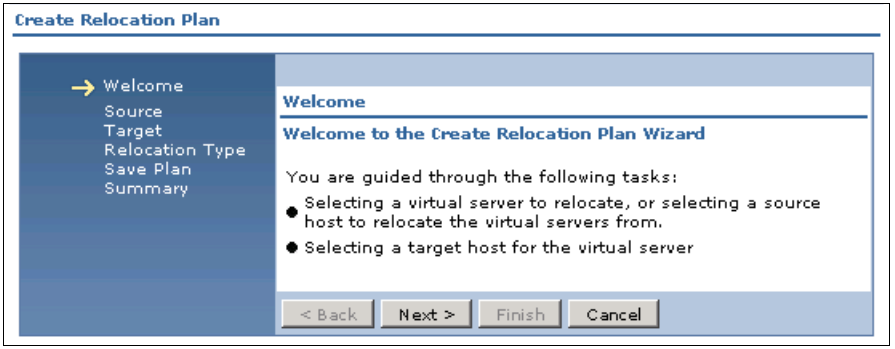


Figure 12-93 The relocation wizard appears

4. Follow the instructions in the wizard to create a relocation plan, which is almost the same as in the relocation wizard, with the only addition shown in Figure 12-94. The Save plan only option is now enabled.

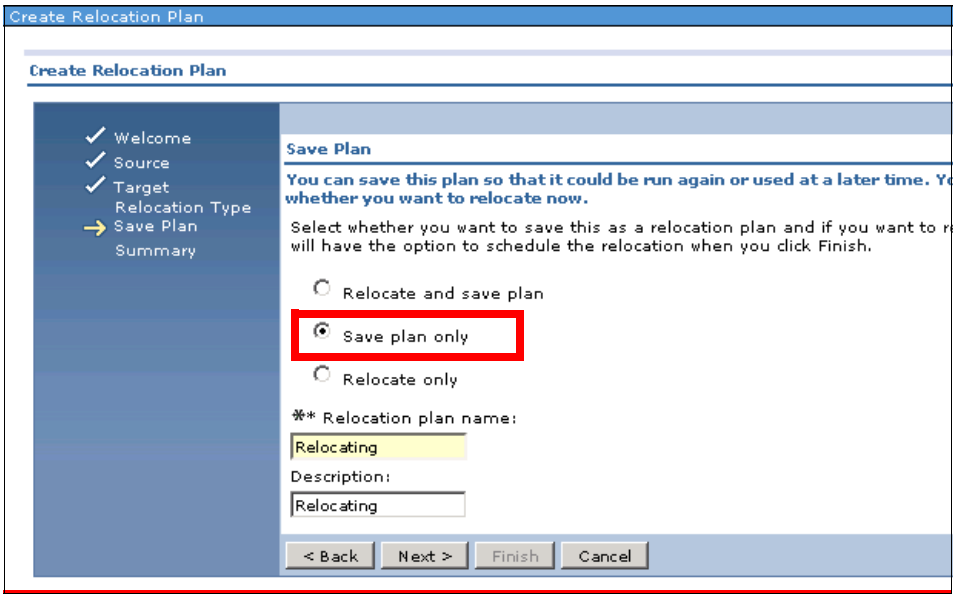


Figure 12-94 Save plan only option is available only in the create relocation plan wizard

5. Select your save plan option and verify that the summary information is correct. Click **Finish**.

As soon as you finish the Create Relocation Plan wizard the new plan is shown, as in Figure 12-95.

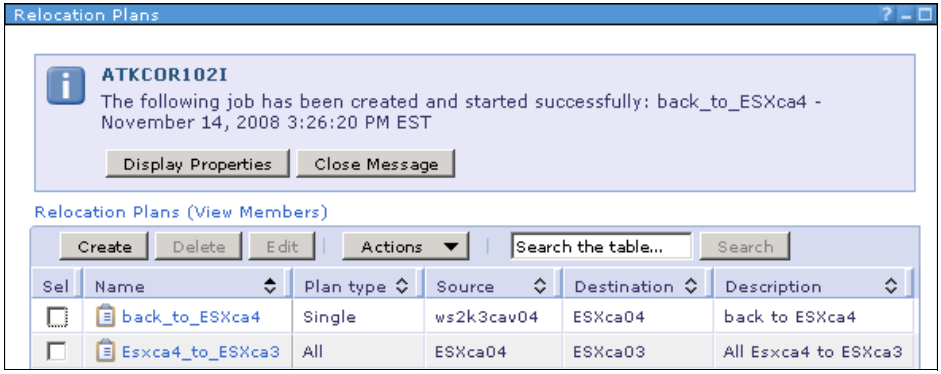


Figure 12-95 Relocation plans ready to be executed at any time

12.7.10 Launch External Manager user interface

Use the External Application Launch to integrate third-party management software and other programs into the IBM Systems Director Web interface user interface.

Launch VMware Infrastructure Client

You can launch the VMware Infrastructure Client to manage your VMware ESX and VMware VirtualCenter hosts.

Note: Make sure that you have installed the VMware Infrastructure Client wherever you are running the IBM Systems Director management console, otherwise IBM Systems Director is unable to launch it.

To launch the VMware Infrastructure Client:

1. In the navigation pane, click **Navigate Resources** or go to topology map to locate the host from which you want to start the VMware Infrastructure Client.
2. Select the host, click **Actions** from the menu bar, and select **System Configuration** → **Launch VMware Infrastructure Client**, as shown in Figure 12-96.

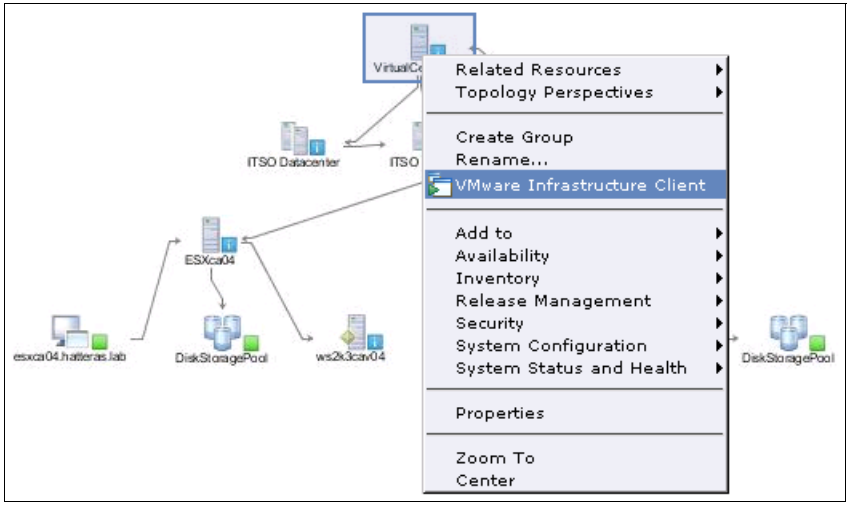


Figure 12-96 Launching VMware Infrastructure Client

The VMware Infrastructure Client is started in a new window, as shown in Figure 12-97.

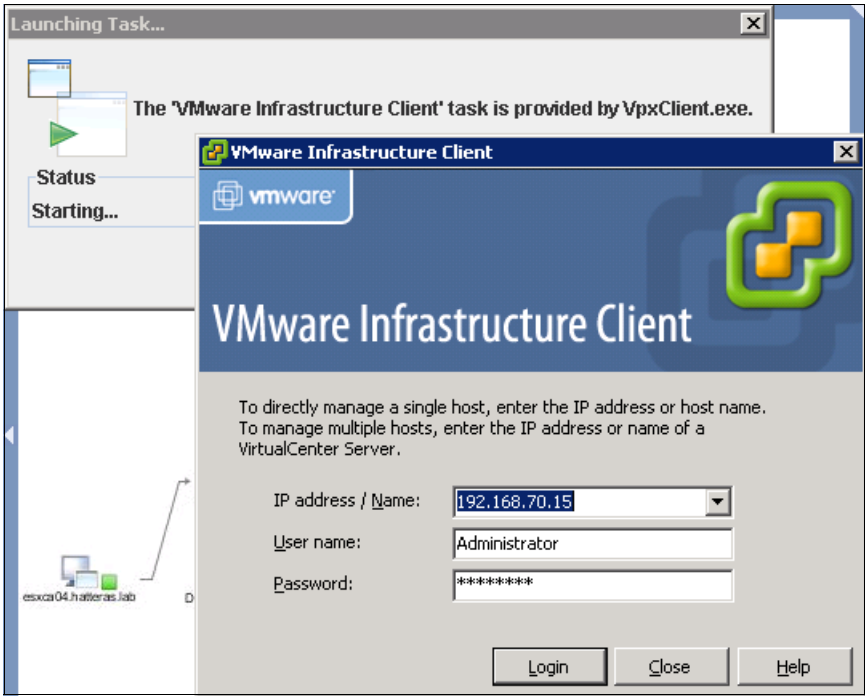


Figure 12-97 VMware Infrastructure Client is launched

Launch VMware ESX Manager user interface

You can launch the VMware ESX Manager user interface to manage your VMware ESX hosts. To launch the VMware ESX Manager user interface:

1. In the IBM Systems Director navigation pane, click **Navigate Resources** to locate the host from which you want to start the VMware ESX Manager user interface.
2. Select the host, click **Actions** from the menu bar, and select **System Configuration** → **Launch VMware ESX Manager User Interface**.

The VMware ESX Manager User Interface is started in a new window.

Launch VMware VirtualCenter Console

You can launch the VMware VirtualCenter Console to manage your VMware VirtualCenter hosts, as we saw in the example in “Launch VMware Infrastructure Client” on page 632.

Launch Microsoft Virtual Server Console

You can launch the Microsoft Virtual Server Console to manage your Microsoft Virtual Server hosts. To launch the Microsoft Virtual Server Console:

1. In the navigation pane, click **Navigate Resources** to locate the host from which you want to start the Microsoft Virtual Server Console.
2. Select the host, click **Actions** from the menu bar, and select **System Configuration** → **Launch Microsoft Virtual Server Console**.

The Microsoft Virtual Server Console is started in a new window.

12.8 Virtualization smcli commands

You can use the systems management command-line interface (smcli) virtualization commands to perform administrative operations on virtual systems, hosts, and farms. The smcli is an important administrative interface into IBM Systems Director and can be used either as an efficient way to accomplish simple tasks directly or as a scriptable framework for automating functions that are not easily accomplished from a graphical user interface.

For security reasons, the CLI runs only on the management server. You can run the CLI remotely using a remote-access utility, such as secure shell or Telnet.

The CLI follows the GNU/POSIX conventions, which means that it fits in the standards to define the API, along with shell and utilities interfaces for software compatible with variants of any operating system.

Tip: The IBM Systems Director smcli supports most commands that were available in previous releases through the discontinued dircli utility.

The smcli commands for virtualization are provided in the vsm bundle. The syntax and usage for each of these commands is available from dircli (supported in the Director 5 versions). For information about the dircli commands, see the commands reference in the IBM Virtualization Manager V1.2 information center at:

http://www.publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/eica7/eica7_reference_command_info_commands.htm

These are the commands available:

chvrtauth	Use the **chvrtauth** command to authorize one or more platform managers or host systems by setting or revoking authorization credentials.
chvrthost	Use the **chvrthost** command to change the attributes of one or more virtual-server host.
chfarm	Use the **chfarm** command to add a host to or remove a host from a virtual farm or change a virtual farm's attributes.
chvs	Use the **chvs** command to change the attributes of one or more virtual servers.
lsvrtsys	Use the **lsvrtsys** command to list the name and ID of virtual systems.
lsvrtcap	Use the **lsvrtcap** command to list virtualization capabilities of a virtual server or host system.
mkfarm	Use the **mkfarm** command to create a virtual farm.
mkrelocatetask	Use the **mkrelocatetask** command to create a task to relocate (or migrate) virtual servers.
mkvs	Use the **mkvs** command to create a virtual server.

For detailed information about all these commands, see the commands reference in the Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/eica7/eica7_reference_command_info_commands.html?tocNode=int_4405

13

Storage Management

The ability to manage storage subsystems and devices is becoming an increasingly critical function for most IT organizations. With the increased number of storage systems that have adopted the Storage Management Initiative Specification (SMI-S), there exists an industry-standard way to manage these systems. IBM Systems Director employs SMI-S to manage a number of IBM storage devices from the same Web console used to manage more traditional systems.

This chapter describes the capabilities that can be found in the Storage Management plug-in, in the following topics:

13.1 Supported storage devices

IBM Systems Director provides life-cycle management of your physical and virtual storage systems, including discovery, health and status monitoring, configuration, updates, and virtualization. IBM Systems Director provides facilities to manage and configure storage devices such as disks, switches, internal RAID controllers, and RAID subsystems. This includes the use of IBM Systems Director features, SMI-S providers, and external storage applications.

IBM Systems Director supports a wide variety of storage devices, including local storage, BladeCenter integrated storage, network storage, and storage switches. Here we describe specifics on each type of device that is supported:

- Local storage

  Dedicated local storage, accessed with an integrated RAID controller.

- BladeCenter integrated storage

  IBM BladeCenter integrated storage, accessed with either IBM BladeCenter S SAS RAID Controller Modules or the IBM SAS Connectivity Module.

- Network storage

  Network storage, such as storage area network (SAN) or network-attached storage (NAS), is accessed with storage switches, adapters, and protocols such as Fibre Channel, serial-attached SCSI (SAS), or internet Small Computer System Interface (iSCSI). The following devices are supported:

  - IBM TotalStorage DS3000 series storage system (Engenio SAS/FC/iSCSI)
  - IBM TotalStorage DS4000 series storage system (Engenio FC)
  - IBM TotalStorage DS6000 series storage system (IBM FC)
  - IBM DS300/400 (Adaptec iSCSI/FC)

- Storage switches

  Storage switches connect servers to storage devices. IBM Systems Director supports following storage switches:

  - Brocade 2 Gbps and 4 Gbps Fibre Channel (chassis and external switch)
  - QLogic 2 Gbps and 4 Gbps Fibre Channel (chassis and external switch)
  - IBM BladeCenter 2-Port Fibre Channel Switch Module
  - IBM BladeCenter SAS Connectivity Module
  - IBM BladeCenter S SAS RAID Controller Module

IBM Systems Director currently does not support management of the following storage devices:

- IBM System Storage DS8000®
- IBM System Storage DS5000
- IBM System Storage SAN Volume Controller
- Internal memory, caches, or registers
- Tape devices
- Bridges/gateways
- InfiniBand devices

13.2 SMI-S providers

The Storage Management Initiative Specification defines an interface for heterogeneous, functionally rich, reliable, and secure monitoring and control of critical global resources in complex and potentially broadly distributed, multivendor storage topologies. An SMI-S provider is the vendor-specific module that must be installed and properly configured for IBM Systems Director to manage certain storage devices. IBM Systems Director communicates with a storage device through its respective SMI-S provider.

IBM Systems Director requires an SMI-S provider to be installed for the following storage devices and switches:

- IBM BladeCenter SAS RAID Controller Module
- IBM TotalStorage DS3000 series storage system
- IBM TotalStorage DS4000 series storage system
- IBM TotalStorage DS6000 series storage system
- Brocade 2 Gbps and 4 Gbps Fibre Channel switches

Installing SMI-S providers

This section provides details about installing the required SMI-S providers for various storage devices that can be managed by IBM Systems Director. We cover providers for the products discussed in the following sections:

- IBM BladeCenter S SAS RAID Controller Module
- IBM TotalStorage DS3000 and DS4000 series storage systems
- IBM TotalStorage DS6000 series storage systems
- Brocade switch
- Installing and configuring ServeRAID manager
- Installing the LSI MegaRAID provider for Windows or Linux

Note: Do not install SMI-S provider and an IBM Systems Director agent on the same machine, as there would be a port conflict between the two. Consider installing the SMI-S provider on a server that contains a Baseboard Management Controller (BMC) or Remote Supervisor Adapter (RSA) II that is set up for out-of-band use.

IBM BladeCenter S SAS RAID Controller Module

When you install IBM Systems Director Server, the SMI-S provider for IBM BladeCenter SAS RAID Controller module gets installed by default. However, you must discover the IBM Systems Director Server and request access to it to get the SMI-S provider to function properly.

The SMI-S provider installed on one system can manage only up to four BladeCenter chassis. For managing additional chassis install additional SMI-S providers.

To install SMI-S providers on a separate managed system:

1. Make sure that the system on which you want to install the SMI-S provider already has Platform Agent installed.

   Important: Before installing SMI-S provider separately for IBM BladeCenter SAS RAID Controller Module, it is mandatory to have Platform Agent already installed.

2. Discover and unlock the system where you want to install SMI-S provider.
3. Collect inventory on the system.
4. From the IBM Systems Director Web navigation panel select **Navigate Resources** → **All Systems**. Select the system on which you want to install the SMI-S provider.

5. Once the system is selected click **Actions** → **Release Management** → **Install Agent**. This opens the Agent Installation Wizard, as shown in Figure 13-1. Click **Next**.

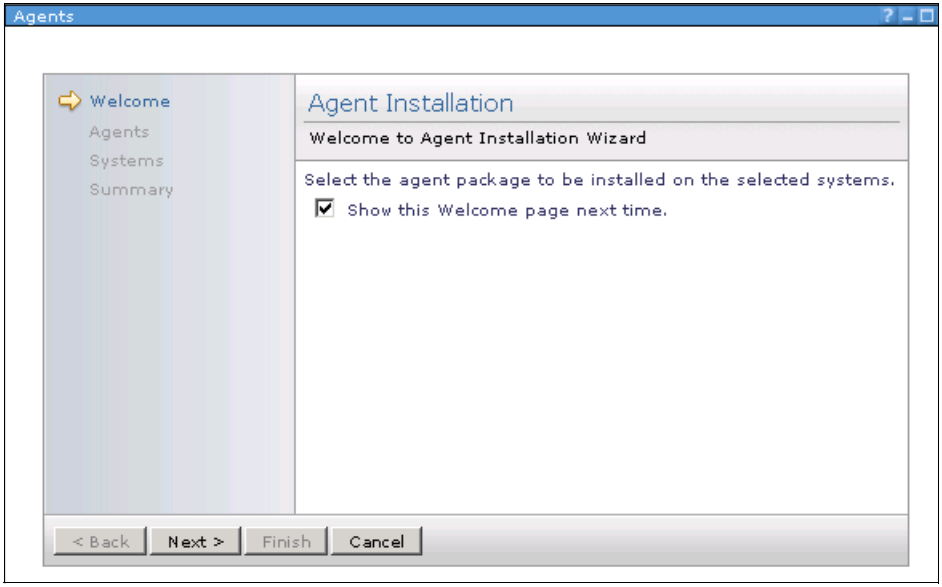


Figure 13-1 Install SMI-S Agent Wizard

6. On the Agents page, select **Platform Agent Subagent Packages**, as shown in Figure 13-2, and click **Add**. The SMI-S provider for IBM BladeCenter SAS RAID Controller Module comes in two packages, one for Windows and one for Linux:
   - PlatformAgentSubagent IBM BladeCenter SAS RAID Controller Module for Linux
   - PlatformAgentSubagent IBM BladeCenter SAS RAID Controller Module for Windows

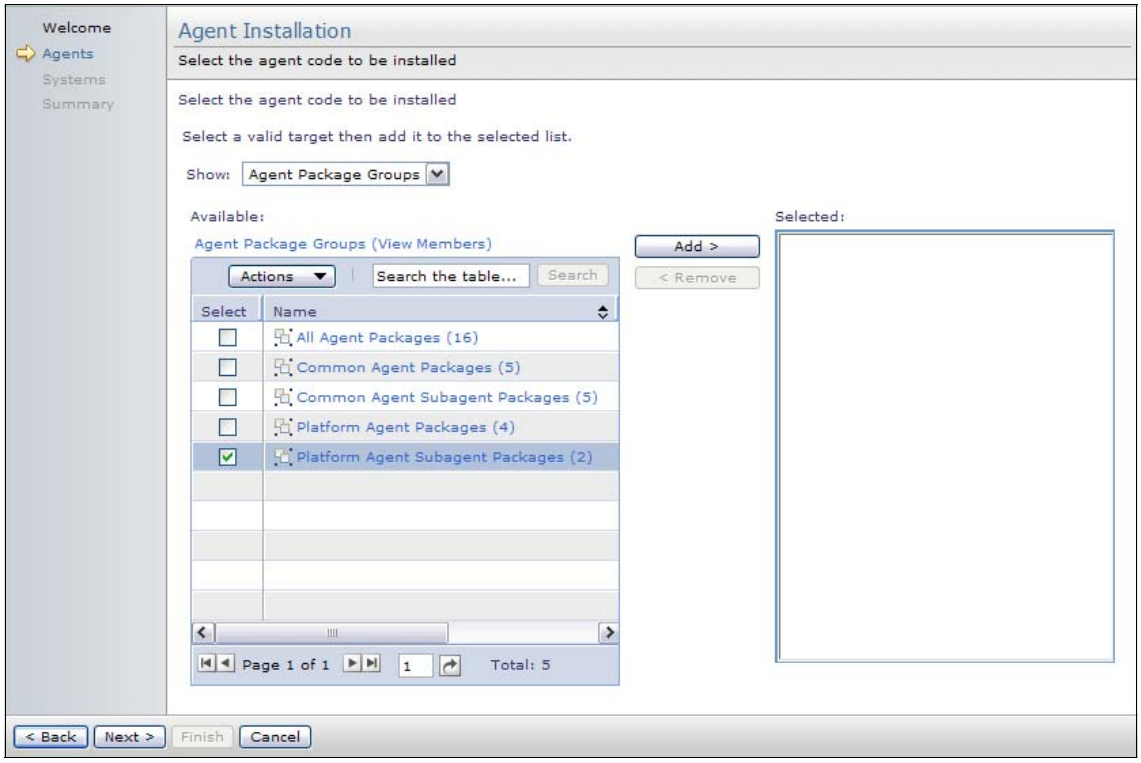


Figure 13-2 Select agent to be installed

7. Select the appropriate PlatformAgentSubagent package, as shown in Figure 13-3. Click **Next**.

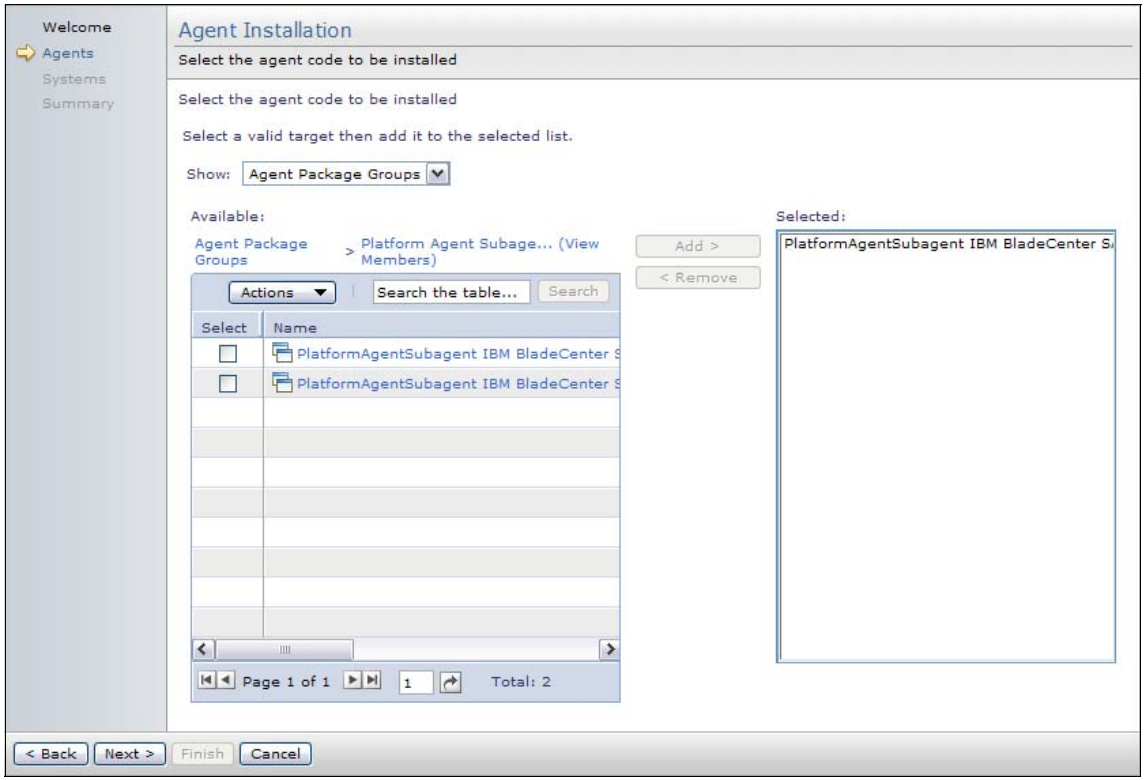


Figure 13-3 PlatformAgentSubagent selection page

8. Select the systems on which you want to install the SMI-S provider, as shown in Figure 13-4. Click **Next**.

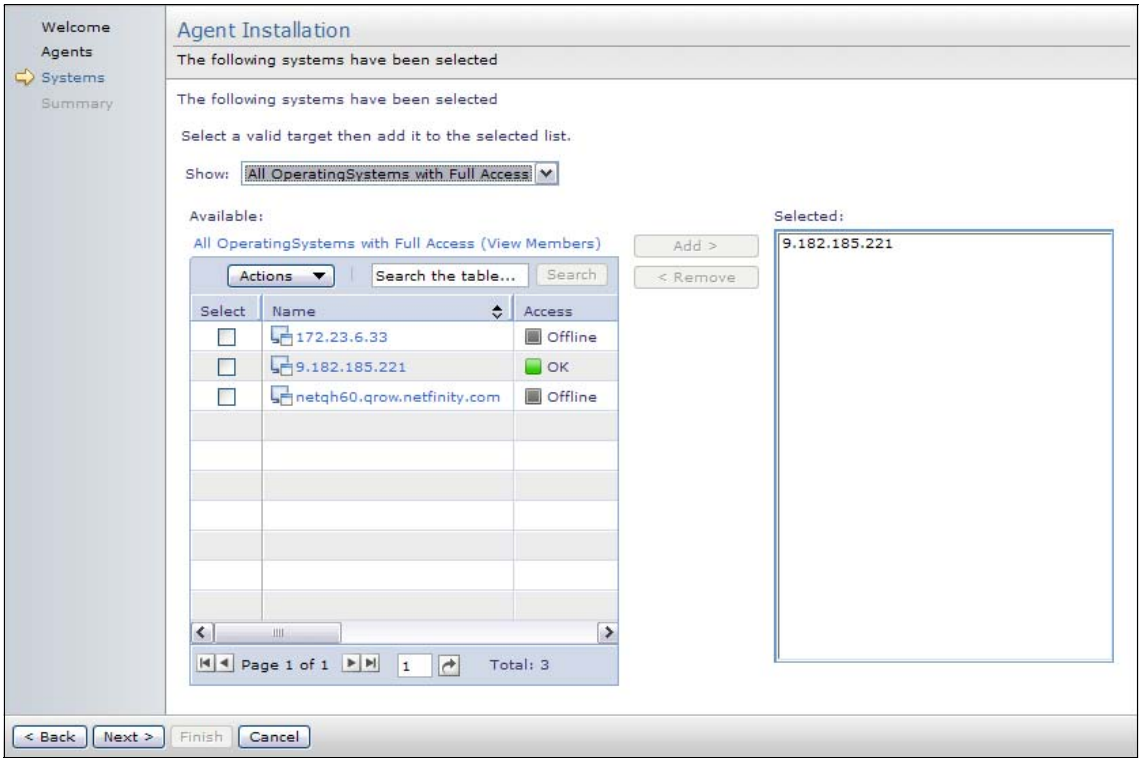


Figure 13-4 Select/Verify correct target system page

9. Verify your selections in the Summary page, click **Finish** to complete the wizard, and select to run or schedule the task to install the agent.
10. After the subagent installation completes, configure the subagent so that it can manage the storage systems. See the next section for details on how to do this.

SMI-S provider configuration

Once the SMI-S provider is installed properly, it must be configured so that it can manage the BladeCenter SAS RAID Controller Module. To configure the provider on IBM Systems Director:

1. From the IBM Systems Director Web navigation panel, select **Navigate Resources** → **Groups** → **Groups by Storage Type** → **Storage Systems** → **SMI-S Providers**.
2. From the list select the system on which you have IBM Systems Director Server installed or the system on which you have installed additional SMI-S Platform subagents.

Important: Make sure that the system on which the SMI-S provider is installed has been discovered and access has been granted. In addition, the BladeCenter chassis should also be discovered and accessible.

3. Click **Actions** → **System Configuration** → **SMI-S Provider Configuration**. This opens the SMI-S Provider Configuration Wizard, which displays a list of storage systems that are already being managed (if any). Refer to Figure 13-5.

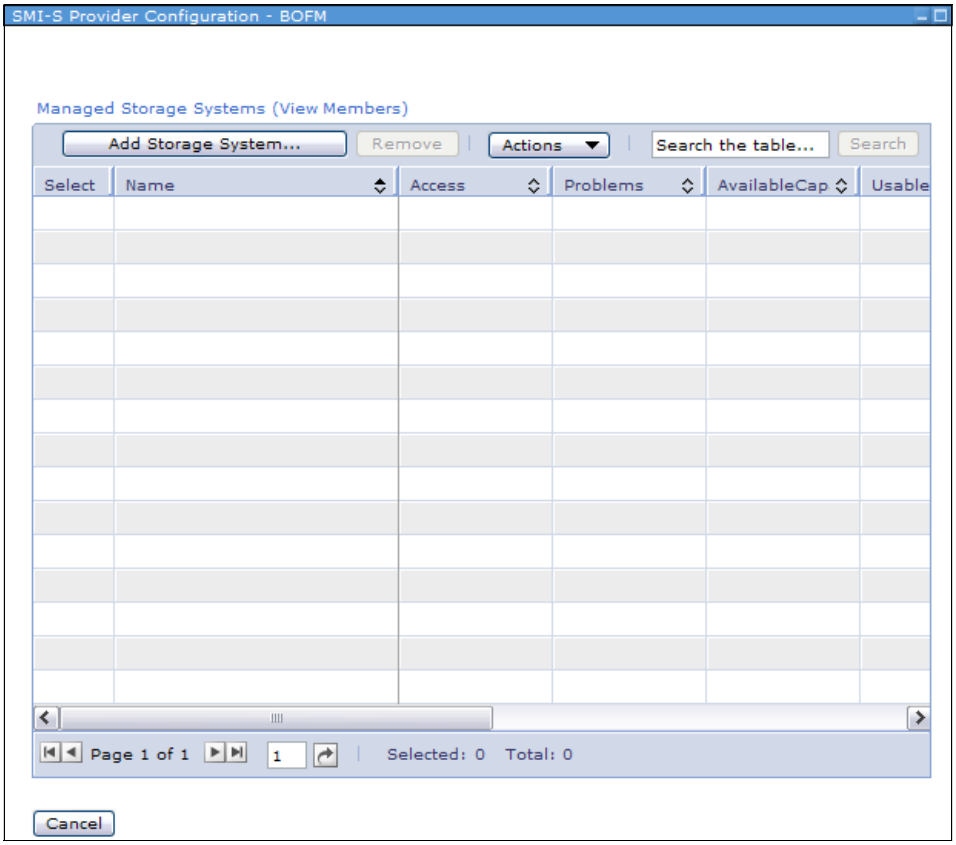


Figure 13-5 Managed storage systems for provider

4. Click **Add Storage System** to open the Add Storage System window shown in Figure 13-6.

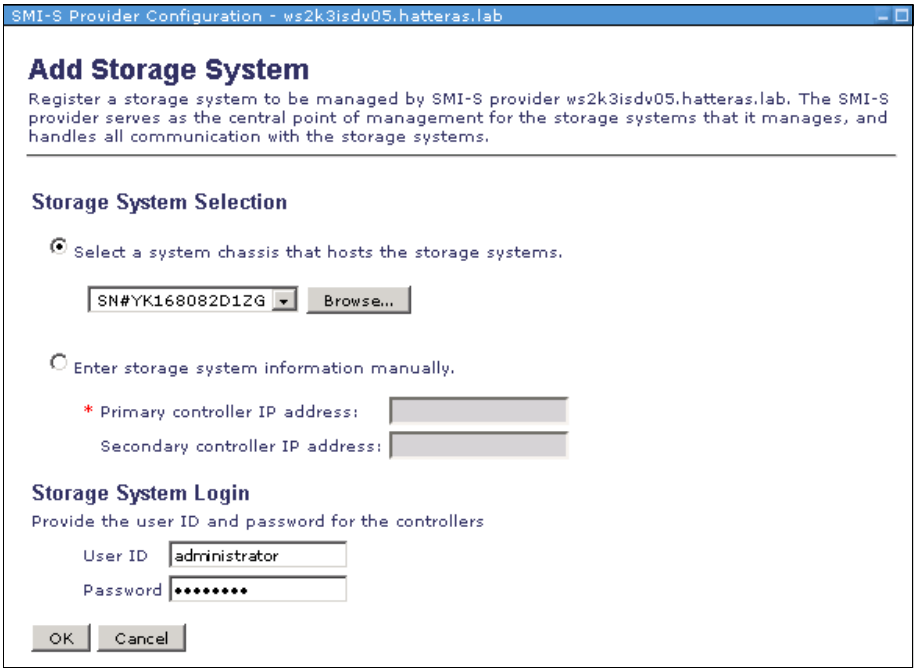


Figure 13-6 SMI-S provider Add Storage System page

5. Click **Browse** to navigate through the discovered BladeCenter chassis and select the chassis on which the storage system that you want to manage is hosted.
6. If the BladeCenter chassis has not been discovered by the management server, you can still add the storage system by specifying the primary controller IP address and optionally the secondary controller IP address.
7. Provide the proper credentials (user ID and password) for the controller.
8. Click **OK** to save the SMI-S provider configuration and close the page.

IBM TotalStorage DS3000 and DS4000 series storage systems

You can obtain the appropriate SMI-S Version 1.1 provider for IBM Systems Director to manage IBM TotalStorage DS3000 and DS4000 series storage systems from this Web site:

http://www.lsi.com/storage_home/products_home/external_raid/management_software/smis_provider/index.html?remote=1&locale=EN

The SMI-S provider can be installed on a system running Windows 2000, Windows Server 2003, Linux, AIX, or Solaris™ SPARC. Make sure that you download SMI-S Provider Version 10.35.30.00 for Windows and 10.35.G0.00 for Linux/AIX/Solaris SPARC.

Tip: Do not install this SMI-S provider on the same system on which IBM Systems Director's Common Agent or Platform Agent is installed, as it will cause a port conflict.

Installing an SMI-S provider on Windows

To install an SMI-S provider on Windows:

1. Unzip the downloaded executable on the system on which you want to install the provider and start the installation process. The default installation directory is C:\Program Files\EngenioProvider\.
2. During installation you will be asked to provide IP addresses. Specify the IP addresses of the DS4000 or DS3000 series controller. Refer to Figure 13-7.

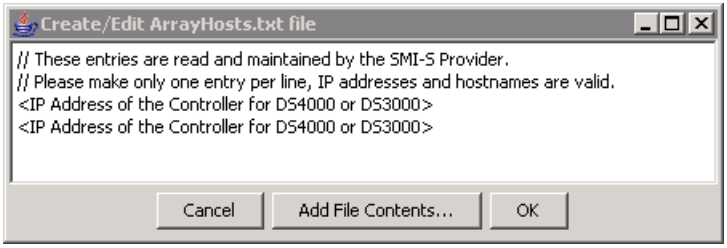


Figure 13-7 DS4000/DS3000 series controller IP addresses

If you do not specify IP addresses during installation, or if you want to specify any additional controller IP addresses after installation, you can manually accomplish this later. To do this, edit the file `C:\Program Files\EngenioProvider\SMI_SProvider\bin\arrayhosts.txt` using a text editor such as Notepad.

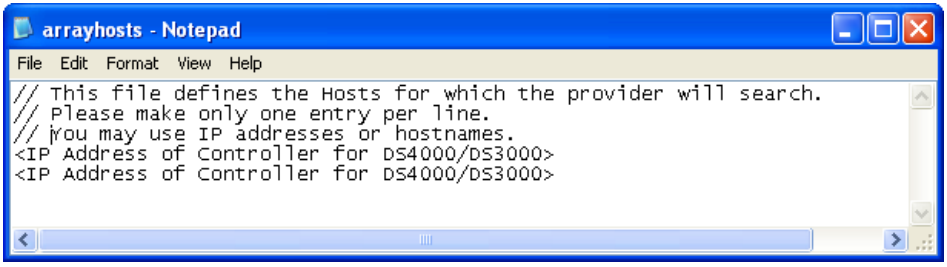


Figure 13-8 Edit arrayhost.txt file

3. Authentication for the SMI-S provider is turned off by default when installed on a system. If you want to turn on authentication:

   a. Stop the provider service. To stop the service, open the Computer Management Console from **Control Panel** → **Administrative Tools** → **Computer Management**. Then open **Services and Applications** → **Services**. From the list of all registered services select **Engenio SMI-S Provider Server** and stop that service.

   b. Open the `cimom.properties` file from C:\Program Files\EngenioProvider\wbemservices\cimom\bin.

   c. From the list of available authentication providers, as shown in Figure 13-9, choose the one you want by removing the number sign (#) at the beginning of the line.

> **Note:** Only *one* authentication provider can be enabled at any time. All others must have # at the beginning of the line.

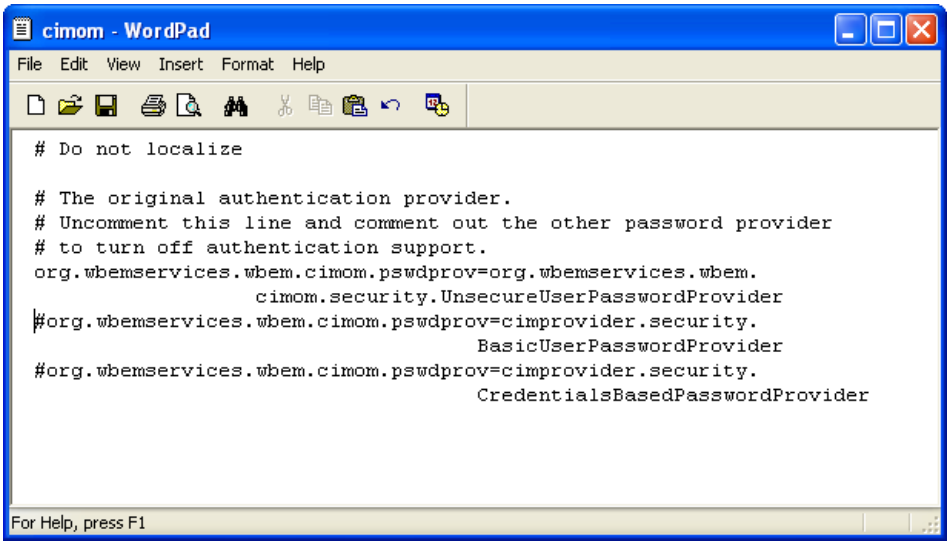


Figure 13-9 Edit provider authentication properties

The following authentication providers may be enabled as specified in the `cimom.properties` file:

– UnsecureUserPasswordProvider

  This indicates that you request access to the provider by specifying anything for the user ID and password. Authentication is not checked.

– BasicUserPasswordProvider

  Domain and local users are allowed to authenticate on Windows machines. If operating over a VPN, domain authentication does not function. Only local users are allowed to authenticate on UNIX machines.

– CredentialsBasedPasswordProvider

  This indicates that initially all users can authenticate. If you want to secure the system you must create an instance of <OEM>_CIMOMSharedSecret in the '/interop'/ namespace. The following keys must be populated with the following values:

```
SystemCreatonClassName = "<OEM>_StorageManagementSystem"
CreationClassName = "<OEM>_CIMOMSharedSecretService"
ServiceName = "CIMOMSharedSecretService"
SystemName = "CIMOM_IP
RemoteId = USER_CHOICE
```

Note: The prefix <OEM> is the vendor/device-specific prefix attached to every CIM class. For example, in case of a DS4000 device, each CIM class has the prefix LSISSI attached to it (for example, LSISSI_CIMOMSharedSecret).

If you want a password, you must also populate the secret property with a password of your choice. With this authentication enabled, only user ID and password combinations created as <OEM>_CIMOMSharedSecret instances can access the CIMOM.

4. Register the DS4000 CIM Agent so that IBM Systems Director Server can receive intelligent alerts.

   Open a command prompt and go to the directory where the slptool is installed. For example:

```
cd c:\Program Files\EngenioProvider\SMI_SProvider\win32
```

   Use the **`slptool`** command as follows:

   – To register the DS40000 CIM Agent in a non-SSL environment, issue the command:

```
slptool register service:wbem:http://{IP Address}:5988
```

     Where *{IP Address}* is the IP address of the DS4000.

– To register the DS4000 CIM Agent in an SSL environment, issue the command:

```
slptool register service:wbem:https://{IP Address}:5989
```

Where *{IP Address}* is the IP address of the DS4000.

– To verify that the DS4000 CIM Agent was registered properly, issue the command:

```
slptool findsrvs service:wbem
```

The IP addresses of the DS4000 controller, as well as the SMI Provider IP address, will be displayed.

5. To verify that the provider has been configured correctly, you can use the CIM view. To do this:

   a. Open the command prompt.

   b. Change the directory to:

   ```
   c:\program files\EngenioProvider\wbemservices\bin
   ```

   c. Run **cimworkshop**. You will see the Login Wizard, as shown in Figure 13-10.

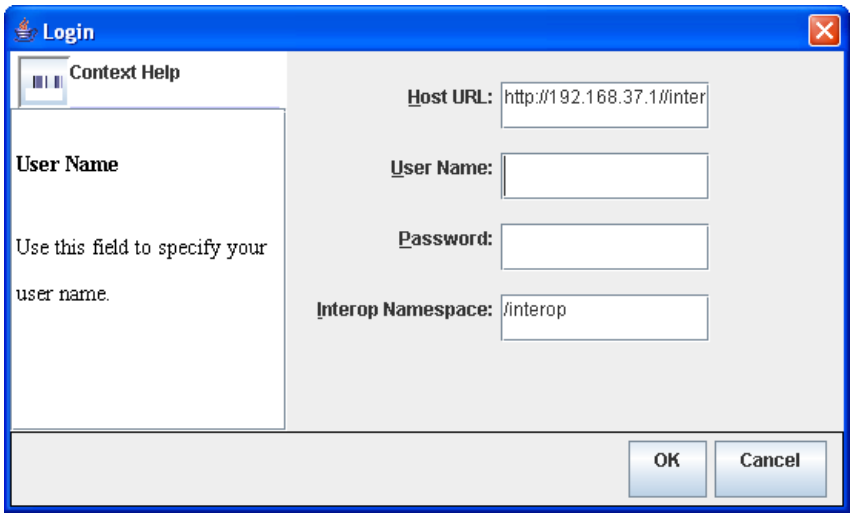


Figure 13-10 Cimworkshop login

   d. Authentication is not enabled by default, so you can enter anything for user name and password unless you have enabled an authentication provider.

   e. Once you log in, you can see the CIM class tree for the interop namespace. Change the namespace from /interop to /root/lsissi11. Now

search for class CIM_ComputerSystem. Right-click the class and select **Show Instances**. If you see a list of instances then the SMI-S provider is installed and configured correctly.

Note: If you have installed an earlier SMI-S provider version (9.16.G0.19 or earlier), then to start the cimworkshop utility make sure that you:

- Set the Java Runtime Environment on the machine
- Created a system environmental variable name JAVA_HOME to point to the JDK™ install directory

Installing an SMI-S provider on Linux or AIX

Installing an SMI-S provider on Linux or AIX is similar to the process described in “Installing an SMI-S provider on Windows” on page 648. Differences are illustrated below:

1. To start the installation, download the SMI-S provider distribution for Linux, uncompress the tarball, and start the installation using the install script, as shown in Figure 13-11.

```
sledlinux:/home/sagar/EngenioProvider # ls
Linux_Installer_09_16_GO_34.tar
sledlinux:/home/sagar/EngenioProvider # tar -xvf Linux_Installer_09_16_GO_34.tar

EngenioProvider-09.16.GO.34-0.i386.rpm
install
deinstall
sledlinux:/home/sagar/EngenioProvider # ./install
```

Figure 13-11 Uncompress Linux distribution of SMI-S provider on Linux machine

The successful completion of provider installation will be prompted, as shown in Figure 13-12.

```
sledlinux:/home/sagar/EngenioProvider # ./install
Preparing packages for installation...
EngenioProvider-09.16.GO.34-0
EngenioProvider has been successfully installed on this computer.
The install location is /usr/engenio.

To start/stop EngenioProvider, issue the commands
'/etc/init.d/cimomd {start|stop|status|restart}'

It is recommended that EngenioProvider is only started/stopped through the
above command.
Note that starting EngenioProvider will also register and advertise its services
 using SLP.

EngenioProvider is now starting for the first time.
cimomd                    0:off  1:off  2:0ff  3:on   4:0ff  5:on   6:off
Starting the SMI-S Provider
sledlinux:/home/sagar/EngenioProvider #
```

Figure 13-12 Provider installation logs

2. During the installation of the SMI provider, you will not be prompted to add the DS4000 controllers. This must be done manually though the command line. To add the DS4000 controllers, issue the command (Figure 13-13):

   `/usr/engenio/SMI_SProvider/bin/ProviderUtil`

   When prompted, enter the following information:

   – CIMOM username: Any user name of your choosing
   – CIMOM password: Any password of your choosing
   – Input CIMOM port: 5988 for non-SSL or 5989 for SSL

   Note: By default, the SMI-S provider does not require any authentication, but once installed can be configured for specific authentication.

```
sledlinux:/usr/engenio/SMI_SProvider/bin # ./ProviderUtil
CIMOM username: \c
cimuser
CIMOM Password: \c

Input CIMOM Port [5988]: \c

Input operation:
'add' for AddDevice,
'rem' for RemoveDevice: \c
add
Input IP or hostname for array: \c
9.182.193.134
Input Array password: \c

Attempting extrinsic method call.
The extrinsic call succeeded.
sledlinux:/usr/engenio/SMI_SProvider/bin #
```

Figure 13-13 Adding Storage Controller to provider

3. You are then prompted to select an input operation:
   – add for Adddevice
   – rem for RemoveDevice
4. Enter `add` to add a new device.
5. You will be prompted to enter an IP or host name for the array. Enter the IP address for the DS4000 or DS3000 series controller.
6. When prompted with the input array password, you can leave this blank.

7. Follow steps 5 and 6 discussed in “Installing an SMI-S provider on Windows” on page 648 to configure the CIM agent to communicate with IBM Systems Director Server and verify correct SMI-S provider installation.
8. The same ProviderUtility can be used to remove Storage controller from the provider, as shown in Figure 13-14.

```
sledlinux:/usr/engenio/SMI_SProvider/bin # ./ProviderUtil
CIMOM username: \c
cimuser
CIMOM Password: \c

Input CIMOM Port [5988]: \c

Input operation:
'add' for AddDevice,
'rem' for RemoveDevice: \c
rem
Input IP or hostname for array: \c
9.182.193.134
Attempting extrinsic method call.
The extrinsic call succeeded.
sledlinux:/usr/engenio/SMI_SProvider/bin #
```

Figure 13-14 Removing storage controller from provider

IBM TotalStorage DS6000 series storage systems

You can obtain the appropriate SMI-S Version 1.1 provider for IBM Systems Director to manage IBM TotalStorage DS6000 series storage systems from this Web page:

http://www-304.ibm.com/systems/support/supportsite.wss/supportresources?taskind=2&brandind=5000033&familyind=5329497

To install the SMI-S provider:

1. Unzip the downloaded executable and start the installation. Select the default directory location for installation. Refer to Figure 13-15.

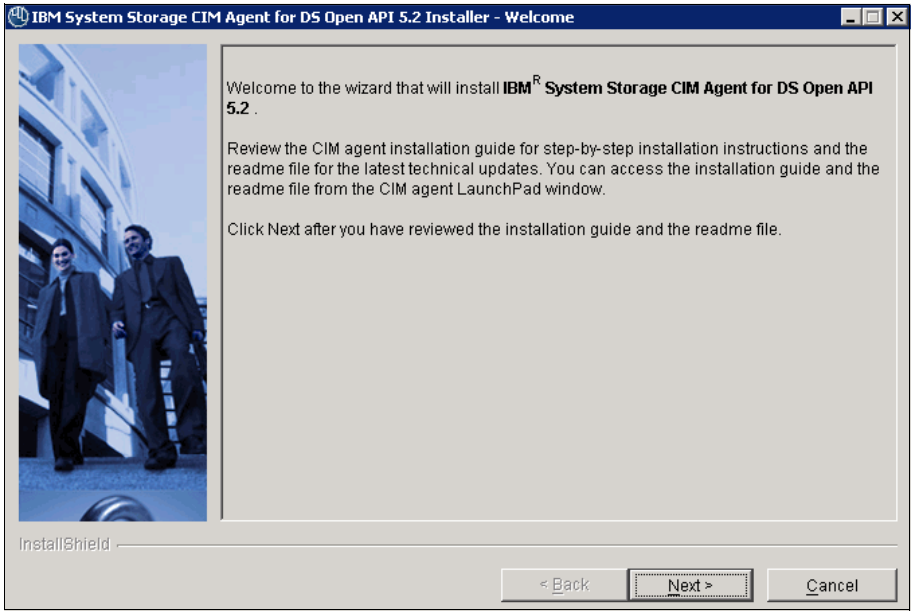


Figure 13-15 DS Open API installation

2. In the Server Communication Configuration window, accept the default communication protocol and ports as shown in Figure 13-16. If the default ports are already in use, select the unused ports.

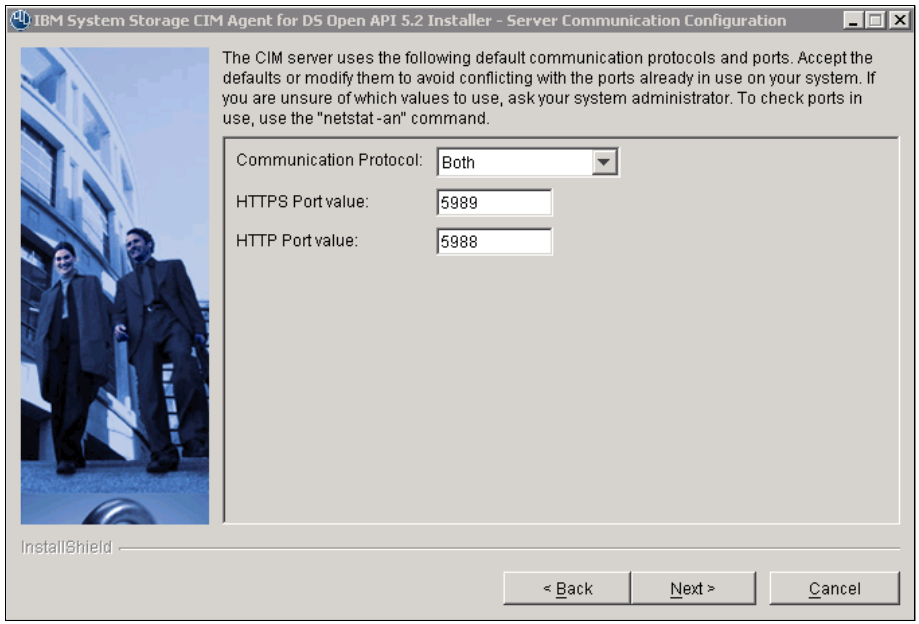


Figure 13-16 Port Selection for DS Open API installation

3. On the Configuration Parameter window, optionally enter a user name and password for the Common Information Model (CIM) server. These credentials will be used to authenticate while communicating to the SMI-S provider. Click **Add** to specify the information about the device that you would like the provider to manage. Refer to Figure 13-17.

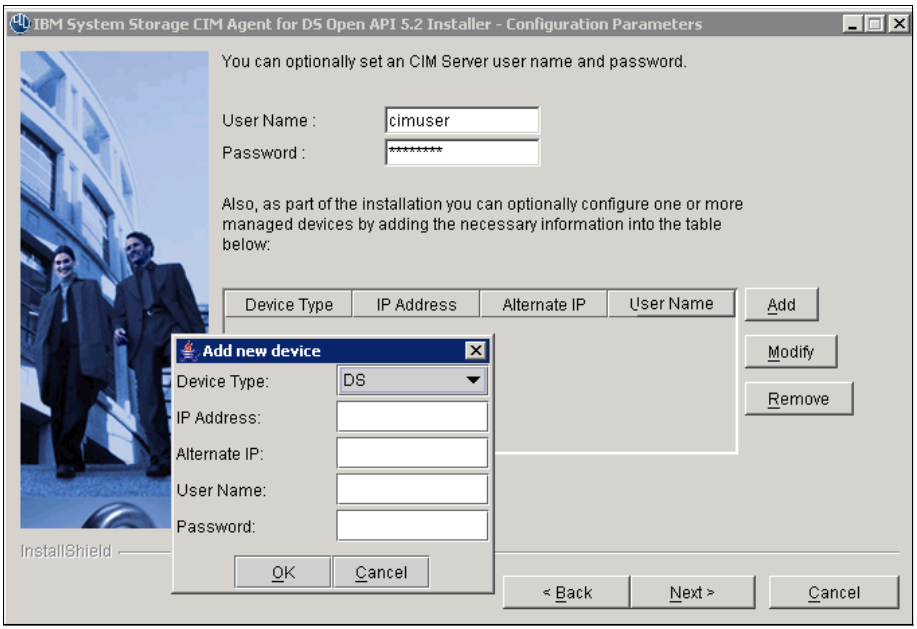


Figure 13-17 Configure managed device

4. Enter the following parameters about the Storage Manager:
   - Device Type: DS/ESS/ESSCS based on storage device family.
   - IP Address: The IP address of the Storage Manager Console of the DS6000 series storage system.
   - (Optional) Alternate IP: An alternate IP address for the Storage Manager Console.
   - User Name: The user ID to log into the Storage Manager Console.
   - Password: The password to log into the Storage Manager Console.

5. You can use this provider to manage to more than one storage, by repeating step 3, for each storage device, as shown in Figure 13-18.

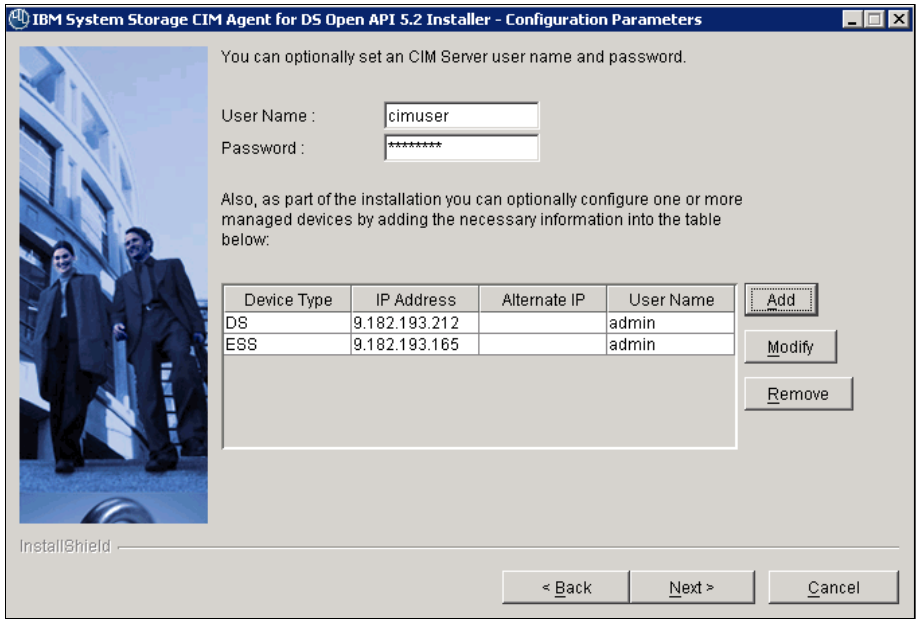


Figure 13-18 Managed devices for provider

6. Complete the installation.
7. To verify the installation of the CIM agent on a Windows system select **My Computer → Manage Services and Applications → Services** and verify that the following two services are installed and started:
   - Service location protocol
   - IBM System Storage CIM Agent for DS Open API 5.x Pegasus Server

Configuring DS CIM Agent for Windows

To configure the CIM Agent:

1. From the system on which you installed the CIM agent, verify that the DS controller system is accessible.
2. Type the following command to configure the CIM agent for each Enterprise Storage Server® (ESS) or DS server that the CIM agent can access:

   `dscimcli mkdev <ip> -type ds -user <user> -password <password>`

   Where *<ip>* is the IP address of the primary hardware or software master console (HMC/SMC), *<user>* is the storage manager graphical user interface

(GUI) or DS command-line interface (DSCLI) user name, and *<password>* is the storage manager GUI or DSCLI password.

3. To verify that the device was added properly, run the command:

   ```
   dscimcli lsdev -i
   ```

   This lists the storage system that you added.

4. Configure the Common Information Model Object Manager (CIMOM) for each user that you want to have authority to use the CIMOM by running the CIMOM configuration program.

   During the CIM agent installation, the default user name to access the CIM agent CIMOM is created. The default user name is *superuser*, with a default password of *passw0rd* (with a zero). You must use the default user name and password when you use the **mkuser** command for the first time after installation. After you have added other users, you can initiate the **mkuser** command using a user name that you defined instead of using the default.

5. Start the CIM agent if not already started by issuing this command:

   ```
   # startagent
   ```

6. To add a user, type this command:

   ```
   # dscimcli mkuser -user cimuser -password cimpass
   ```

   Where *cimuser* is the user name and *cimpass* is the password for the new user.

Brocade switch

You can obtain the appropriate SMI-S Version 1.1 provider for IBM Systems Director to manage supported Brocade switches from this Web site:

`http://www.brocade.com/support/SMIAGENT.jsp`

To install the SMI-S provider for a supported Brocade switch:

1. Unzip the downloaded executable and start the installation.
2. Accept the license agreement and select the default install directory.

3. On the Proxy Connection Configuration page (Figure 13-19) click **Add** to add Brocade devices for the SMI-S agent to manage.

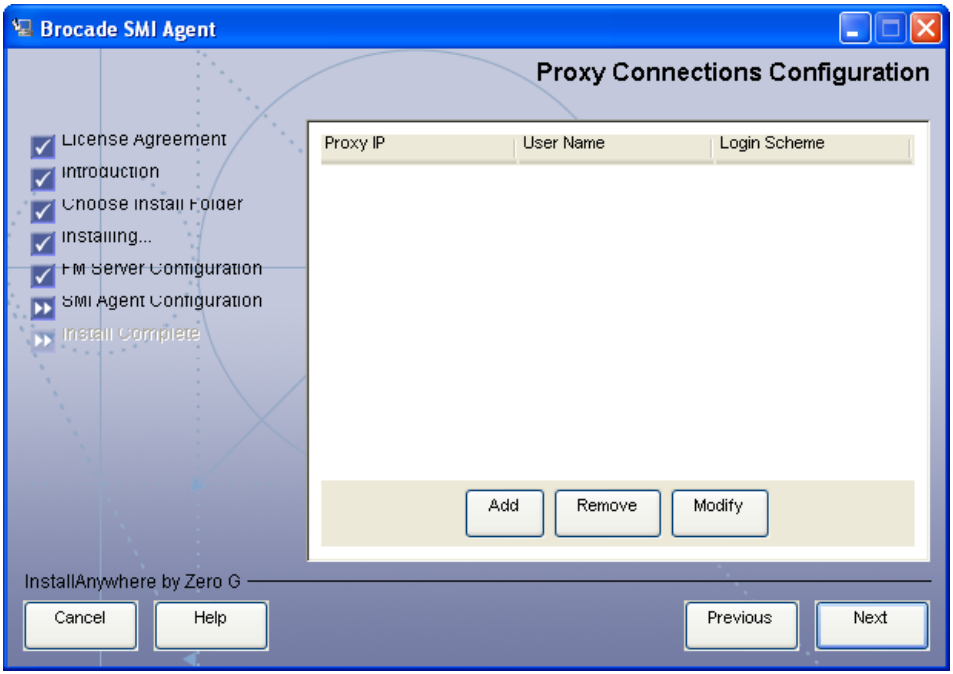


Figure 13-19 Proxy connection configuration

4. The Proxy Configuration pop-up is displayed, as shown in Figure 13-20.

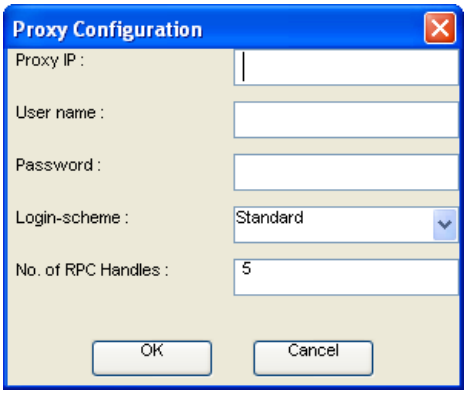


Figure 13-20 Proxy configuration setting

Specify the following parameters for proxy configuration settings:

- Proxy IP: The IP address of the Brocade switch
- User name: The user ID used to access the Brocade switch
- Password: The password used to access the Brocade switch
- Login scheme: Standard
- Number of RPC handles: 5

5. On The Configuring and Starting as a Service page, for the question “Do you want to start SMI Agent as a Service,” click **Yes**.
6. Complete the installation.

Once the Brocade SMI-S provider is installed you must install the SLP service, since this provider uses Service Location Protocol (SLP) for running discovery. To install SLP:

1. Stop the Brocade SMI agent service from **My Computer** → **Manage Services and Applications** → **Services**.
2. Change the working directory to the location where the Brocade SMI agent is installed with the **`cd agent\bin`** command.
3. Enter the command **`slp-install`**. On successful installation of SLP the message `Service Location Protocol` installed is displayed.
4. Enter the command **`slp-start`** to start the SLP service.
5. Start the Brocade SMI-S agent from **My Computer** → **Manage Services and Applications** → **Services**.

Installing and configuring ServeRAID manager

For the ServeRAID controllers listed below, you must install ServeRAID Manager 9.00 for use with IBM Systems Director 6.1. ServeRAID Manager 9.00 is available from:

`http://www.ibm.com/support/docview.wss?uid=psg1SERV-RAID`

Out of all the available ServeRAID software features, IBM Systems Director needs only two:

- ServeRAID Manager Console
- ServeRAID Manager Agent

ServeRAID Manager is needed only for the following listed ServeRAID controllers. Before installing ServeRAID manager, make sure that your ServeRAID controller is one of these:

- IBM ServeRAID-8i serial-attached SCSI (SAS) controller
- IBM ServeRAID-8k and 8k-l
- IBM ServeRAID-8s

- IBM ServeRAID-7t SATA controller
- IBM ServeRAID-7k Ultra320 SCSI controller
- IBM ServeRAID-7e/8e (Adaptec HostRAID) controllers
- IBM ServeRAID-6i/6i+ Ultra320 SCSI controller
- IBM ServeRAID-6M Ultra320 SCSI controller
- IBM ServeRAID-4H/4M/4L/4Mx/4Lx Ultra160 SCSI controllers
- LSI-1030 integrated RAID controller

To install and configure ServeRAID Manager:

1. Install IBM Systems Director 6.1 Common Agent on the system that hosts the RAID adapter, if not already done.
2. Browse to the folder that contains ServeRAID Manager extension packages and run the ServeRAID Manager Level-1 Agent setup.
3. Navigate to the folder of the ServeRAID Manager 9.00 Application CD and install ServeRAID Manager Agent (Standalone Edition).
4. Ensure that following features are installed on the system that hosts the Redundant Array of Independent Disks (RAID) adapter:
   - Director Agent (shown as IBM Director Agent) and IBM Director Core Services, which is the Platform Agent
   - ServeRAID Manager for Director Core Services, which is the ServeRAID Manager Level 1 Agent
   - ServeRAID Manger, the ServeRAID Manager Agent (Standalone Edition)
5. Once the ServeRAID Manager Agent is installed, you must install the ServeRAID Manager Console on the system that is hosting the IBM Systems Director Web interface. Install the ServeRAID Manager Console (Standalone Edition) from the application CD.

Installing the LSI MegaRAID provider for Windows or Linux

If you have a managed system that has an LSI 1078 MegaRAID controller installed, you must install the LSI MegaRAID provider on the managed system after installing Common Agent, Platform Agent, IBM Director Agent 5.20, or IBM Director Core Services 5.20.

To install the LSI MegaRAID provider:

1. Download the installation package from the IBM Systems Director Downloads Web Site at:

   http://www.ibm.com/systems/management/director/downloads/

2. Change to the directory to which you saved the installation package on the Platform-Agent-managed system.

3. For installation on Linux only run the following command:

   `rpm -ivh pk_name`

   pk_name is the installation package name.

4. For installation on Windows for agent Version 5.20.3 or later, simply download the installable package and run the installation.

5. For installation on Windows for agent Version 5.20.2, run the downloaded installable package. Then run the `IndicationSubscription.bat` batch file. This file is located in one of the following directories:

   - `C:\Program Files\Common Files\IBM\ICC\cimom\bin`
   - `C:\Program Files (x86)\Common Files\IBM\ICC\cimom\bin`

   Then restart the Windows system.

13.3 Discovering storage devices

IBM Systems Director can help you manage and provision various kinds of storage (see 13.1, “Supported storage devices” on page 638, for all supported storage devices). Before you can manage your storage systems, they must be discovered and accessible in the IBM Systems Director Web interface.

The topics that we discuss in this section are:

- 13.3.1, “General discovery” on page 664
- 13.3.2, “Direct connection discovery” on page 666
- 13.3.3, “Advanced discovery” on page 672

13.3.1 General discovery

General discovery works following the IBM Systems Director default system discovery procedure. To discover storage systems:

1. From the IBM Systems Director Web navigation panel select **Inventory** → **System Discovery**.
2. Specify a single system by IP address (or system name) of the system that is hosting the SMI-S provider.
3. Click **Discover** to run basic discovery.

4. Once the system is discovered, check the access property of the discovered system. If it shows `No Access`, establish access to the system using the Request Access function, enter the appropriate credentials, then access should be granted. Refer to Figure 13-21.

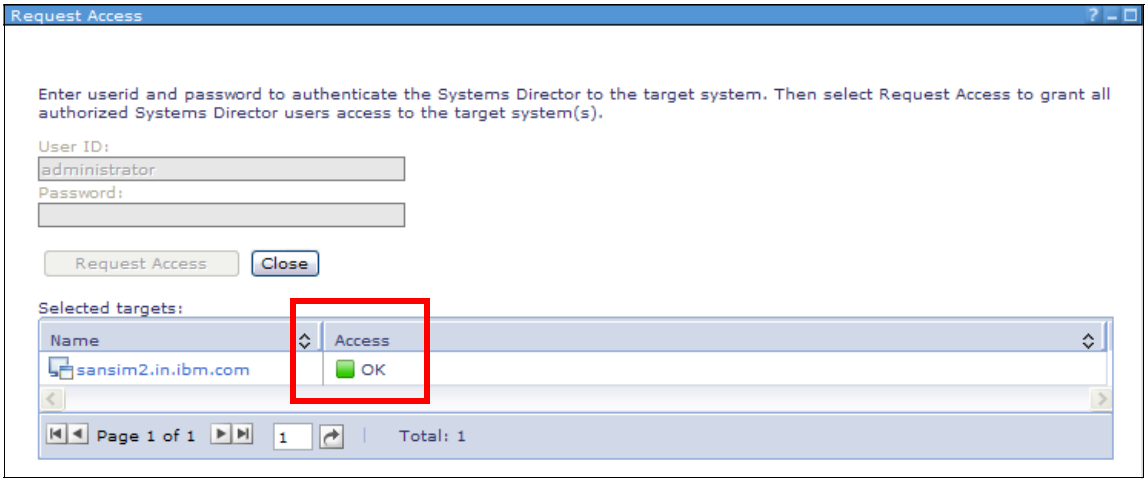


Figure 13-21 Establish access to discovered system

5. Collect inventory for the discovered system.

6. To verify successful completion of discovery, click **Navigate Resources** → **All Systems** and make sure that the discovered system is listed, along with the storage device, as shown in Figure 13-22.

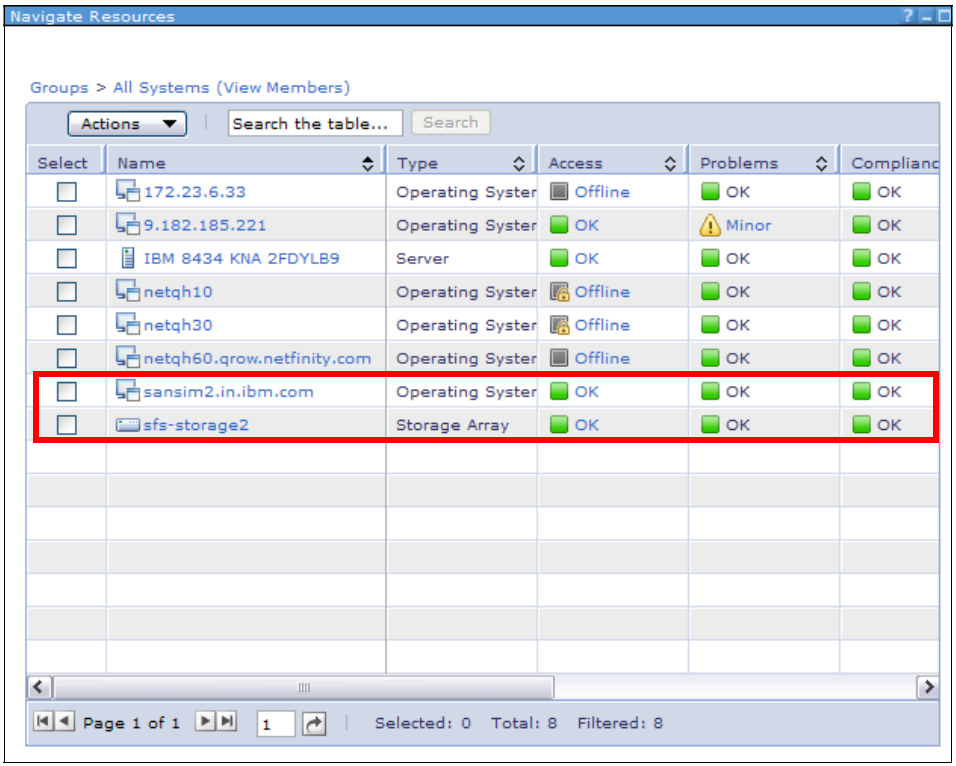


Figure 13-22 List of discovered systems, including provider host and storage device

13.3.2 Direct connection discovery

Direct connection discovery works to discover a storage device by searching for systems that have an installed SMI-S provider for managing storage devices. Platform Component Library (PCL) is an IBM API used for SMI-S direct connection discovery. It allows clients to locate a specified system in the network. To run direct connection discovery for a storage device:

1. From the IBM Systems Director Web navigation panel select **Inventory** → **Advanced System Discovery**. For the first time user you must create a new customized discovery profile. Click **Actions** → **Create**.

2. In the Profile Properties page (Figure 13-23) specify the profile name and optionally the profile description. From the System Type drop-down menu select **Operating System** and system subtype **All**. Click **Next**.

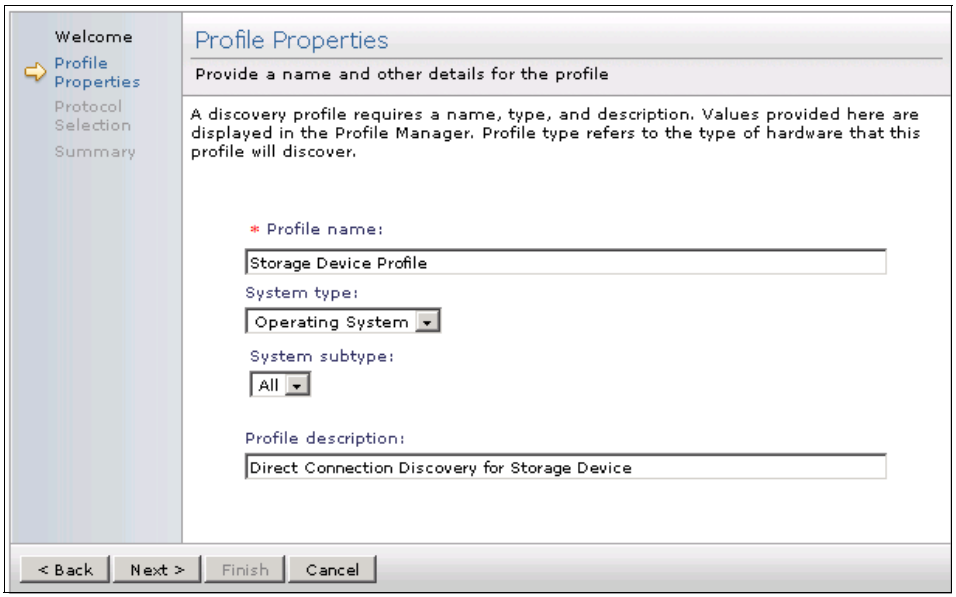


Figure 13-23 Advanced discovery profile properties

3. From the Protocol Selection page (Figure 13-24), select **Storage Management Initiative Specification (SMI-S)**. Click **Next**.

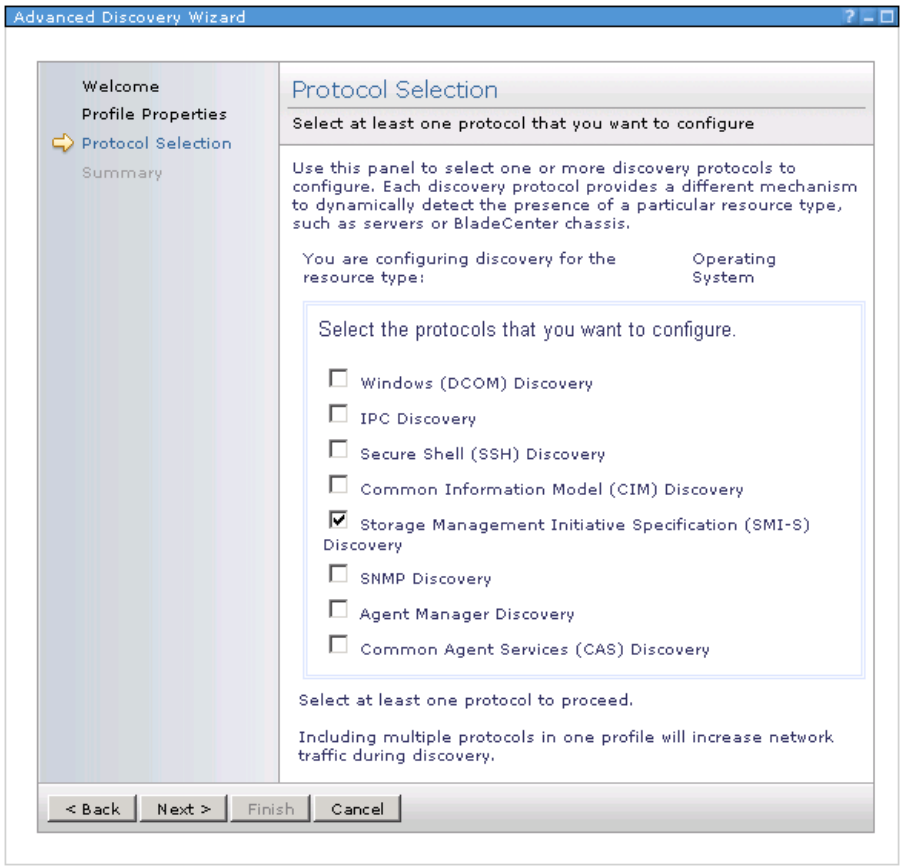


Figure 13-24 Protocol Selection page

4. On the SMI-S Configuration page (Figure 13-25) you must configure settings for SMI-S. Select **Direct connection** as a type of discovery. IBM Systems Director supports SMI-S direct connection discovery only for following types of hardware:
   - IBM System Storage DS3000 and DS4000 series storage systems
   - IBM System Storage DS6000 series storage system
   - Brocade Fibre Channel switches
   - IBM BladeCenter S SAS RAID Controller Module

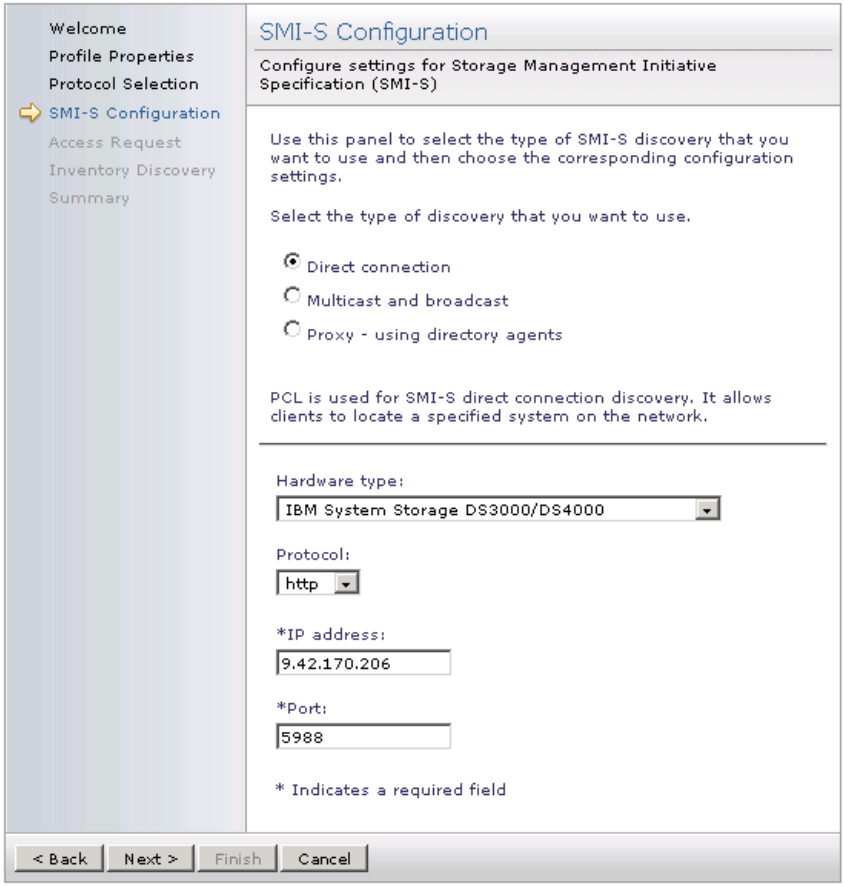


Figure 13-25 SMI-S Configuration page

Select the correct hardware type. Select from the protocols:

- http
- https

If you selected the hardware type **IBM BladeCenter S SAS RAID Controller Module**, you cannot select a protocol. The http protocol will always be used.

Specify the IP address of the system on which you have installed the SMI-S provider. The port number field will be automatically updated for every selected protocol. You can edit this field if required. Refer to Figure 13-25 on page 669.

5. On the Access Request page, activate the automatic access request and specify correct access credentials for the user ID and password, as shown in Figure 13-26.

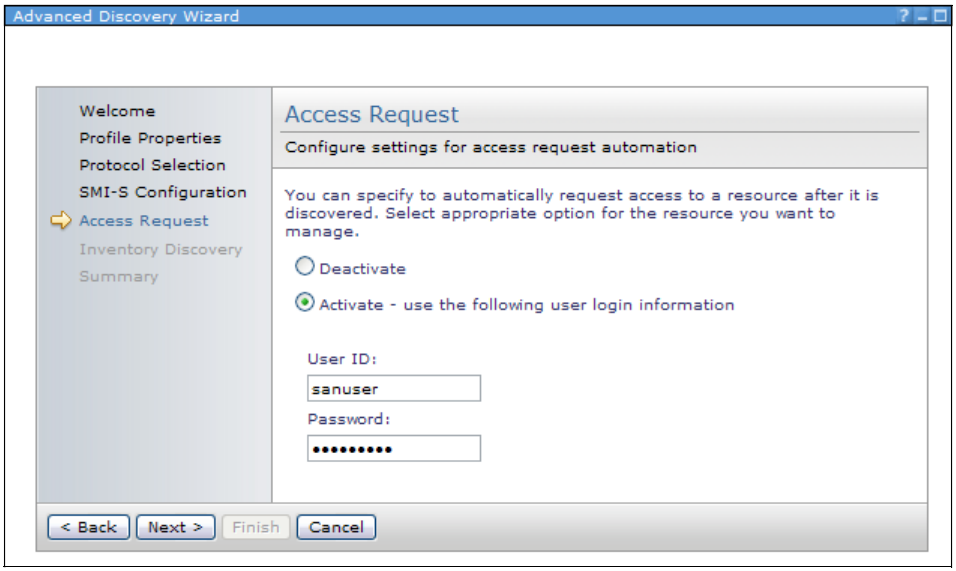


Figure 13-26 Access Request page

6. On the Inventory Discovery page activate the automatic inventory discovery option and select default inventory profile, as shown in Figure 13-27.

Figure 13-27 Inventory Discovery selection page

Once completed, IBM Systems Director saves your created discovery profile and list your profile among the available discovery profiles.

7. From the listed available discovery profiles, select your created profile and run the discovery for that profile by clicking **Run**, as highlighted in Figure 13-28.

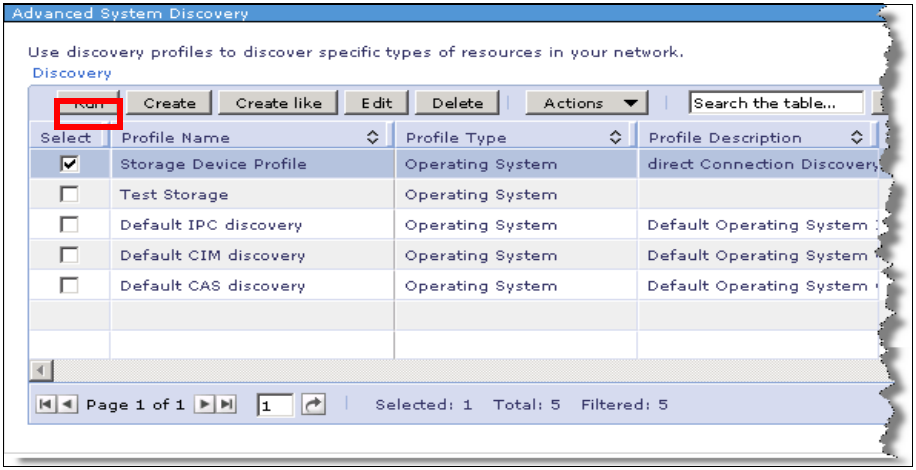


Figure 13-28 Discovery profiles

When the task completes, verify that the discovery and inventory collection was successful by selecting **Navigate Resources** → **All Systems** and make sure that the discovered system is listed along with the storage device.

13.3.3 Advanced discovery

The direct connection discovery described in the previous section is a part of advanced discovery. Using a direct connection you can discover and manage only one SMI-S provider at a time. However, if you want to discover multiple SMI-S providers you can use multicast and broadcast modes of advanced system discovery. You can also discover multiple SMI-S providers using Directory Agent discovery. Both these methods of discovering multiple SMI-S providers are described in this section.

Using multicast and broadcast

Service Location Protocol (SLP) is the protocol used for SMI-S multicast and broadcast discovery. SLP is used for clients to locate servers and other services in the network. IBM Systems Director finds all SMI-S providers by:

- Sending a SLP request to the default multicast group
- Sending a SLP request to the broadcast group

To configure a discovery profile for using multicast or broadcast:

1. As detailed in 13.3.2, “Direct connection discovery” on page 666, start the Advanced System Discovery wizard and choose to **Create** a new discovery profile.

   Tip: Instead of creating a new discovery profile you can edit and make changes to an existing discovery profile.

2. On the SMI-S Configuration page, for the type of discovery select **Multicast and broadcast**, as shown in Figure 13-29.

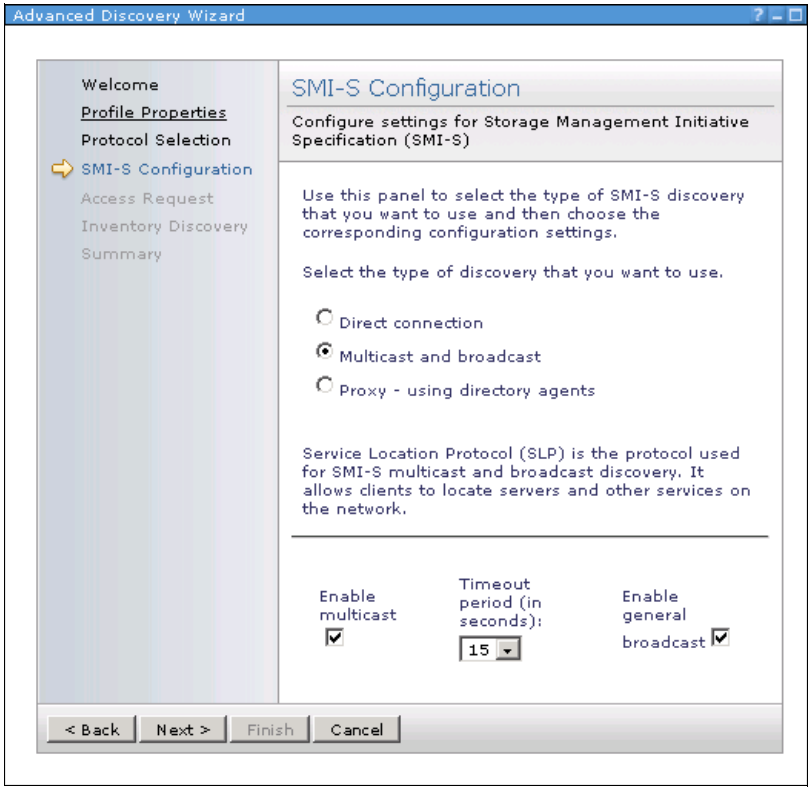


Figure 13-29 SMI-S configuration page

3. Check the **Enable Multicast** or **Enable general Broadcast** option based on which discovery type you want. The time-out period is 15 seconds by default. You can change that if required.

4. On the Access Request page make sure the Activate - use the following user login information field is not selected, since multiple SMI-S providers will be discovered and the discovered providers can have different access credentials. Once discovered you can perform an access request for each individual SMI-S provider. Refer to Figure 13-30.

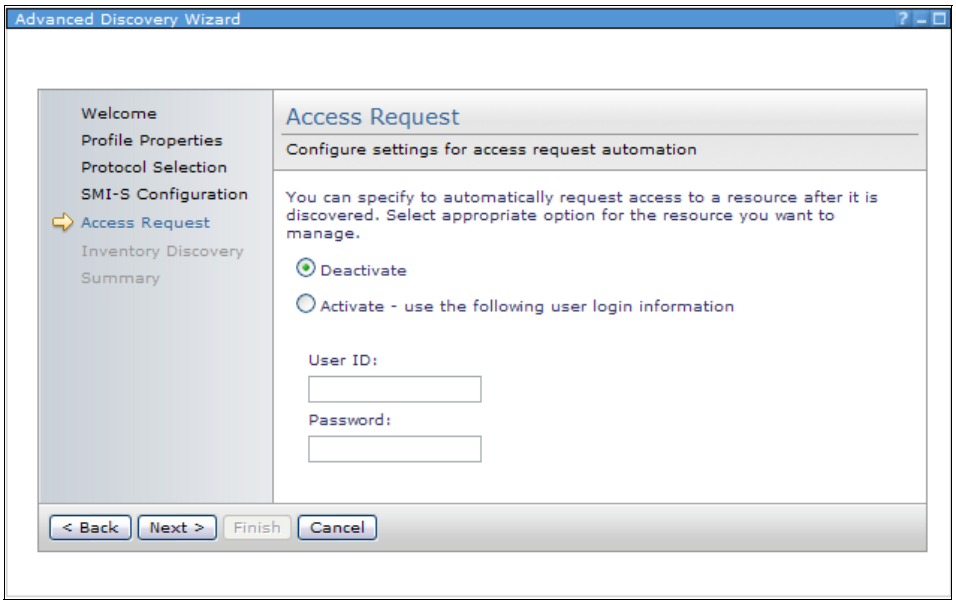


Figure 13-30 Deactivate automatic request access

5. On the Inventory Discovery page uncheck Automatic inventory discovery for same reason as for the access request. You can collect inventory for each individual SMI-S device later. Refer to Figure 13-31.

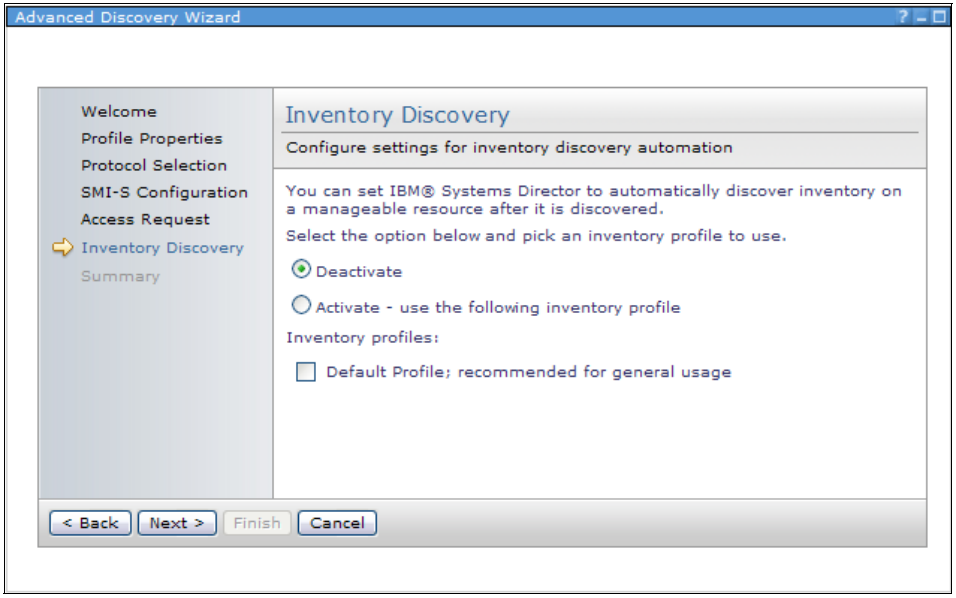


Figure 13-31 Deselect automcatic inventory discovery

6. Save the discovery profile and click **Run** to run the discovery profile.

Once completed, verify the successful discovery of SMI-S providers by traversing from the IBM Systems Director Web navigation panel to **Navigate Resources** → **All Systems** and verifying that your newly discovered systems are listed.

Using directory agent discovery

Service Location Protocol is the protocol used for SMI-S directory agent discovery. SLP is used for clients to locate servers and other services in the network. This discovery method is particularly useful to find SMI-S providers that are on a different subnet from the management server.

To configure a discovery profile for using directory agents to discover multiple SMI-S providers at once:

1. As detailed in 13.3.2, “Direct connection discovery” on page 666, start the Advanced System Discovery wizard and choose to **Create** a new discovery profile.

2. On the SMI-S Configuration page (Figure 13-32), for the type of discovery option select **Proxy - using directory agents**.

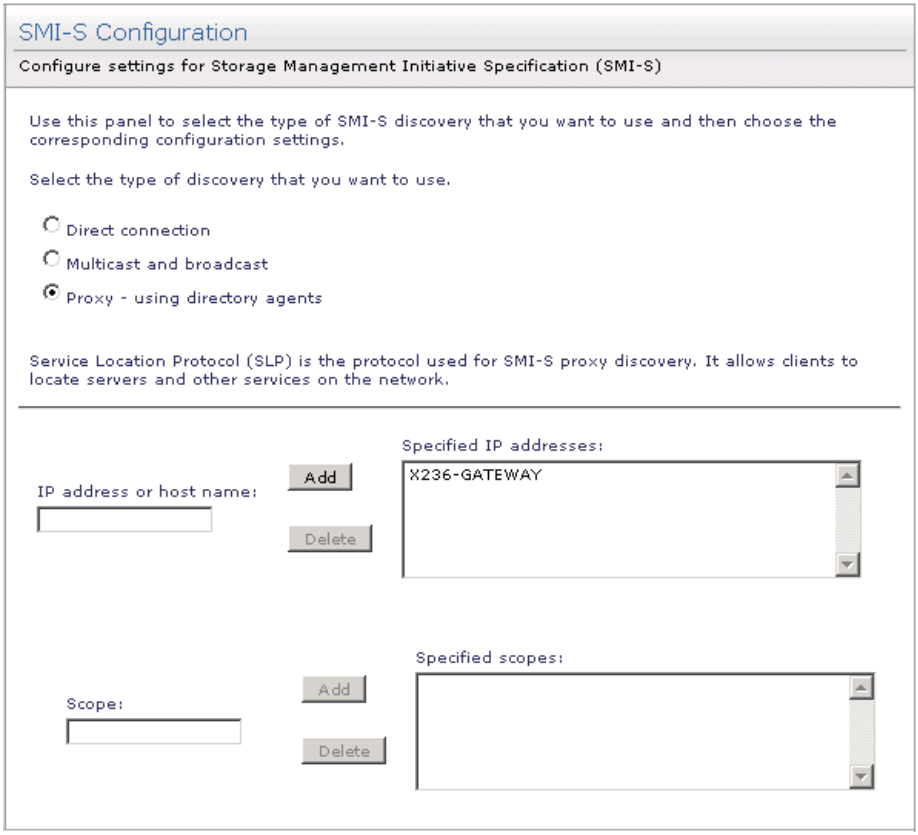


Figure 13-32 SMI-S configuration page

3. Enter the IP address of the Director Agent and click **Add**. Repeat this step until all the directory agents are added and make sure that the IP addresses from the Specified IP addresses list box are valid (do this manually by cross-checking).
4. Optionally, specify values in the scope field. The scope limits the discovery task to only those providers listed in the scope area of the directory agent. A scope is used to categorize SMI-S providers.

   A scope is a list of SMI-S providers defined in the directory agent. If a scope is used in this procedure, a particular SMI-S provider will not be discovered unless it is listed in the scope. Refer to Figure 13-32.
5. Uncheck Automatic Access Request and Automatic Inventory Discovery (Figure 13-30 on page 674 and Figure 13-31 on page 675).

6. Click **Finish** to save the discovery profile and close the wizard.
7. Click **Run** to run the discovery profile. Wait for the discovery process to finish.

Once completed verify the successful discovery of SMI-S providers by traversing from IBM Systems Director Web navigation panel to **Navigate Resources** → **All Systems** and verify that your newly discovered systems are listed.

13.4 Viewing storage devices

Once a storage device is discovered and inventory is collected for the device, IBM Systems Director provides you with various perspectives to view and provision storage devices. In this section we describe the different perspectives that you can use to view storage device.

The topics that we discuss in this section are:

13.4.1 Storage Management summary

The Storage Management page (Figure 13-33) is the central location where all the discovered storage devices are listed, categorized, and summarized. The Storage Management summary page provides an introduction to your storage systems.

You can launch the Storage Management summary page from the Manage tab on the Welcome page by clicking the **Storage Management** link.

Note: Discovery and inventory collection must be run before you can view your storage device details on the Storage Management summary page.

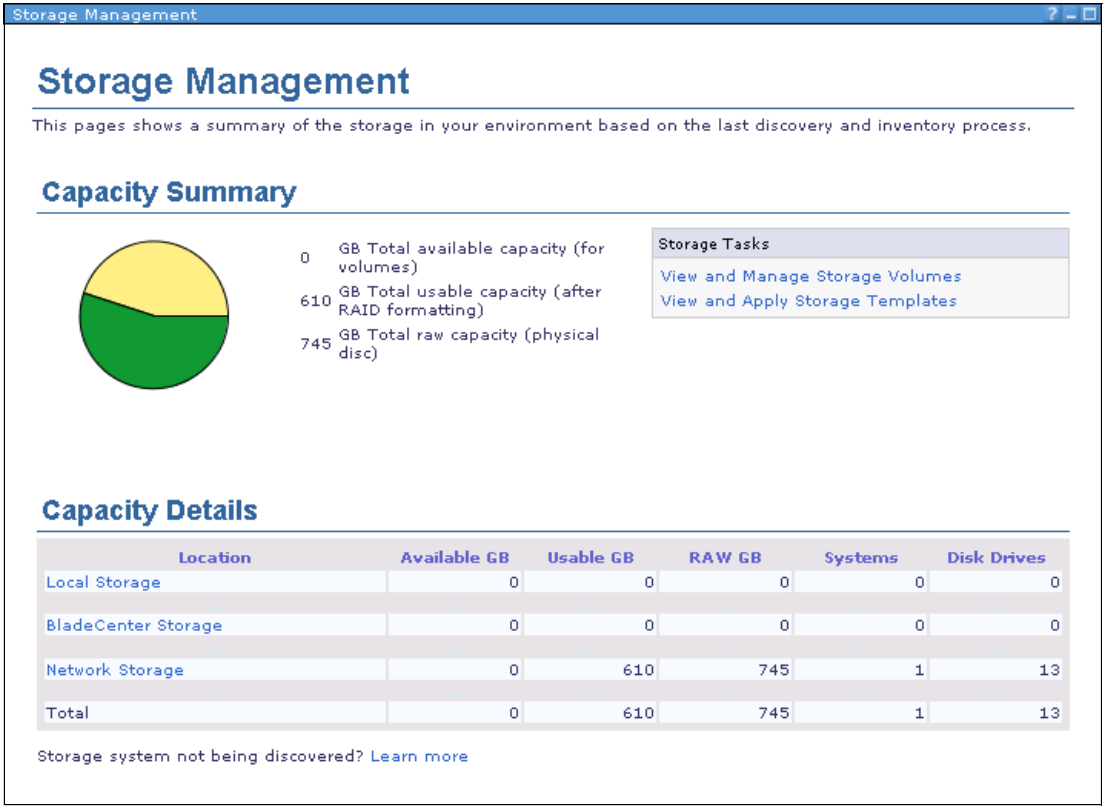


Figure 13-33 Storage Management summary page

This page shows a comprehensive summary of all the supported storage devices in your environment. The Storage Management summary page is broadly divided into two sections, the capacity summary and the storage tasks.

Capacity summary

This area summarizes various storage capacity configurations for the storage system. It describes three parameters:

- Total available capacity

  This specifies the total disk space (in GB) available for creating volumes and attaching them to a system.

- Total usable capacity

  This specifies the number of GB of disk space after RAID formatting is performed. Usable capacity represents the total storage array or storage pool space that could be used to create volumes. Initially, when a storage array or pool is created, the usable and available capacity are the same. As volumes are created from the total usable capacity, the amount of available capacity decreases. The usable capacity is a measurement of the current quantity of usable storage.

- Total raw capacity

  Raw capacity represents total physical disk space in GB.

Storage tasks

This tasks box on the right side of the capacity summary lets you perform the following storage tasks:

- View and manage storage volumes.

  Using this option you can work with your currently defined storage volumes to make changes, or add or delete them. It displays the current available configurations for the system.

  By selecting an appropriate configuration plan you can create a new volume from network storage to be assigned to a selected host system, or delete a volume that is currently assigned to a selected host system. The create volumes function simplifies the allocation process by determining the best fit storage system, and creating any necessary RAID arrays automatically.

  Refer to 13.5, “Configuration templates” on page 691, for more details on creating and using configuration templates.

- View and apply storage templates.

  This option opens the Configuration Templates wizard and list all the default storage templates. You can select from the available templates and deploy settings to one or more systems. Refer to Figure 13-34.

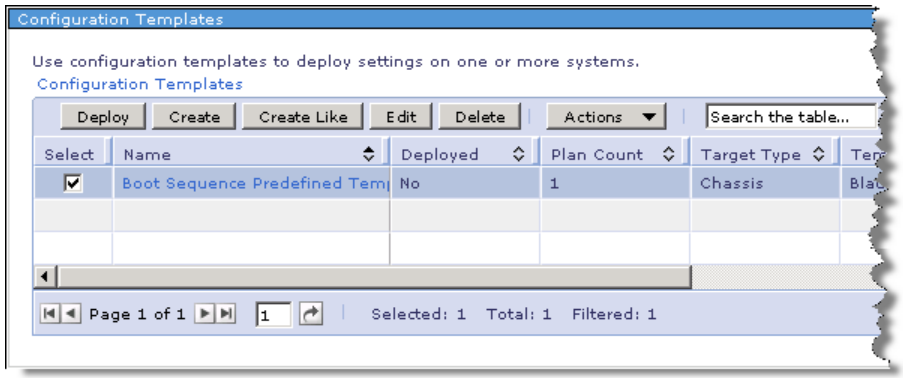


Figure 13-34 Storage configuration templates

Storage configuration templates can be used to perform the following operations:

- Cloning the storage configuration of a system: Save a storage volume template from an existing server, and then later apply a saved template to another system. This can be used for duplication (clustering, or virtual server hosts) or for saving the storage configuration for backup or disaster recovery purposes.
- As a starting point for creating additional volumes: Start with a base template and make changes as needed.

Capacity details

The lower half of Figure 13-33 on page 678 displays a table that summarizes the available, usable, raw disk space, number of disk drives, and number of systems for three different storage groups (based on location of the storage device):

- Local storage

  This location is the local dedicated storage attached to a given system. For local storage only the Raw GB column is populated. The Available GB and Usable GB columns are always displayed with values of 0.

- BladeCenter storage

  This location represents storage accessible to your IBM BladeCenter systems. Specifically, this is IBM BladeCenter S storage being managed by an IBM SAS Controller Module.

- Network storage

  This location shows storage accessed via switches, adapters, and protocols, such as Fibre Channel, SAS, and iSCSI. Network storage comes under this group.

- Total

  This location provides a summary of all the storage groups by summing each of the columns in this view.

13.4.2 Displaying storage systems and volumes

To view storage systems using storage groups:

1. From the IBM Systems Director Web navigation panel select **Navigate Resources → Groups → Groups by System type → Storage Systems**. A list of predefined storage groups is displayed, as shown in Figure 13-35.

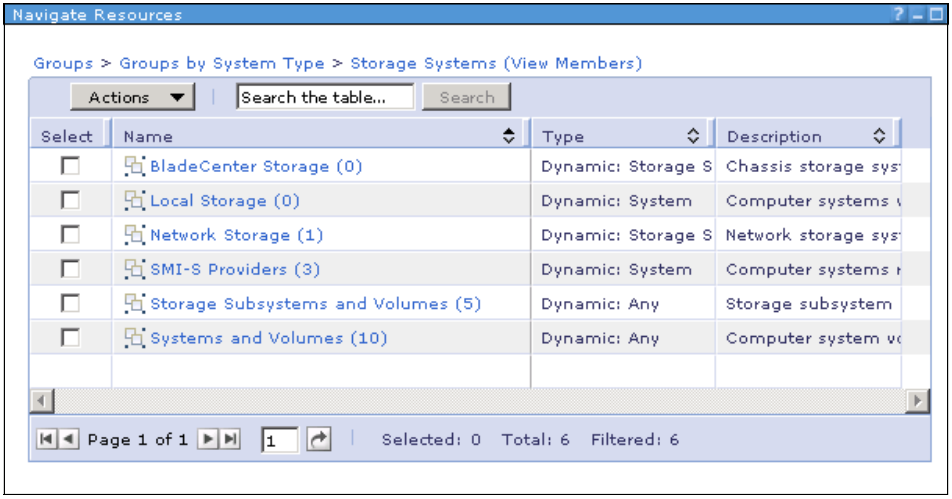


Figure 13-35 Storage groups

2. Select an appropriate storage group and then select **Actions → View Members**.

The table of systems from the selected groups and their associated volumes will be displayed in the default Resource View, as shown in Figure 13-36.

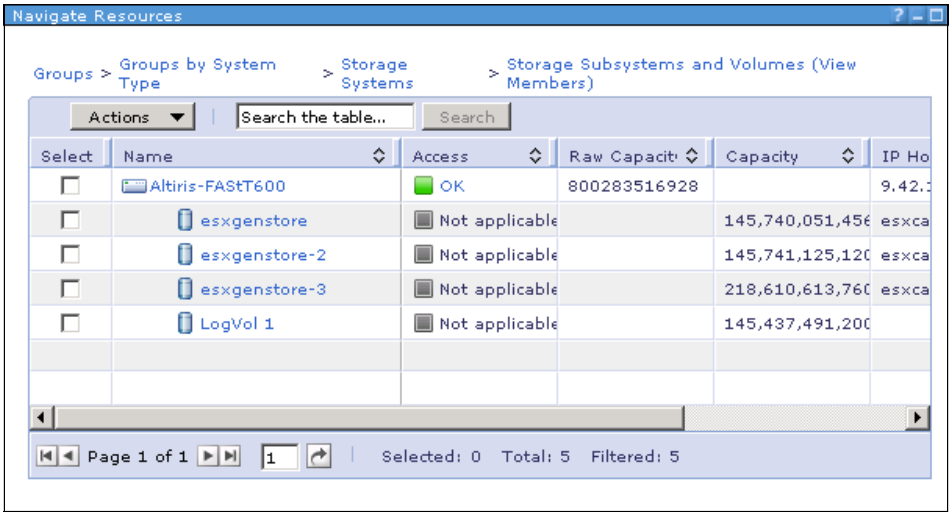


Figure 13-36 Resource view for displaying storage

3. You can optionally change the view for better perspective. IBM Systems Director primarily provides three views for displaying storage:
   - Resource View (default view)
   - Map View
   - Relationship View

To change the view select the **Actions** menu and then select the view that you would like to see. The Map view displays a visual representation of the storage and its volume allocations, as shown in Figure 13-37.

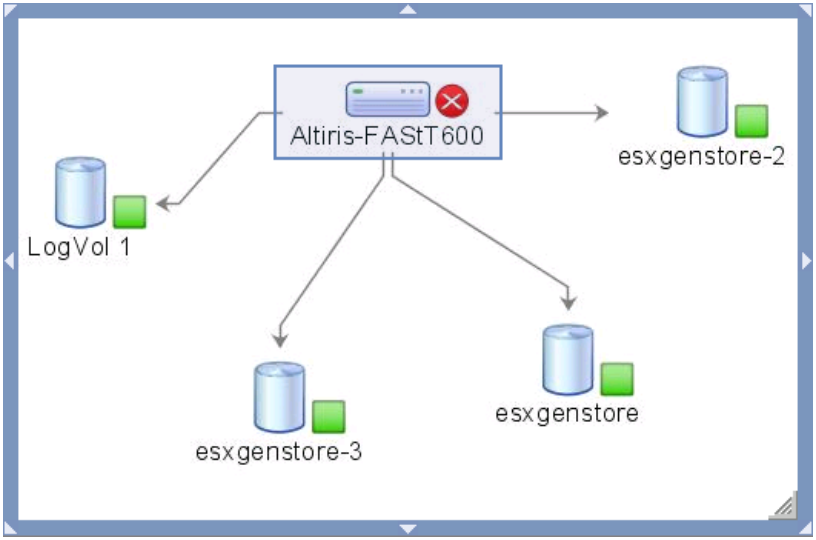


Figure 13-37 Map view for displaying storage

The Relationship View details the From → Relationship Type → To information between the storage system and allocated fragments (storage pools, volumes, and so on), as shown in Figure 13-38.

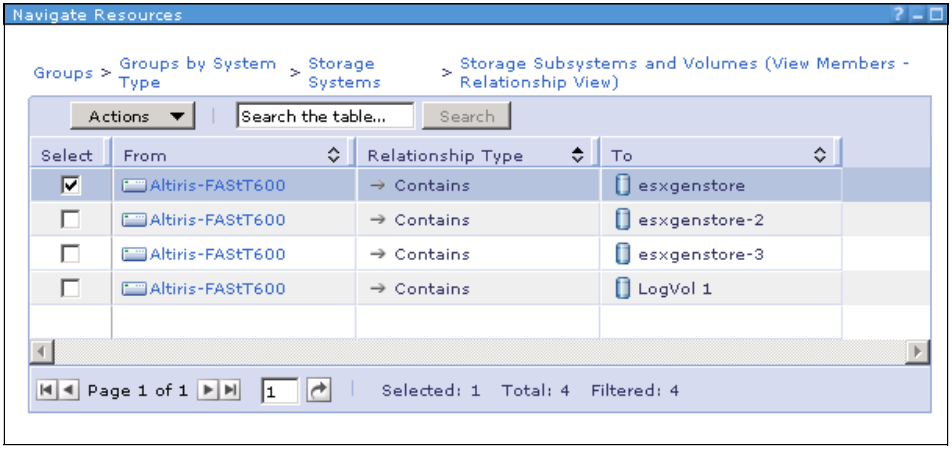


Figure 13-38 Relationship view for storage systems

4. If you want to view any specific relationship in a map view, select the relationship and select **Actions** → **Show Relationship in Map**. This opens the storage topology in a map view and highlights your selected relationship, as shown in Figure 13-39.

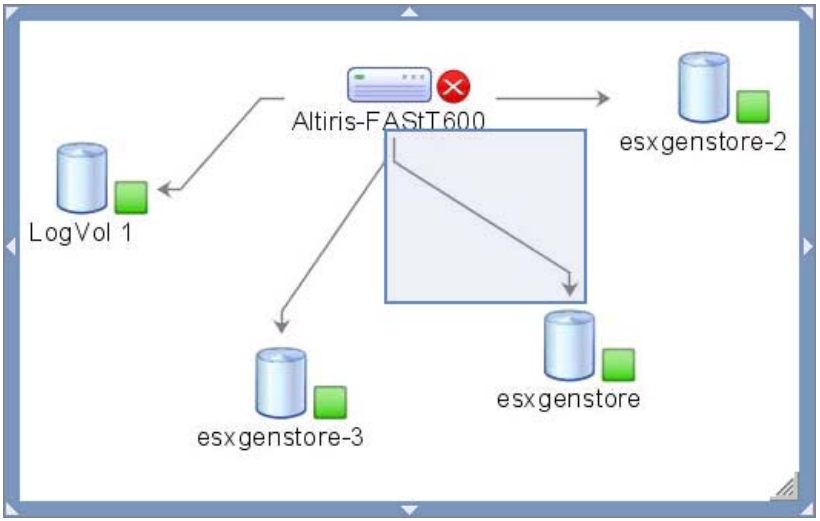


Figure 13-39 Relationship in a Map view

5. Further, IBM Systems Director also allows you to view the topology perspective for each individual storage volume. To see the topology view of a volume, select the storage volume from Resource view and then select **Actions** → **Topology Perspectives** → **Storage**. You can view the topology, as shown in Figure 13-40.

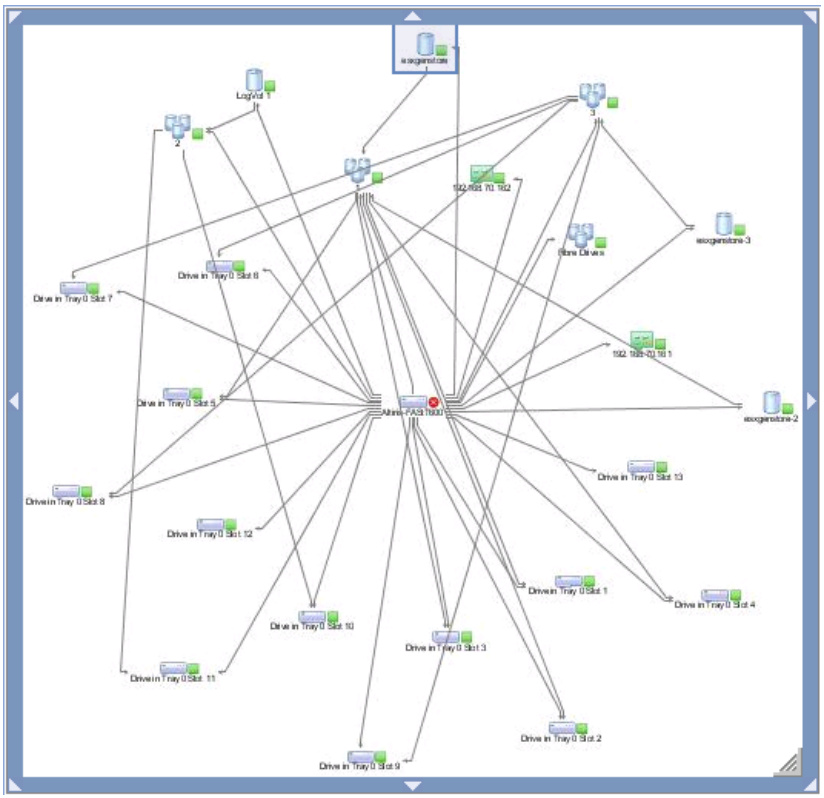


Figure 13-40 Topology view for the storage volume

Systems Director also allows you to see an overview and details of the selected device, as shown in Figure 13-41.

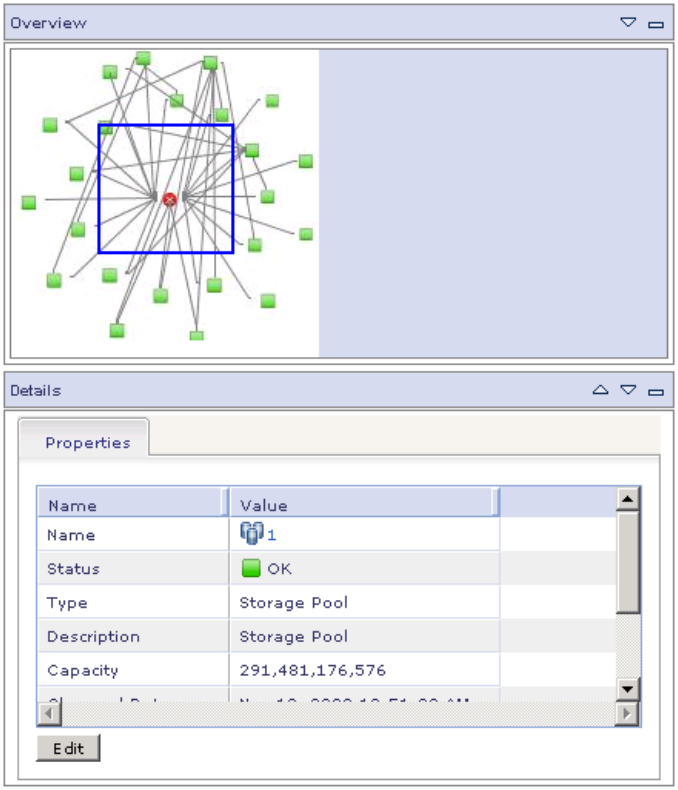


Figure 13-41 Overview and Detail view of storage device

You can move the blue-colored box in the Overview section to get the corresponding magnified view of topology. From the topology view you can select any storage element (storage system, volume, storage pool) to view detail properties in the Detail window, as shown in Figure 13-41.

13.4.3 Storage topology perspective

The storage topology perspective displays a topology view tailored to the storage-related resources for a system or device. By default, a topology

perspective contains all resources related to the device. The storage perspective limits the resource types to storage-related resources.

IBM Systems Director provides the following topology views:

- Basic
- Network
- Storage
- Storage area network
- Updates

To change the topology view, select the storage system, select **Actions** → **Topology Perspectives**, and select the desired topology view. For example, Network topology shows the storage device and its connection configuration with other storage elements and systems, as shown in Figure 13-42.

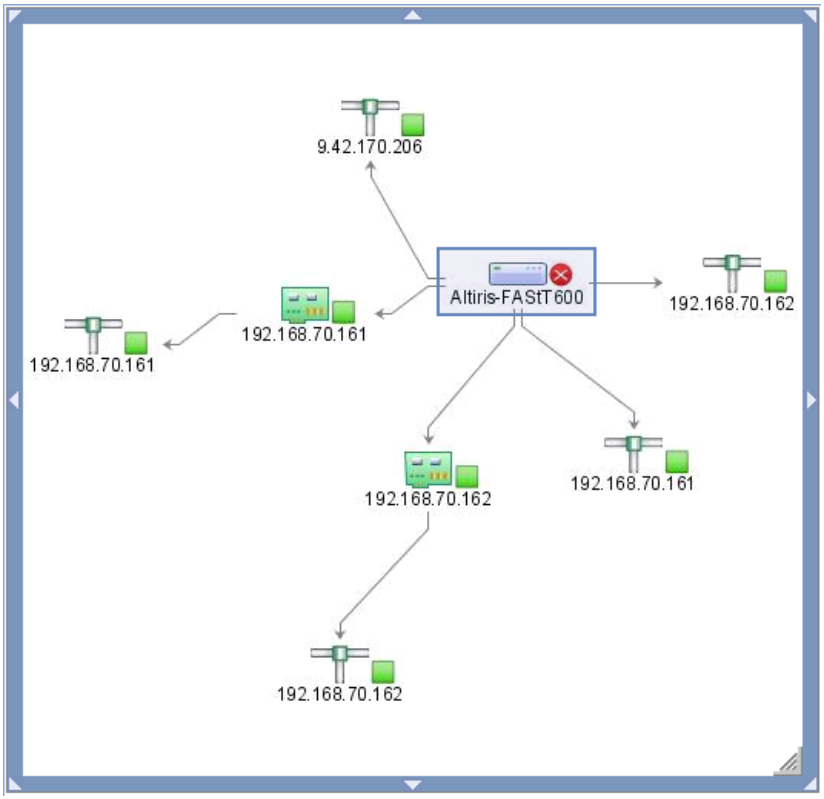


Figure 13-42 Network topology view for storage device

Similarly, the Storage view provides a topology map that shows logical relationships between resources that are related to the selected resource,

including hosts, host volumes, storage systems, storage volumes, storage pools, and disk drives, as shown in Figure 13-40 on page 685.

13.4.4 Health and status of storage devices

You can view the health and status of a storage device once the storage device is discovered in IBM Systems Director and inventory has been collected for the device. To view the status and health summary for the storage device:

1. From the IBM Systems Director Web console select **Welcome** → **Status Manager**. The Status Manager summary page is displayed for the systems in your environment, as shown Figure 13-43.

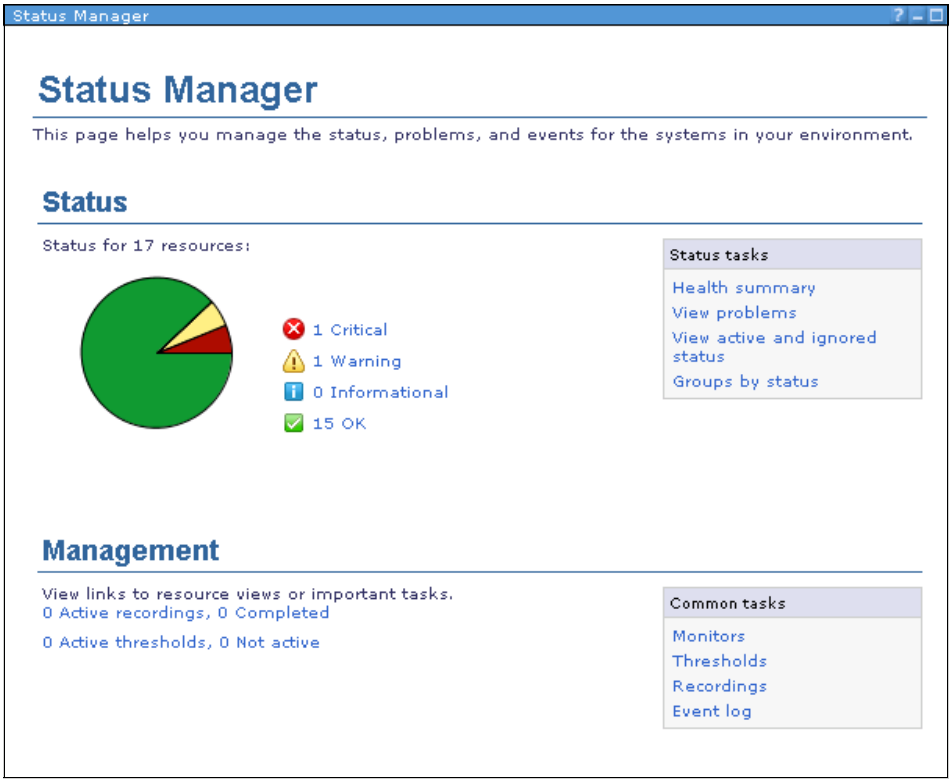


Figure 13-43 Status summary for discovered systems

2. To view the health of the system, from the Status tasks pane click **Health summary**. The summarized health status display opens for all systems, as shown in Figure 13-44.

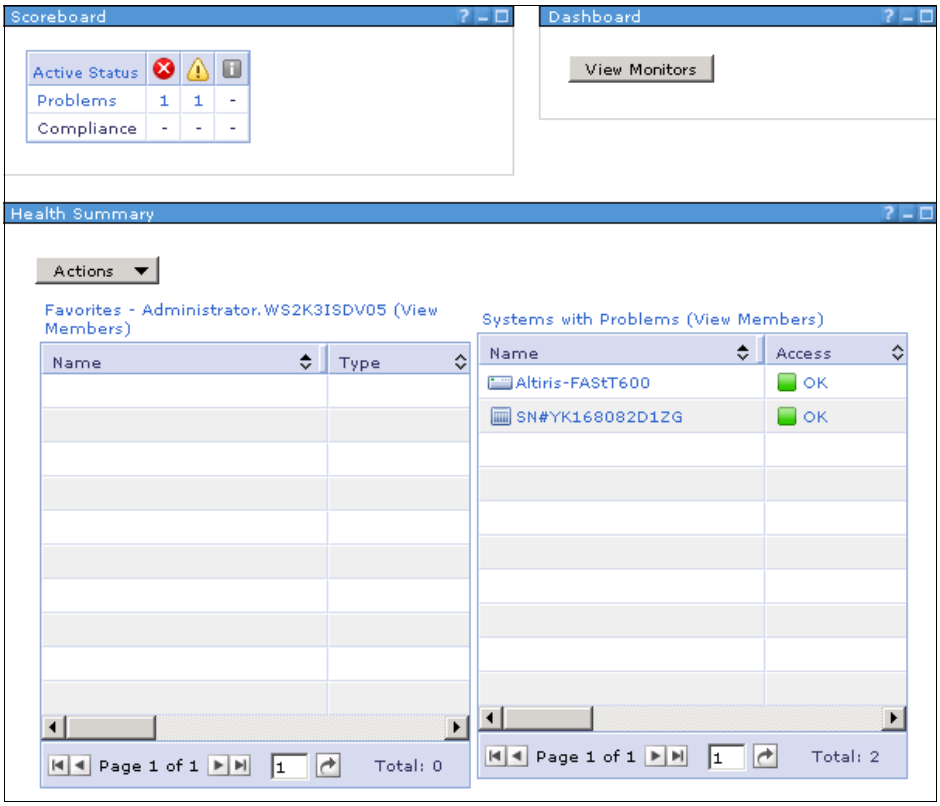


Figure 13-44 Health Summary page

3. For more details click the **Systems with Problems (View Members)** link, which shows a list of all systems with their configuration parameters, as shown in Figure 13-45.

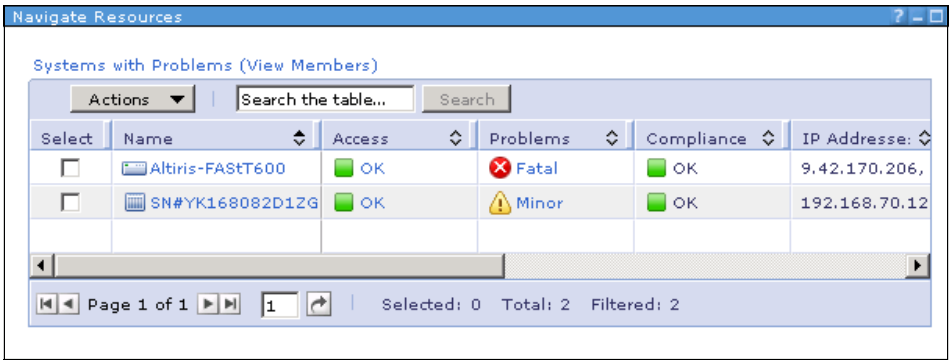


Figure 13-45 Systems with Problems page

4. To view the status of a system, navigate to **Welcome** → **Status Manager**, then in the Status tasks pane click **View active and ignored status**. This lists all discovered systems and their status and severity, as shown in Figure 13-46. You can select a storage system and check its status.

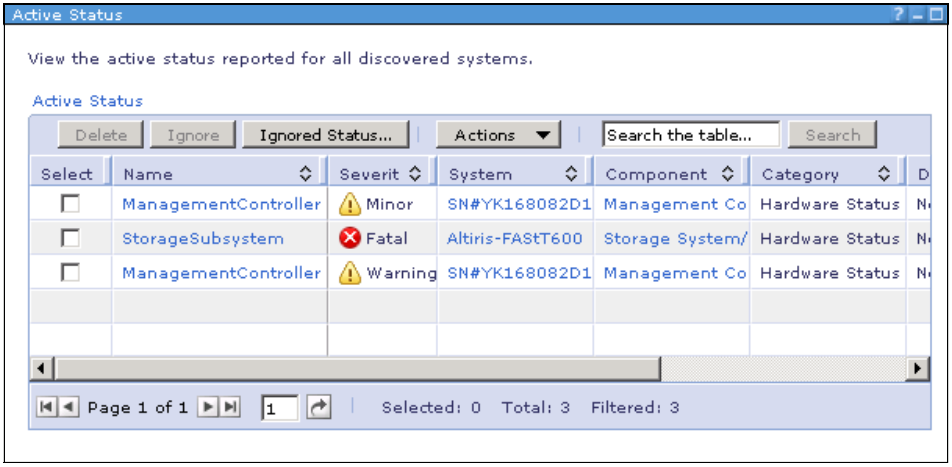


Figure 13-46 Status page for systems

Note: The status for storage devices must be cleared manually if the cause of the status change is resolved outside of IBM Systems Director. In this case, either ignore, deactivate, or delete the status set to reset the status of a storage system.

5. To view the event logs for your system, from the Status Manager summary page in the Management section, view **Common tasks** and click **Event log**. To view logs for a storage system, search for the system in the Source column of the event log table and view its corresponding events. Refer to Figure 13-47.

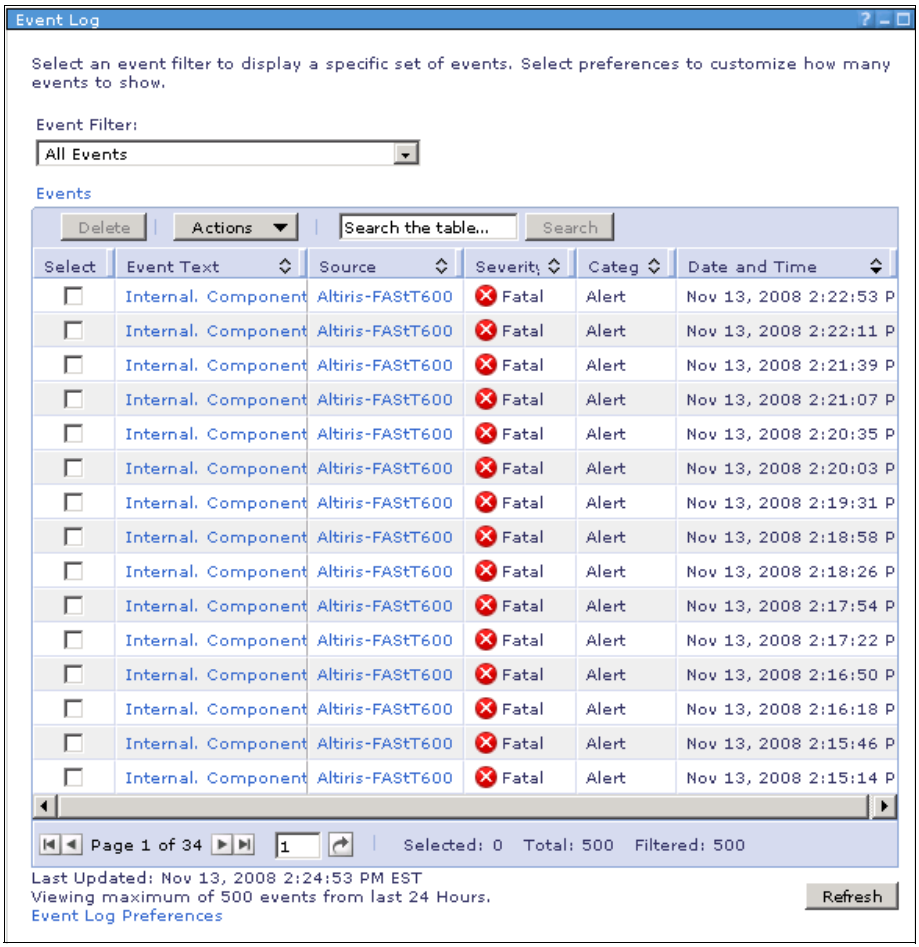


Figure 13-47 Event log display

13.5 Configuration templates

Storage configuration templates are used to specify storage definitions, such as storage volume definitions and SAS zoning. These configuration templates are stored by IBM Systems Director and can then be deployed to the associated

storage devices. The configuration manager is used to create and manage these configuration templates.

To create configuration templates for storage provisioning:

1. To view the existing storage configuration templates from the IBM Systems Director Web console select **Welcome** → **Configuration Manager**. Then from the Configuration tasks pane click **View Configuration templates**. Refer to Figure 13-48.

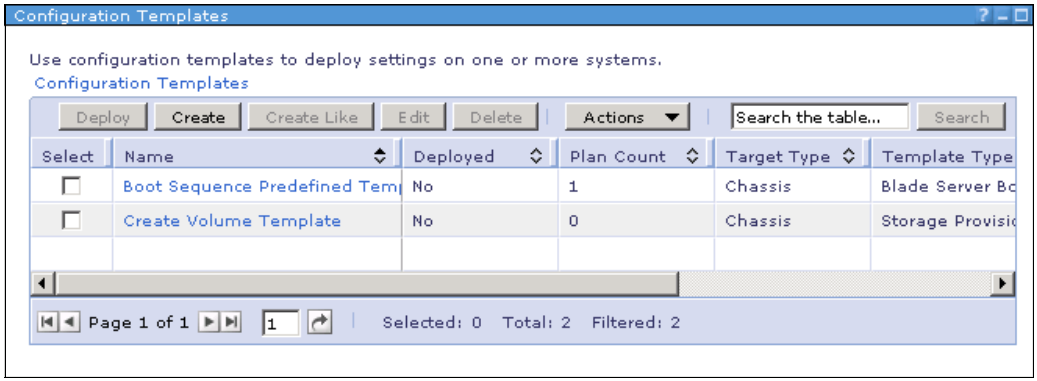


Figure 13-48 Configuration templates page

2. To edit an existing profile, select the profile that you want to edit and click **Actions** → **Edit**. You can change the configuration templates parameters and save the changes.

3. To create new configuration template, click **Actions** → **Create** from the Configuration Templates page. Refer to Figure 13-48 on page 692. This opens the Create wizard, as shown in Figure 13-49.

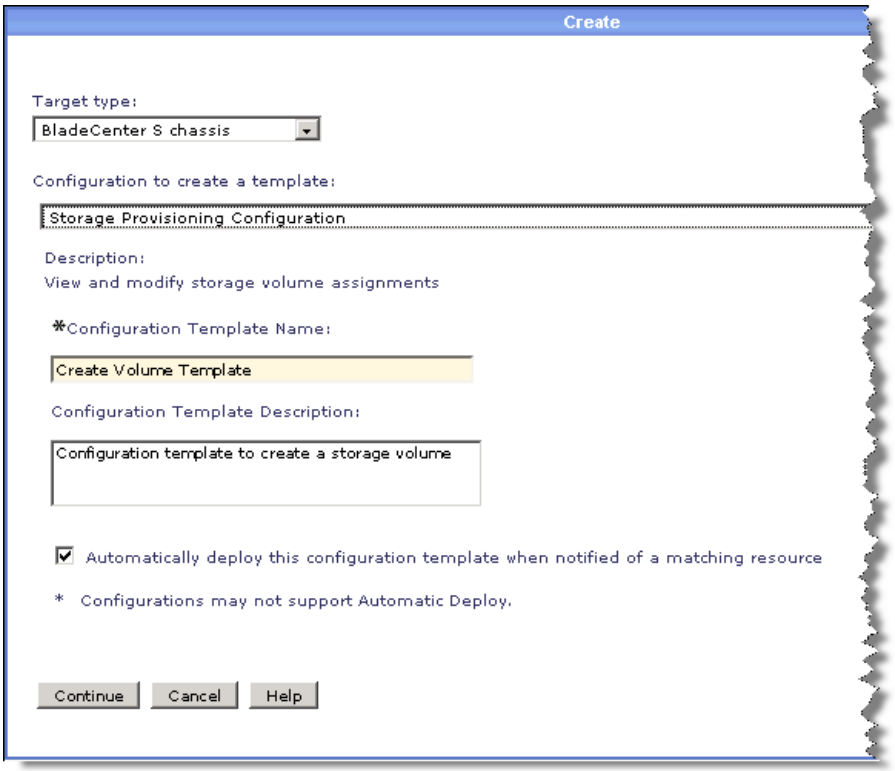


Figure 13-49 Create new storage configuration template page

4. Select the correct target type. From the Configuration to create a template drop-down menu list select **Storage Provisioning Configuration**. Specify an appropriate Configuration Template name and optionally a configuration template description. Check or uncheck the **Automatic deploy** feature as per requirements. Once completed, click **Continue**.

5. On the Create Storage Volumes page, you can add configuration settings for volumes to be created. You can specify more than one volume to be created as part of a single storage configuration template. Refer to Figure 13-50.

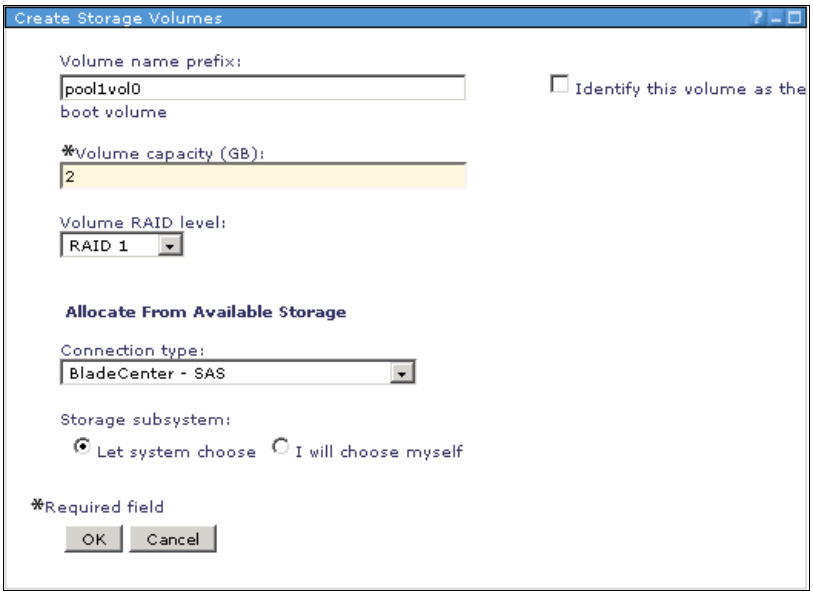


Figure 13-50 Create storage volume setting page

6. Specify the volume name, volume capacity (in GB), RAID level, and connection type from the options. Select whether you want to manually select the storage subsystem for creating a volume or let the system choose based on available storage.
7. Click **OK** to save your configuration template.
8. Your storage configuration template will be saved and listed among the available configuration templates. To deploy your settings, select your storage configuration template and click **Deploy**. You will be asked to select a valid target on which you want to run the job.
9. Select an appropriate target and run the job.

13.6 External storage applications

External storage applications refers to all storage management and provisioning applications that can be used separately for a storage device. The following list describes the applications available for each storage device:

- IBM TotalStorage Productivity Center (SAN-attached devices)
- IBM DS4000 Storage Manager (DS3000/DS4000 series storage devices)
- IBM DS Storage Manager (DS6000 series storage devices)
- ServeRAID Manager (Internal RAID controllers)

IBM Systems Director can be used to launch an external storage management application to configure, control, and maintain certain storage devices and their connectivity to the network.

Note: Before launching external storage applications from IBM Systems Director, make sure that the respective storage application is installed and configured correctly. External Storage Manager must be installed on the same system that is running the client browser session (that is, the browser used to connect to IBM Systems Director).

Launching external storage application

To launch the external storage application:

1. From IBM Systems Director tasks navigation panel, go to **System Configuration** → **External Storage Applications**, as shown in Figure 13-51.

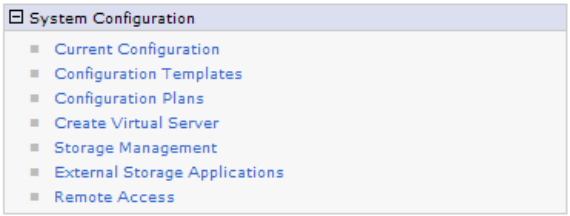


Figure 13-51 Launching external storage application

2. The External Storage Application wizard starts, as shown in Figure 13-52.

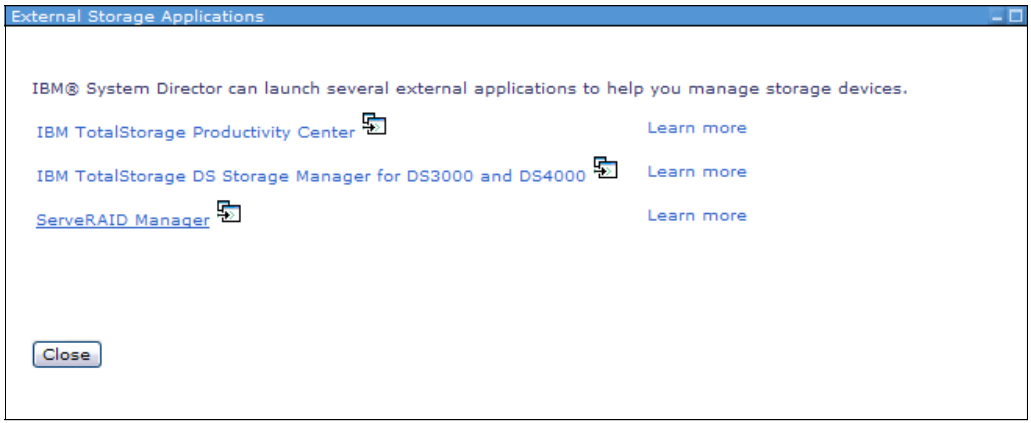


Figure 13-52 External application Wizard

You can click **Learn more** to know more details about each storage application.

3. Click the links to launch the respective external application from IBM Systems Director.

   All these external applications will be started as Launched in Context for IBM Systems Director. If you do not have the IBM JRE 1.5 or later version installed you are prompted to install it.

4. Before launching the DS Storage Manager for DS3000 and DS4000, make sure that you have discovered the system that hosts the SMI-S provider, requested access, and collected inventory. Once these steps have been successfully completed, you can also launch the DS Storage Manager from the Actions menu of the storage system, as shown in Figure 13-53.

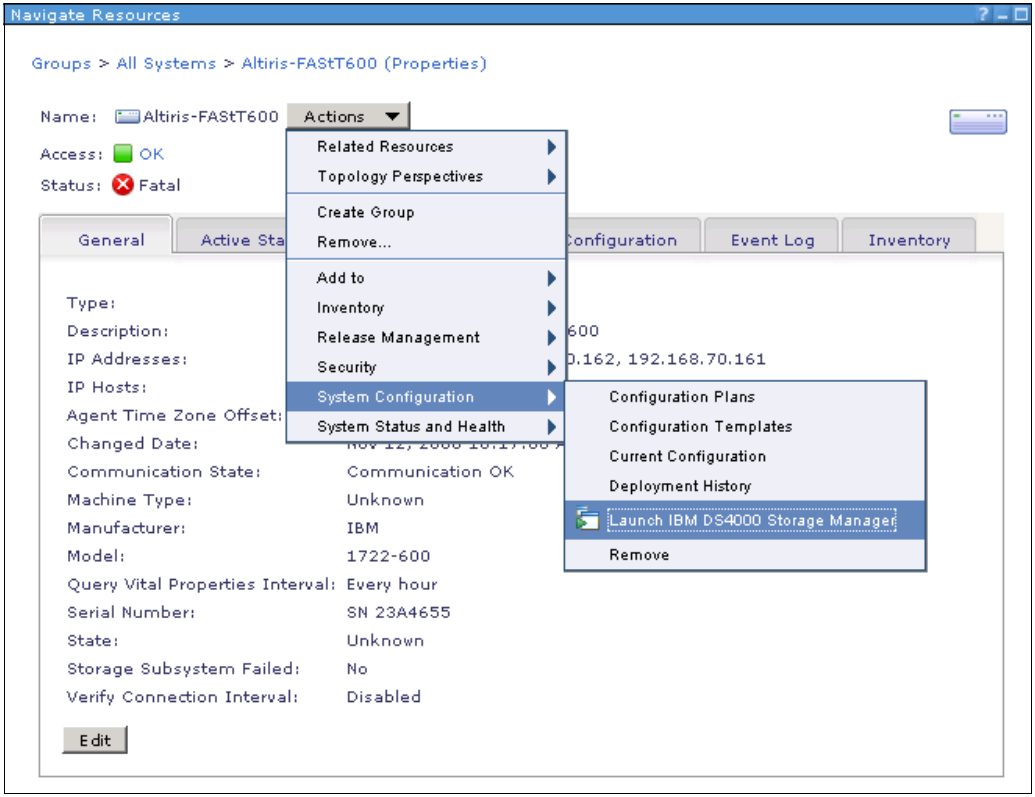


Figure 13-53 Launch DS4000 Storage Manager

5. Similarly, before you can launch the ServeRAID Manager, discover the system that hosts the RAID adapter, request access, and collect inventory. The ServeRAID Manager Level 1 Agent provides inventory and events support. ServeRAID Manager can now be launched as an external storage application or from the Actions menu of a server of the system that hosts the RAID adapter. When the ServeRAID Manager Console (Standalone Edition) is launched for the first time, you must add the managed system manually.

14

Task management

Much of what you do in IBM Systems Director involves creating schedule jobs and other tasks. In this chapter we look at how to create and manage these jobs and how to create your own tasks.

This chapter covers the following:

14.1 Tasks and jobs overview

Within IBM Systems Director many of the things that you do are referred to as tasks. Simply put, a task is something that the management server must do. When you schedule a task, whether to run immediately or to be scheduled to run in the future, you create a job that is one or more tasks targeted at zero or more resources that the management server executes on your behalf.

While you can create jobs when you perform tasks, such as running a discovery profile or collecting inventory, you may want to create other tasks that run commands on managed systems. For this we use Command Automation, as we describe in the next section.

14.2 Command Automation

Command Automation allows you to create tasks within IBM Systems Director that can be run against a Common Agent managed system. In addition to running a command, you can specify the user ID and password to use when running the command. This allows you to run a task as a specific user without having to include a password in the script file.

When you create a Command Automation task, the Command Definition window opens, as shown in Figure 14-1. Enter the command that you want to run in this window.

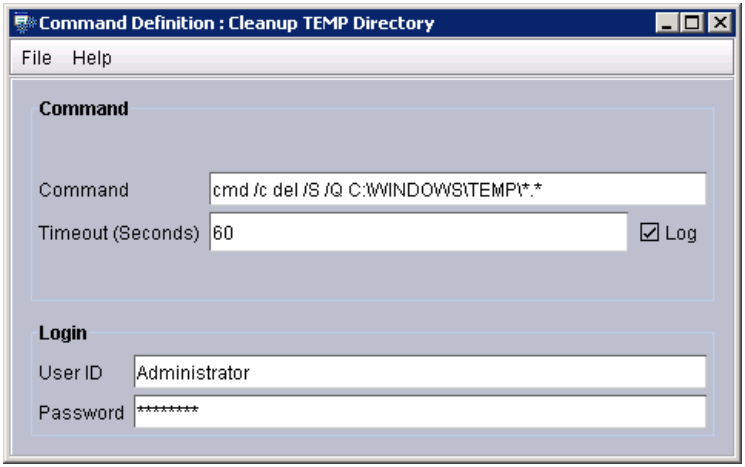


Figure 14-1 Command Definition window

Tip: The command must be one that you can run from a command prompt in any working directory. Make sure that the command is in the system path or specify the full path to the script or executable. If the command that you want to run is built into your command interpreter, you can specify the interpreter in the command field.

By default, IBM Systems Director starts the command, then returns, reporting the status of its ability to start the task. If you check the Log check box, IBM Systems Director waits for the job to complete, capturing the standard output and including it in the task log. To keep a hung command from permanently holding onto IBM Systems Director, the command definition includes a Time-out field, which limits how long IBM Systems Director will wait for the command to finish.

In addition to defining the command, you can optionally specify which user will run the command. By default, IBM Systems Director commands are run as either the LOCAL SYSTEM account in Windows or root in other operating systems. We recommend that you specify a user ID and password that have the minimum privileges necessary to run the command.

Once you have defined the command you can save it, making it available on the Command Automation page.

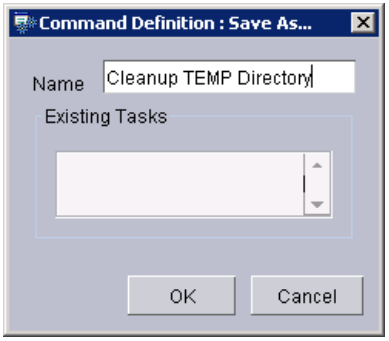


Figure 14-2 Command Definition Save As window

Figure 14-2 on page 701 shows the Command Definition: Save As window. Since each command must have a name unique to the IBM Systems Director Server, the existing tasks are shown to help you avoid duplication.

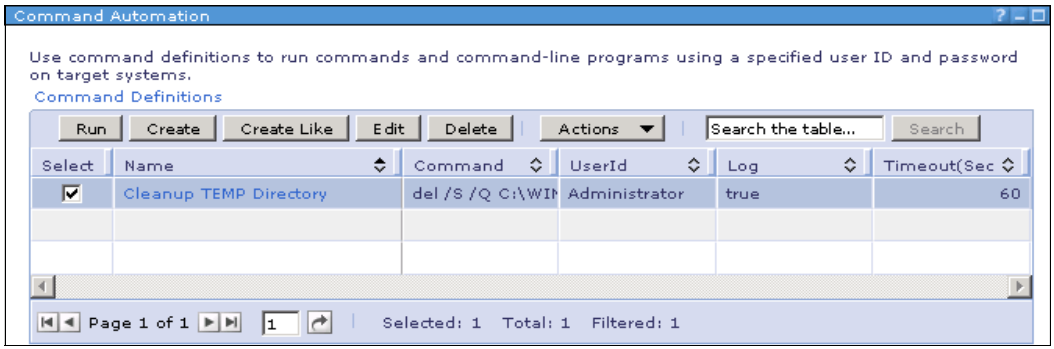


Figure 14-3 Command Automaton page

Once you have defined a command, you can run it as a scheduled job. Select the command and click **Run** and you will see the Run window shown in Figure 14-4.

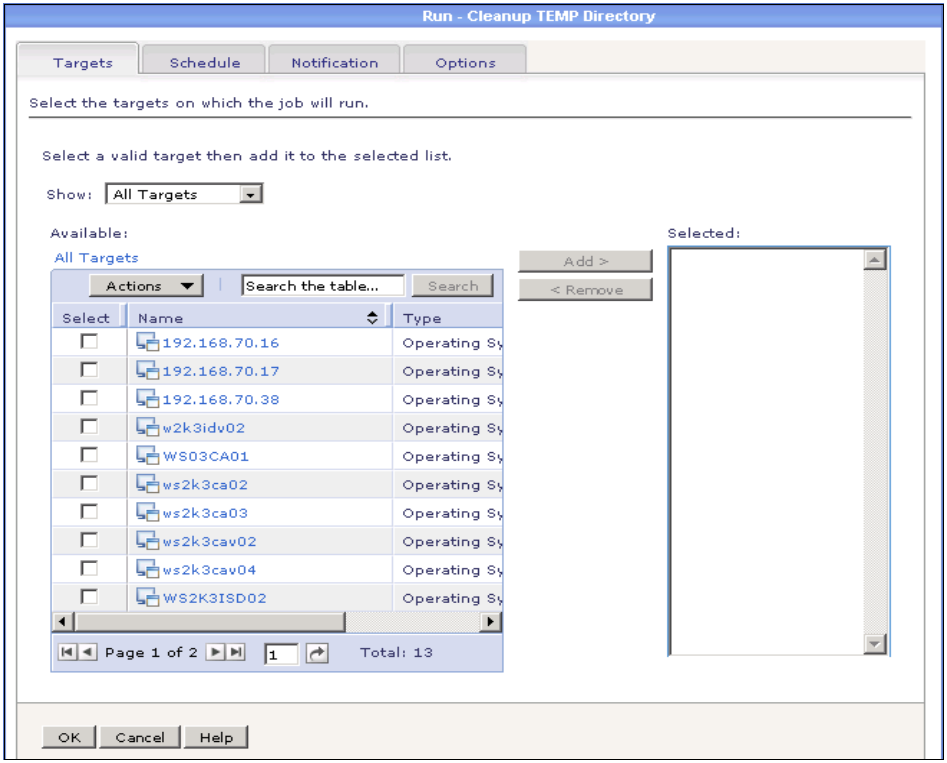


Figure 14-4 Target job window

Here you can specify which Common Agent managed systems to target the job against. Using the tabs at the top of the window you can further modify how the job will run. Next we discuss the parameters found on each tab.

On the Schedule tab in Figure 14-5 you can give the job a name and determine when it will run. This includes the ability to schedule the job to run at a repeating interval on a regular basis.

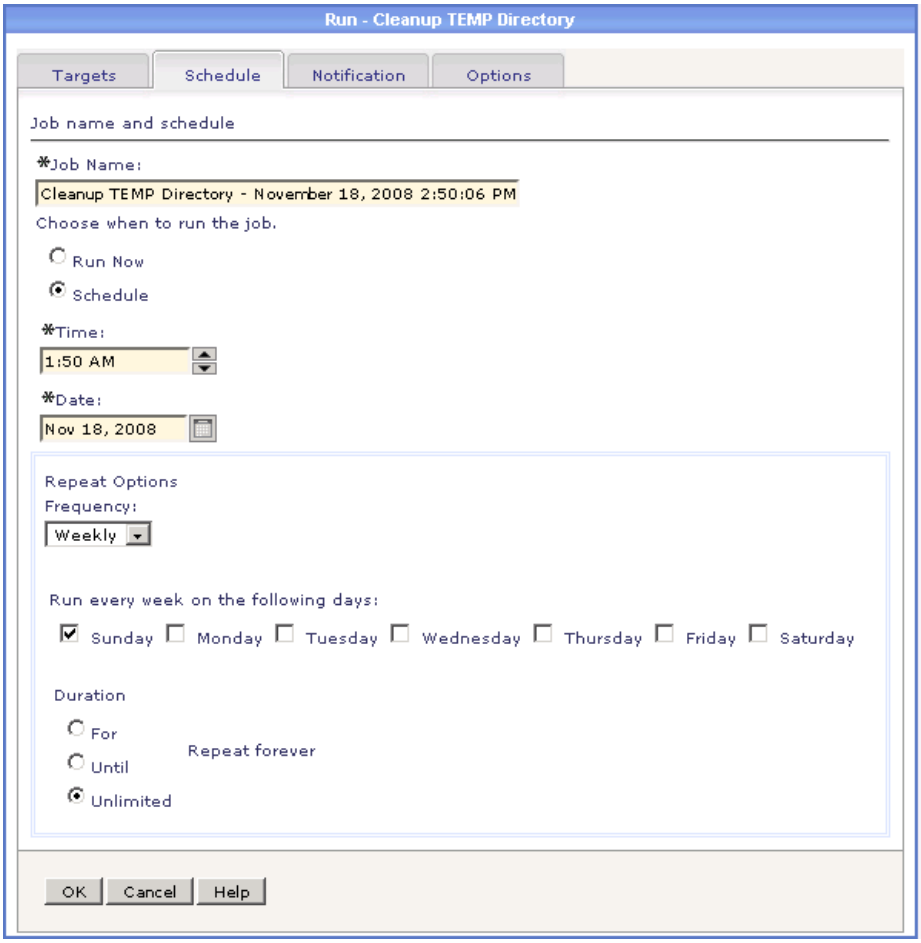


Figure 14-5 Job schedule window

The Notification tab in Figure 14-6 allows you to specify e-mail notifications about the status of the job and where these notifications will be sent. You can request notification to be sent when the job starts, when it completes, or when it fails. You can also specify an error threshold that will cause a notification to be sent.

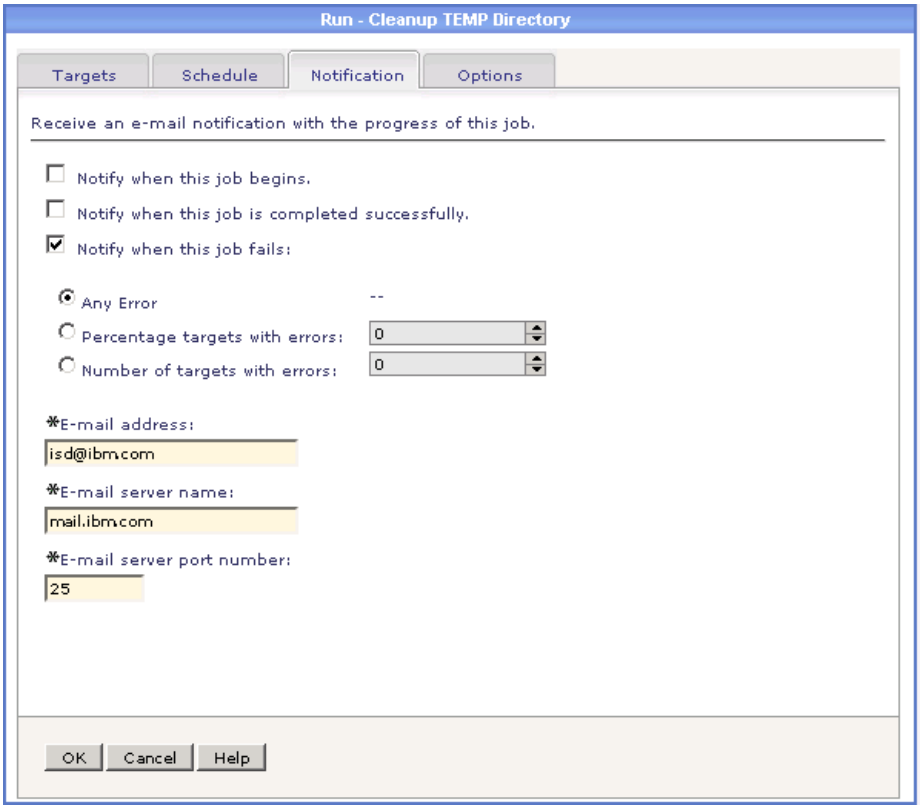


Figure 14-6 Job notification window

The Options tab shown in Figure 14-7 allows you to select which system's time will be used as the basis for starting the job and what to do if the system is not available when the job is scheduled to run.

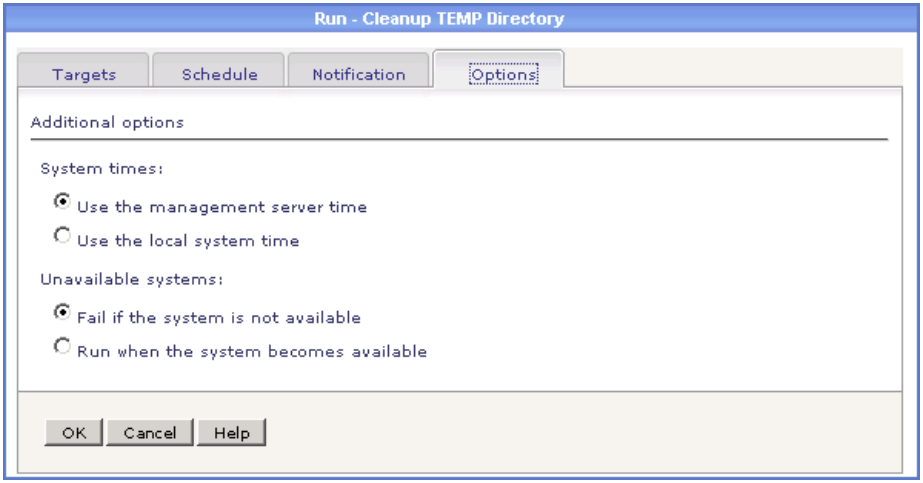


Figure 14-7 Options tab in job window

Once you have set up the job to run, you can check its status and logs in the Active and Schedule Jobs task, which we cover in the next section.

14.3 Active and scheduled jobs

The Active and Scheduled Jobs page shows all jobs that are active or scheduled. Active jobs include those that are currently running and those that have completed and have logs on the IBM Systems Director Server.

From the page shown in Figure 14-8, you have an overview of the jobs that have been created on your management server. In addition to the status and progress of a job, you can see when the job was run, when it will next run, and who created the job. You can also delete a job, create another job like the one selected, or run a job now. From the Actions menu you can suspend a running job or resume a suspended one.

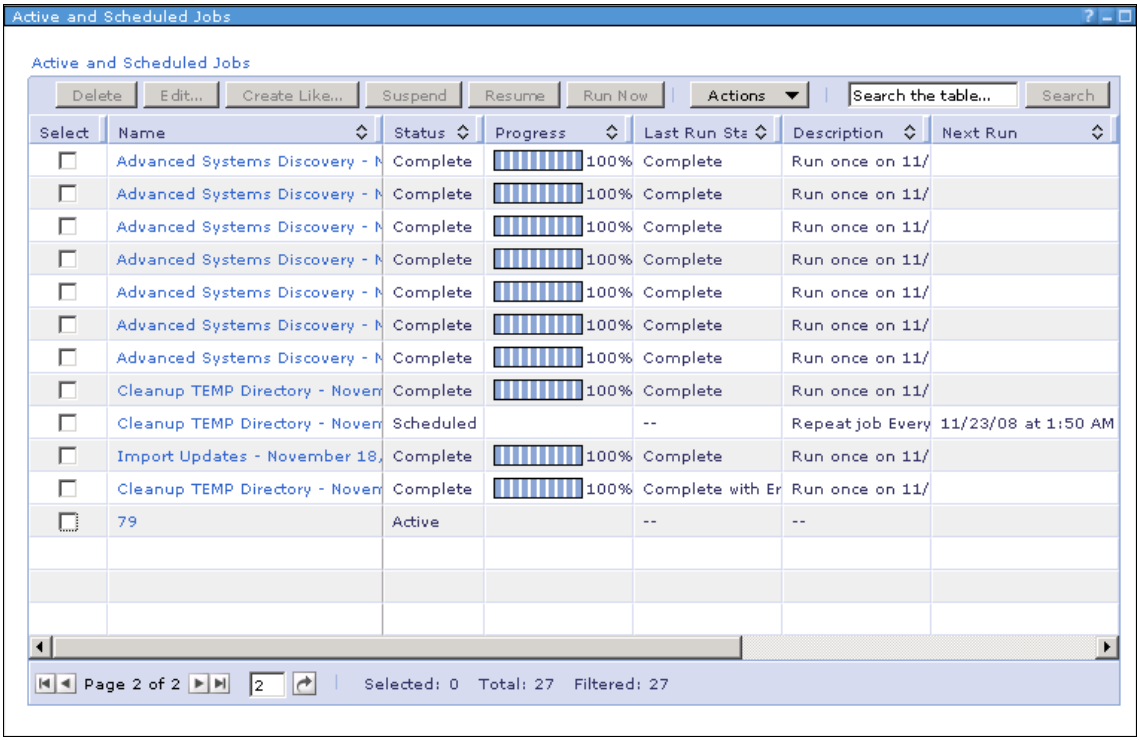


Figure 14-8 Active and Scheduled Jobs page

Clicking the job name brings up the job status page shown in Figure 14-9. This page shows the detailed status for the last time that the job was run.

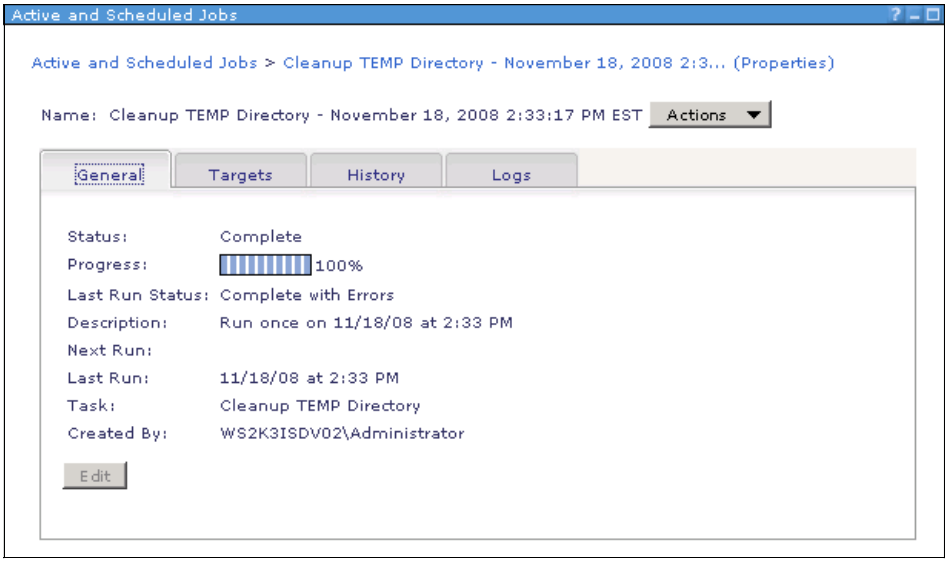


Figure 14-9 Job status page

Clicking the **History** tab shows you the history for each time the job has been run on each target (Figure 14-10).

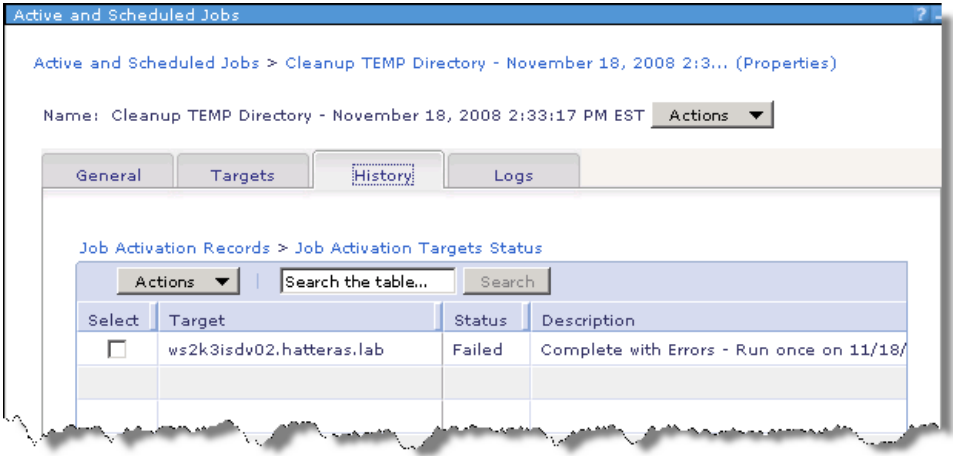


Figure 14-10 Job history page

Clicking the **Logs** tab shows you the logs for the job, as shown in Figure 14-11.

Figure 14-11 Job Logs tab

Each time that the job runs, the information for each target is written to the job log, an example of which is shown in Figure 14-12.

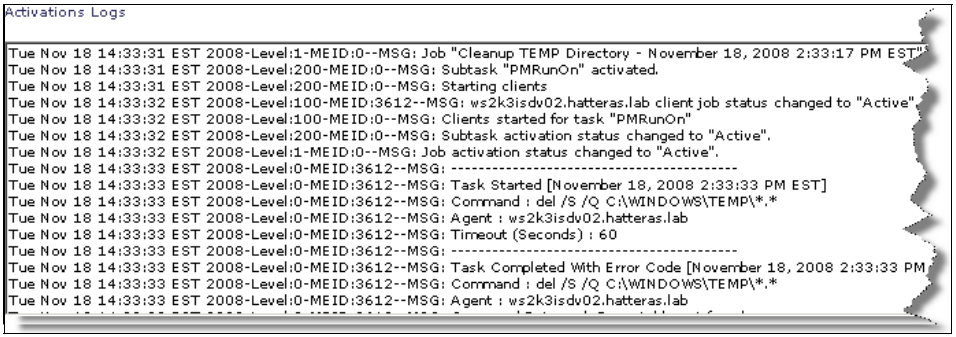


Figure 14-12 Partial job log

14.4 External application launch

External Application tasks are user-defined tasks that allow you to launch third-party applications from within the IBM Systems Director Web console.

Note: For external application tasks to work properly the application and any required resources must be installed with the same path on both the management server and the system on which the Web browser is running.

Each external application task is defined in a command-task file (with the .CMDExt extension) in the `<install_root>/classes/extensions` directory. In the command-task file you specify what command will be run, what will be the default directory, and how IBM Systems Director will determine whether the command is valid for a specific target.

For detailed information about External Application Launch command-task files, see the External Application Launch topic on the IBM Systems Director 6.1 Information Center at:

`http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html`

Note: During our testing we found several errors in the Information Center External Application Launch topic. Although these errors may be fixed by prior to publication of this book, we have decided to provide some tools to help you through these issues.

Each command-task file includes comment lines, which start with a pound sign (#), and parameter lines. Only one parameter is allowed per line and must be in the format:

```
parameter = value;
```

Both parameters and values are case sensitive. For this reason, you must exercise some care when building a command-task file.

14.4.1 The command-task file

The command-task file defines which resources are valid targets, which commands to run on different systems, and which resource properties to pass to the target environment.

Validating targets

The first thing that we must determine is which resources to target, if any. You can create untargeted tasks by specifying Targeted = none. This is useful if you want to run tasks on the Web console system without pointing toward any resource.

If you are creating a targeted task, you must specify the client resources type. The Client.*x*.Resource parameters (where *x* is a sequential number starting at 0) list the valid resource types:

- The Client.0.Resource line in Example 14-1 means that all operating system resources are valid targets.
- The Client.1.Resource line means that server resources (the systems management hardware) are also a valid target.

Example 14-1 Client.x.Resource example

```
Client.0.Resource=OperatingSystem
Client.1.Resource=Server
```

Tip: A resource only needs to meet one of the Client.x.Resource parameters to be a valid target.

In addition to the resource type you can require that a specific file exists on the target for it to be valid. For example, if the task requires specific software in order to function properly, you can have the command-task file verify that an identifying file exists on the target before the task will be available for that system.

Commands

The basic parameters to define which commands are run and how they are run are the CommandString and CommandString.Server parameters. Each of these parameters has operating system variations such as CommandString.Linux and CommandString.Server.Windows. CommandString runs the command on the target system, while CommandString.Server runs the command on the IBM Systems Director Server. For example, if you want to run the notepad.exe command on your Windows system running the Web console you would specify:

```
CommandString.Windows = notepad.exe
```

If, on the other hand, you want to run notepad.exe on the management server, you would specify:

```
CommandString.Server.Windows = notepad.exe
```

The other item that you may need to specify is the working directory to use when running the task. To specify this, use the Cwd and Cwd.Server parameters.

Note: When specifying directories in Windows, you must double the back slashes. For example, to set the working directory to C:\Windows you would specify:

```
Cwd.Windows = C:\\Windows
```

The last item that you may need to specify is whether a shell is required to run the command. The ShellRequired and ShellRequired.Server parameters can be either true or false. Specifying `ShellRequired = true` causes Windows systems to prepend `start cmd.exe /k` and Linux or UNIX systems to prepend `bash -c`.

Passing properties

The command that you want to run may require information about the targeted system in order to work properly. For example, if you want to create a task to start a Telnet session on a target system, you must know the system's IP address. This information is passed in environment variables. The environment variables set by the External Application Launch start with CMDTASK.

Two variables for the target, the computer name and IP address, are set by default. Additional properties can be passed by setting System.Property.*x* properties (where *x* is a sequential number starting from 0). For a list of resource properties you can pass, see the Environment variables for external-application tasks topic of the IBM Systems Director Information Center, found at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

14.4.2 Example

Since knowing which variables are set can be quite helpful, we include an example that you can use. The command-task file in Example 14-2 shows you the command-task-related environment variables that your script or program can use. You can modify this file to test other parameters.

Example 14-2 Show CMDTASK variables command-task file

```
# Show CMDTASK Variables (CMDTASK.CMDExt)

# Parameters for all operating systems:
Targeted = one
ShellRequired = true
Client.O.Resource = OperatingSystem

# Parameters for Windows:
CommandString.Windows = set CMDTASK

# Parameters for Unix or Linux:
CommandStraing.Unix = env | grep CMDTASK
```

Here is an explanation of the parameters in the example:

`Targeted = one`:	Only one resource can be targeted at a time.
`ShellRequired = true`:	A shell is required to run this command.
`Client.O.Resource = OperatingSystem`:	The target must be an operating system.
`CommandString.Windows = set CMDTASK`:	The command that will be run on a Windows system.
`CommandStraing.Unix = env | grep CMDTASK`:	The command that will be run on a UNIX/Linux system.

Note: Although piping commands in UNIX/Linux works as expected, our testing produced unpredictable results when this was attempted on Windows targets. Therefore, we recommend that you avoid piping Windows commands.

Running the task from a Web console on a Windows system yields the output shown in Figure 14-13.

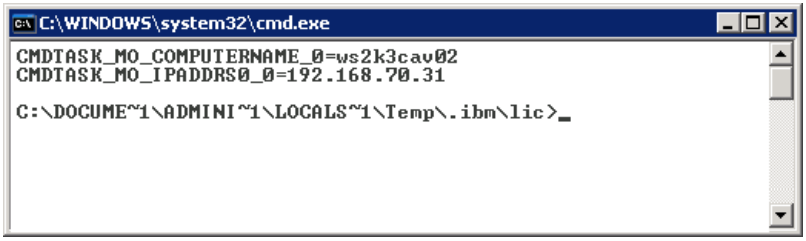


Figure 14-13 External Application Launch example output

As you can see, this task returns the environment variables for the computer name and IP address, which are the two default environment variables passed by the External Application Launch task.

15

Additional plug-in managers

This chapter provides introductory information related to the some of the plug-in managers that can be added to IBM Systems Director 6.1 after initial installation. These plug-in managers extend the value of IBM Systems Director with key additional functions from a single point of management.

The specific plug-ins discussed in this chapter include:

Note: At the time writing, none of the plug-ins discussed in this chapter had been released. Therefore, the plug-ins that you install might be slightly different from those discussed here.

15.1 IBM Systems Director Migration Tool v6.1

IBM Systems Director Migration Tool Version 6.1 is a free offering that enables you to migrate from a previous version of IBM Director to IBM Systems Director Version 6.1.

The IBM Systems Director Migration tool can be downloaded from the following link:

https://www.ibm.com/services/forms/preLogin.do?source=dmp&lang=en_US&S_PKG=SysDir6_1_mtk&S_TACT=sms

For more information about the IBM Systems Director Migration tool see the white paper *IBM Systems Director 6.1 Migration from IBM Director 5.20 Tips and Information* available from:

http://www.ibm.com/common/ssi/fcgi-bin/ssialias?infotype=SA&subtype=WH&appname=STGE_XB_XB_USEN_&htmlfid=XBW03009USEN

15.2 Active Energy Manager

IBM Systems Director Active Energy Manager Version 4.1 measures, monitors, and manages the energy components built into IBM Systems, enabling a cross-platform management solution. Active Energy Manager extends the scope of energy management to include facility providers to enable a more complete view of energy consumption within the datacenter.

15.2.1 Overview

Active Energy Manager is an IBM Systems Director extension that supports the following endpoints:

- IBM BladeCenter
- Power Systems
- System x
- System z
- IBM storage systems and non-IBM platforms[1]

In addition, Active Energy Manager can collect information from select facility providers including Liebert SiteScan from Emerson Network Power and SynapSense. (The preceding linked content resides outside of ibm.com.)

[1] IBM storage systems and non-IBM platforms can be monitored through IBM or non-IBM (Raritan and Eaton) Power Distribution Unit (PDU) support.

The Active Energy Manager server can run on the following platforms:

- Windows on System x
- AIX and Linux on System x
- Linux on Power
- Linux on System z

Active Energy Manager uses agent-less technology, and therefore, no agents are required to be installed on the endpoints.

Monitoring and management functions apply to all IBM systems that are enabled for IBM Systems Director Active Energy Manager.

- Monitoring functions include power trending, thermal trending, IBM and non-IBM PDU support, support for facility providers, energy thresholding, and altitude input.
- Management functions include power capping and power savings mode. Active Energy Manager also provides a source of energy management data that can be exploited by Tivoli enterprise solutions such as IBM Tivoli Monitoring. For more information about IBM Tivoli Monitoring see the following link:

  http://www.ibm.com/software/tivoli/products/monitor/

15.2.2 What is new in Active Energy Manager 4.1

This release of Active Energy Manager provides a number of new features and enhancements since the previous release, such as:

- New Web interface: Active Energy Manager has been integrated into the Web-based interface of IBM Systems Director. The result is tighter integration of Active Energy Manager and IBM Systems Director, eliminating the separately installable Active Energy Manager console interface of previous Active Energy Manager releases.
- Power policies: A system power policy is either a power cap or power savings setting that can be defined and applied to any number of individual systems or groups of systems. A group power capping policy specifies an overall power cap that the systems in the group collectively may not exceed, and can be applied to any number of groups. These policies are continually enforced by Active Energy Manager on the systems or groups to which the policies are applied.
- Full support for Active Energy Manager, systems management command-line interface (smcli) commands have been added.
- Altitude setting: On the latest IBM Power systems, specifying the altitude for an Active Energy Manager resource allows Active Energy Manager to adjust

power usage and cooling needs accordingly. Active Energy Manager can make this adjustment for altitude on the latest IBM Power systems only.

- Support for:
  - IBM PDU+ PDUs
  - SynapSense sensor nodes
  - Non-IBM PDUs
  - Uninterruptible power supplies
  - Computer room air conditioning (CRAC) units

For more detailed information about any of the above new features and a list of new supported devices see the following link:

http://publib.boulder.ibm.com/infocenter/systems/topic/aem_410/frb0_r_whats_new.html

15.2.3 Licensing

Active Energy Manager has both a no-charge (free) monitoring function and an optional chargeable (fee-based) management function:

- Monitoring functions include power usage trending, environmental trending including temperature and humidity, setting power-related thresholds, and event viewing support.
- Management functions provide the ability to set power-capping and power-savings modes.

When you download, install, and begin using Active Energy Manager, you are granted a 60-day evaluation license. The evaluation license enables use of the optional (fee-based) management function. Once the evaluation license expires, you must purchase a license in order to continue using the optional management function.

Active Energy Manager can be downloaded from the following location:

https://www.ibm.com/services/forms/preLogin.do?source=dmp&lang=en_US&S_PKG=SysDir6_1_AEM&S_TACT=sms

The 60-day evaluation period begins the first time that you begin using Active Energy Manager. The number of days left on the evaluation license appear in the License section at the bottom of the Active Energy Manager summary page. The day that the evaluation license expires is also displayed, as well as information about obtaining a license.

The Active Energy Manager license is packaged on a CD-ROM with an authorization key and install program. Once you install the license, the optional

management functions are enabled and function just as they did during the evaluation period, with your configurations and settings remaining intact. the license section will also be updated and detail that you have installed the full licensed product, as shown in Figure 15-1.

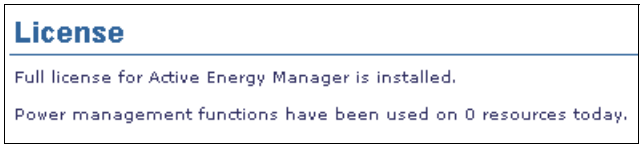


Figure 15-1 Full license information

Licensing consists of the part numbers given in Table 15-1.

Table 15-1 Part numbers for Active Energy Manager

Part number	Description
46D0968	IBM Systems Director Active Energy Manager for x86 4.1 media pack CD
46D1008	BM Systems Director Active Energy Manager 4.1 single server license + 1-year software subscription
Software subscription	
46D0969	IBM Systems Director Active Energy Manager 4.1 + 1-year software subscription renewal
46D0970	IBM Systems Director Active Energy Manager 4.1 + 1-year software subscription after license

15.2.4 Installing Active Energy Manager

Before installing Active Energy Manager, review the planning requirements as detailed at the following Information Center link:

http://publib.boulder.ibm.com/infocenter/systems/topic/aem_410/frb0_r_requirements.html

You can install the Active Energy Manager plug-in on IBM Systems Director management servers running AIX, Linux, and Windows. For instructions on how to install on each of these platforms see Information Center link:

http://publib.boulder.ibm.com/infocenter/systems/topic/aem_410/frb0_r_installing_overview.html

You can migrate data and settings from Active Energy Manager 3.1 or later to Active Energy Manager 4.1 using the IBM Systems Director Migration Tool. The IBM Systems Director Migration Tool is a command-line utility. For more information about the IBM Systems Director Migration tool see the paper *IBM Systems Director 6.1 Migration from IBM Director 5.20 Tips and Information* available from:

http://www.ibm.com/common/ssi/fcgi-bin/ssialias?infotype=SA&subtype=WH&appname=STGE_XB_XB_USEN_&htmlfid=XBW03009USEN

The IBM Systems Director Migration tool can be downloaded from:

https://www.ibm.com/services/forms/preLogin.do?source=dmp&lang=en_US&S_PKG=SysDir6_1_mtk&S_TACT=sms

There are two main parts in the utility:

- **smexport**
- **smimport**

Both **smexport** and **smimport** are invoked from the command line.

Exporting data from Active Energy Manager 3.1.x is accomplished by running **smexport**, while importing data into Active Energy Manager 4.1 is done by running **smimport**.

Some considerations to take note of are detailed on the following Web site:

http://publib.boulder.ibm.com/infocenter/systems/topic/aem_410/frb0_t_migrating.html

15.2.5 Starting Active Energy Manager within IBM Systems Director

Once installed, Active Energy Manager appears as a new manager in the Welcome, view as shown in Figure 15-2.

Figure 15-2 New Active Energy Manager entry on the Welcome page

There will also be a new task present on the tasks list, as shown in Figure 15-3.

Figure 15-3 New Active Energy Manager task

You can open the Active Energy Manager via either of the options described. Once you select **Active Energy Manager** the Active Energy Manager page opens, as shown in Figure 15-4.

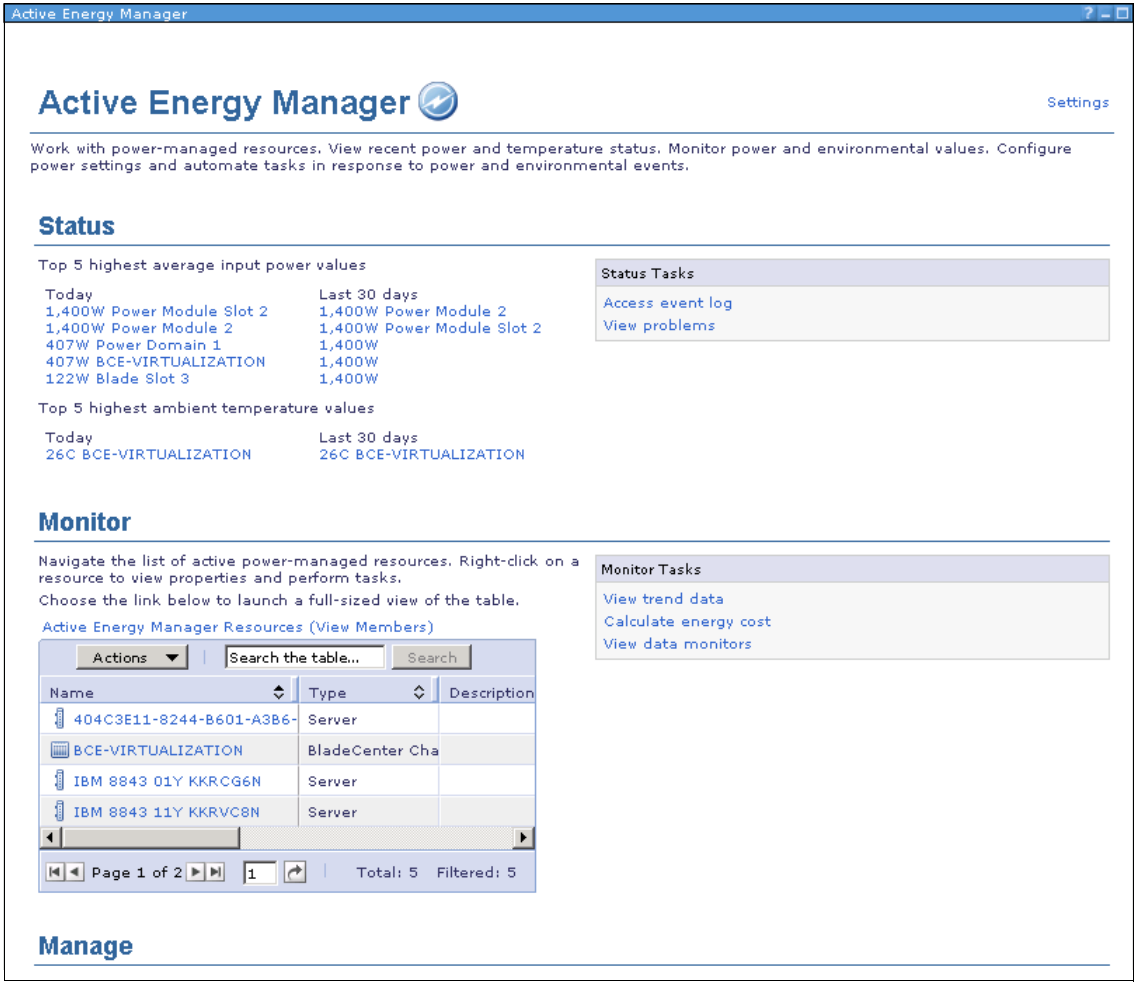


Figure 15-4 Active Energy Manager page

This view lets you do the following:

- Work with power-managed resources.
- View recent power and temperature status.
- Monitor power and environmental values.
- Configure power settings and automate tasks in response to power and environmental events.

15.2.6 Using Active Energy Manager

For information about using Active Energy Manager refer to the following links:

- Active Energy Manager Information Center

  http://publib.boulder.ibm.com/infocenter/systems/topic/aem_410/frb0_main.html

- Active Energy Manager Publications and related information

  http://publib.boulder.ibm.com/infocenter/systems/topic/aem_410/frb0_r_pubs_and_related_info.html

15.3 BladeCenter Open Fabric Manager

IBM BladeCenter Open Fabric Manager (BOFM) Release 3.0 offers an enhanced feature set that will be available as a (fee-based) plug-in to IBM Systems Director in 2Q/2009.

15.3.1 Overview

BOFM is a solution that enables users to quickly replace and recover blades in their environment. It does this by assigning Ethernet MAC and Fibre Channel WWN addresses to the BladeCenter slots in such a way that any blades plugged into those slots will take on the assigned addresses. The BladeCenter Open Fabric Manager-Advanced upgrade adds capabilities to monitor blades for failure events and to take automatic action to fail over from a faulty blade to a cold standby blade.

15.3.2 What is new in BOFM

BOFM Release 3.0 will be available in two installation package formats for all Windows and Linux platforms that IBM Systems Director supports:

- Director extension
- Stand Alone application

The BOFM Director Extension installer will only install BOFM plug-ins for Director after first checking that Director has already been installed on the target system. It will not customize the Director Server.

The BOFM Stand Alone installer will first install IBM Systems Director in express mode and only install those Director components that are required by BOFM.

Then the installer will install the BOFM plug-ins for Director and make the standalone customizations for Director.

15.3.3 Installation and licensing

All installation packages will be delivered in Web package format. The BOFM offering will be in BOFM Release 3. Users will be able to download BOFM R3 from one of these URLs:

http://www.ibm.com/systems/management/director/
http://ibm.com/systems/bladecenter/hardware/openfabric

The downloaded file is a zip or tar file that contains the installer. You can unpack the archive and launch the executable, which will begin the installation process in graphical mode by default. You can modify the response file in order to perform the install in silent mode. Silent install uses a response file in order to specify any user input. A default response file is provided as part of the archive file.

As downloaded, the BOFM offering will operate under a 60-day trial period offering, but you can install the permanent key to get a full offering.

15.4 Service and Support Manager

Service and Support Manager is an IBM Systems Director plug-in that allows you to control several aspects of IBM Electronic Service Agent from the Systems Director Web console.

15.4.1 Overview

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring.

15.4.2 What is new in Service and Support Manager

Electronic Services comprises two separate, but complementary, elements:

- IBM Electronic Services Web site
- IBM Electronic Service Agent

IBM Electronic Service Web site

The Electronic Services news page is a single internet entry point that replaces the multiple entry points traditionally used to access IBM internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems. The features of Electronic Service Web site that we highlight here are:

- A single entry point for hardware and software support
- 24-hour access to customized IT information
- Access to Web-delivered premium services
- The ability to submit a hardware or software problem electronically
- The ability to research technical problems
- The ability to view Electronic Service Agent information
- More efficient IT operations

The Electronic Services Web site evolved from a single-platform, single-country, single-language Web site in 1999 to a Web site that reaches as many as 65 countries (regions) in 23 languages, with more countries added each year, and serves many platforms. Today you are able to:

- View Electronic Service Agent (ESA) inventory reports.
- Use My Search to get results from IBM databases filtered by your machines.
- Open service requests.
- Customize the site to your preference
- Receive support messages by platform or individual.

The Electronic Services Web site is located at:

`http://www.ibm.com/support/electronic`

Several of the categories use the IBM registration ID (IBM ID) for authentication and privacy to determine the relationship to systems (using machine serial numbers) and the ESA information.Your IBM Registration ID is your single sign-on or single point of access to IBM Web applications that use IBM Registration. You need just one IBM ID and one password to access any IBM Registration-based application. Furthermore, your information is centralized so you can update it in a convenient and secure location. The benefits of having an IBM Registration ID increase over time as more and more IBM applications migrate to IBM Registration. Because IBM Electronic Services is a

registration-based application, you need an IBM ID for IBM Electronic Service Agent.

Several activities ensure that only authorized users can view and use the Service Agent information:

- Service Agent code must be activated on a machine so that it can transmit inventory information.
- A representative from your company must register her IBM ID during the activation process. The first person to register is the administrator who has the ability to add, remove, or approve additional IBM IDs. Additional IBM IDs can be added using the ESA client fields after activation. The ESA chapters show examples of the field.
- A new IBM ID user who requests access to a machine's information completes a request on the Electronic Services Web site under the Services Administration category. This request goes to the administrator of the machine serial number. The administrator must approve the request before any access is given.

For more information about the IBM ID or to create or update your IBM ID, go to this Web page:

https://www.ibm.com/account/myibm/profile.do

IBM Electronic Service Agent

The Electronic Service Agent is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge of potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

- No-additional-charge software that resides on your IBM eServer™
- 24 x 7 system monitoring
- Reports hardware error logs and performance information
- Automatic hardware problem submission
- Tracks system inventory

- Automated Microcode PTF downloads
- IBM Customer Service Representative (CSR) access to data while diagnosing problems

The following list outlines the current Electronic Service Agents. Because there are periodic updates on each platform, refer to the Service Agent User Guide for the latest listing of machine types and operating system coverage:

- Electronic Service Agent for System i
- Electronic Service Agent for System p
- Electronic Service Agent for Linux on System p
- Electronic Service Agent for System x
- Electronic Service Agent for Linux on System x
- Electronic Service Agent for System z

Service Agent is available on each IBM system product line for stand-alone and network environments. The secure communication options range from modems to the internet. IBM Electronic Service Agent can run on a variety of operating systems and system platforms:

- i5/OS
- AIX
- Linux on System p, System i, or System x
- Windows on System x
- Hardware Management Console (HMC)
- z/OS

Moreover, the inventory collected as a part of electronic service ensures privacy and security.The ESA inventory information includes:

- Your support contact information, including names, phone numbers, and e-mail addresses
- System utilization, performance, system failure logs, part feature codes, part number, part serial number, part locations, software inventory, operating system applications, program temporary fixes (PTFs), the maintenance level, and configuration values

Inventory information does not include:

- Collection or transmission of any of your company's financial, statistical, or personnel data
- Client information
- Your business plans

For more information about using Service and Support Manager refer to the following links:

- Service and Support Manager infocenter main page:

  http://publib.boulder.ibm.com/infocenter/systems/topic/esa_6.1/esa_kickoff.html

- Service and Support Manager related information:

  http://publib.boulder.ibm.com/infocenter/systems/topic/esa_6.1/esa_related_info.html

15.5 Tivoli Provisioning Manager for OS Deployment: IBM Systems Director Edition

IBM Tivoli Provisioning Manager for OS Deployment (TPMfOSD) is a database-driven, Preboot Execution Environment (PXE) based deployment solution. Through a easy-to-use interface, Tivoli Provisioning Manager for OS Deployment provides the following from Windows, Linux, and IBM AIX servers:

- Windows cloning and unattended setup
- Linux cloning and unattended setup
- Solaris cloning and unattended setup
- AIX unattended setup
- VMWare ESX unattended setup

TPMfOSD uses industry standards including:

- Wake on LAN
- vPro
- PXE
- OpenBOOT
- ODBC
- Java Database Connectivity (JDBC)
- Desktop Management Interface (DMI)
- Microsoft Sysprep
- Kickstart
- Autoyast
- Jumpstart
- Network Installation Management (NIM)

TPMfOSD provides ready-to-use installation of operating systems and selected software on tens, or even hundreds, of computers simultaneously.

There are two versions of TPMfOSD:

- Standalone TPMfOSD (current version is 7.1)

  This version is a software offering from IBM Tivoli. This version does not provide any integration into IBM Systems Director. For more information about this option see:

  http://www.ibm.com/software/tivoli/products/prov-mgr-os-deploy/

- IBM Systems Director 6.1 Edition (TPMfOSD-ISDE v7.1)

  Basically, this is the same as the standalone version above. However, this version will be the replacement for the current deployment solution Remote Deployment Manager 4.40.1. This version of TPMfOSD will provide integration into IBM Systems Director 6.1 via its own manager, as shown in Figure 15-5.

Figure 15-5 TPMfOSD-ISDE Manager visible on Welcome view

Once TPMfOSD IBM Systems Director 6.1 Edition (ISDE) is released all information will be available from the following link:

http://publib.boulder.ibm.com/infocenter/tivihelp/v3r1/topic/com.ibm.tivoli.osdisde.doc/welcome/osdisdehome.htm

15.5.1 Licensing

At the time of writing, the TPMfOSD-ISDE licensing information was not available. However, it will be posted on the IBM Redbooks Wiki site at the following location once released:

http://www-01.ibm.com/redbooks/community/display/director/IBM+Systems+Director+Plugins

15.5.2 Remote Deployment Manager migration

Because of the differences between IBM Director Version 5.20.x and IBM Systems Director 6.1, it was not possible to adapt Remote Deployment Manager (RDM). Therefore, IBM will release a migration tool to assist you with moving from RDM 4.40.1 to TPMfOSD-ISDE v7.1.

Note: It is also possible to migrate from RDM to the Standalone TPMfOSD 7.1. However, this version does not integrate with IBM Systems Director 6.1.

The IBM Technote *Migrating RDM 4.40.1 to TPM for OSD - IBM Systems Director Edition 7.1* includes a migration document explaining how to perform the migration. It is available at:

http://www.ibm.com/support/docview.wss?uid=swg21326651

Earlier RDM versions

For users of RDM 4.30 and earlier it is not possible to move directly to TPMfOSD-ISDE v7.1 and we do not recommend moving to RDM 4.40. We recommend installing TPMfOSD-ISDE V7.1, recreating your images, and recreating the required deployment tasks.

16

Command-line interface (CLI)

Although the new Web interface to IBM Systems Director is quite powerful and can be used virtually anywhere to open a systems management console, it is often very desirable to perform certain functions against the management server using the command line.

This chapter contains useful information for anyone who prefers to get the job done using the command line. We cover the following topics:

16.1 Overview

Whether scripting something to be used on a large number of systems or to automate a process, a command-line interface can be very useful in a management environment like IBM Systems Director.

In the next section we cover some of the single-purpose commands, then focus on the two command-line interfaces used in conjunction with Systems Director.

In 16.3, “smcli: Server-based command-line interface” on page 736, we cover IBM Systems Director systems management command-line interface (smcli), and in 16.4, “mpcli: Hardware command line” on page 738, we discuss the IBM management processor command-line interface (mpcli).

See the management server and agent commands section of the Information Center at:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

16.2 Single-purpose commands

The commands in this section are generally single-purpose commands, meaning that the command performs one function, as opposed to a command-line interface that can perform many functions.

16.2.1 cfgdbcmd

The **cfgdbcmd** command allows you to configure and initialize the database connection for IBM Systems Director Server. We discuss its use in 4.2, “Selecting an external database” on page 184.

Note: If you change the database configuration of IBM Systems Director Server you must reset the server. See 16.2.7, “smreset” on page 734, for information about the **smreset** command.

16.2.2 changePassword

With the **changePassword** command you can change the password for either the *tioadmin* account (the service account that you specified when you installed IBM

Systems Director Server) or the *tiodb* account (the account used to access remote databases).

16.2.3 cimsubscribe

The **cimsubscribe** command allows you to see which Common Information Model (CIM) events will be sent where. It also allows you to modify which CIM events are generated and where they are sent.

Note: The **cimsubscribe** command only effects CIM events, not thresholds or process monitors.

While the detailed uses of **cimsubscribe** are beyond the scope of this book, there are a couple of commands that you might find particularly useful, as discussed in the following subsections.

cimsubscribe -lh: List handlers

If you run **cimsubscribe -lh** on a Systems Director agent it generates several multi-line entries showing you which handlers (also called consumers) are currently defined on the agent. Example 16-1 shows a sample handler definition.

Example 16-1 Sample cimsubscribe handler definition (the emphasis is ours)

```
CIM_ListenerDestinationCIMXML.CreationClassName="CIM_ListenerDestinationCIMXML",Name="Health",S
ystemCreationClassName="CIM_ComputerSystem",SystemName="ws2k3isdv02.hatteras.lab"
Caption =
CreationClassName = CIM_ListenerDestinationCIMXML
Description =
Destination = http://localhost:6988/CIMListener/HealthConsumer
ElementName =
Name = Health
OtherPersistenceType =
PersistenceType =
SystemCreationClassName = CIM_ComputerSystem
SystemName = ws2k3isdv02.hatteras.lab
```

The items that we tend to focus on are the name and the destination:

- Name: The name of the handler
- Destination: Shows where the handler will send the event

Notice that the destination is an http URL and that the event goes to the local host on port 6988. In order for this handler to work, nothing can block communication on this port. Also, something (usually the CIM Listener service or

daemon) must be listening on this port. You can check this with the **netstat -an** command, shown in Example 16-2.

Example 16-2 Check for listening port using netstat -an

```
C:\Documents and Settings\Administrator>netstat -an | find "6988"
  TCP    0.0.0.0:6988           0.0.0.0:0              LISTENING
```

cimsubscribe -ls: List subscriptions

The other **cimsubscribe** command that we tend to use is to get a list of subscriptions, or links between filters and handlers.

Example 16-3 Sample CIM subscription

```
CIM_IndicationSubscription.Filter="CIM_IndicationFilter.CreationClassName=\"CIM_IndicationFilte
r\",Name=\"Power Supply
Criticals\",SystemCreationClassName=\"CIM_ComputerSystem\",SystemName=\"ws2k3isdv02.hatteras.la
b\"",Handler="CIM_ListenerDestinationCIMXML.CreationClassName=\"CIM_ListenerDestinationCIMXML\"
,Name=\"Health\",SystemCreationClassName=\"CIM_ComputerSystem\",SystemName=\"ws2k3isdv02.hatter
as.lab\""
FailureTriggerTimeInterval =
Filter = CIM_IndicationFilter.CreationClassName="CIM_IndicationFilter",Name="Power Supply
Criticals",SystemCreationClassName="CIM_ComputerSystem",SystemName="ws2k3isdv02.hatteras.lab"
Handler =
CIM_ListenerDestinationCIMXML.CreationClassName="CIM_ListenerDestinationCIMXML",Name="Health",S
ystemCreationClassName="CIM_ComputerSystem",SystemName="ws2k3isdv02.hatteras.lab"
OnFatalErrorPolicy =
OtherOnFatalErrorPolicy =
OtherRepeatNotificationPolicy =
OtherSubscriptionState =
RepeatNotificationCount =
RepeatNotificationGap =
RepeatNotificationInterval =
RepeatNotificationPolicy =
SubscriptionDuration =
SubscriptionStartTime =
SubscriptionState =
SubscriptionTimeRemaining =
TimeOfLastStateChange =
```

While the example in Example 16-3 seems quite complicated, there are most likely only two things that must look at:

- Filter: What filter or type of event this subscription will use.
- Handler: Where the event is going to be sent.

From this example we can see that power supply critical events[1] will be sent to the health handler[2].

16.2.4 configAgtMgr

This command is for AIX and Linux only. The **configAgtMgr** command is run after installing IBM Systems Director on an AIX or Linux server to configure the Agent Manager. We discuss the use of this command in 4.1.4, “Configure the use of the Agent Manager” on page 182.

16.2.5 genevent

The **genevent** command is used on Common Agents to send events to the IBM Systems Director Server and is most often used for testing (either connectivity or Event Automation Plans, or by scripts and programs to send events to IBM Systems Director. For example, if you run the following command on a Common Agent managed system, the management server would receive an event like the one shown in Figure 16-1:

```
genevent /compcat:"Operating System" /comptype:"Operating System"
/text:"Agent Registration Event" /sev:4
```

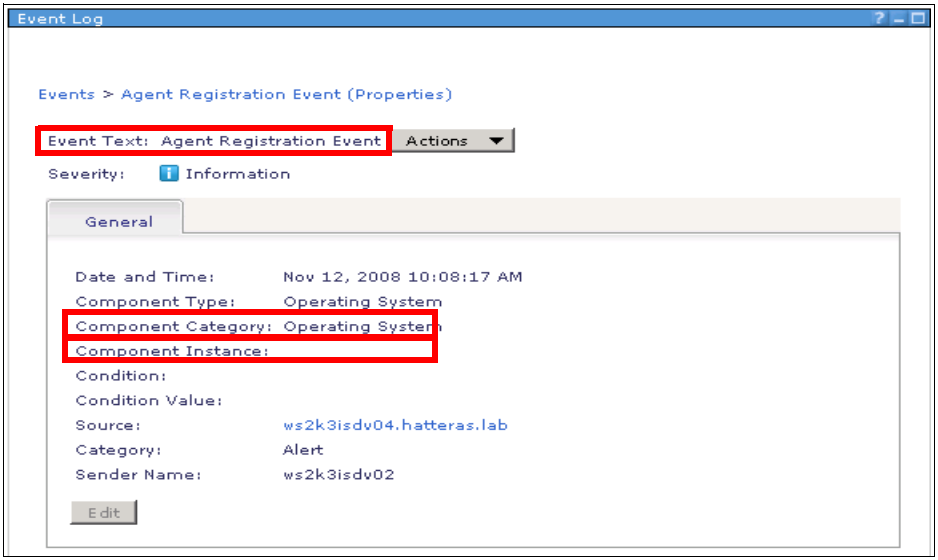


Figure 16-1 Sample generated event

[1] Defined as: Filter = CIM_Indi cationFilter.CreationClassName="CIM_IndicationFilter", Name="Power Supply Criticals",SystemCreationClassName="CIM_ComputerSystem", SystemName="ws2k3isdv02.hatteras.lab"

[2] Defined as: Handler = CIM_ListenerDestinationCIMXML.CreationClassName= "CIM_ListenerDestinationCIMXML",Name="Health",SystemCreationClassName="CIM_Computer System",SystemName="ws2k3isdv02.hatteras.lab"

16.2.6 getfru

The **getfru** command is run from Platform Agents and Common Agents to retrieve part number information categorized as the Field Replaceable Unit (FRU) data for the system.

Note: The system that you run **getfru** from must have File Transfer Protocol (FTP) access to the IBM FTP site.

16.2.7 smreset

Use **smreset** to reset the IBM Systems Director Server to the installation defaults. After running the **smreset** command all changes that you made to the management server will be reset, including discovered systems, inventory, Event Automation Plans, monitors, and so on, so use this command with care.

16.2.8 smrestore

The **smrestore** command restores a backup created by **smsave**:

```
smrestore [-dbUserName user_name] [-dbUserPwd password] {-sourceDir
directory} {-dbsourceDir directory} {-timestamp timestamp} [-noPrompt
{true|false}]
```

Where:

- *-dbUserName* and *-dbUserPwd* are used to specify access to the database. This user must have privileges to back up the database.
- *-sourceDir* and *-dbSourceDir* point to the data previously backed up with **smsave**.

If you have more than one backup in the source directory you must specify the -timestamp option. The timestamp is in the format of *yyyymmddhhss* where *yyyy* is the year, *mm* is the month, *dd* is the day, *hh* is the hour, and *ss* is the seconds. You can find the timestamp in the <*install_root*>\tpm\config\logs\backup.log file.

Notes: If the database is remote you must specify the *-dbSourceDir* option.

The *-dbUserName* and *-dbUserPwd* options do not apply to the Apache Derby database.

You must stop the IBM Systems Director Server before using the **smrestore** command to restore data.

16.2.9 smsave

The **smsave** command backs up all data associated with IBM Systems Director Server, including any file-systems data (called the master data) and database data:

```
smsave [-dbUserName user_name] [-dbUserPwd password] [-targetDir
directory] [-dbTargetDir directory] [-noPrompt {true|false}]
```

Where

- *-dbUserName* and *-dbUserPwd* are used to specify access to the database. This user must have privileges to back up the database.
- The *-targetDir* and *-dbTargetDir* options determine where the data will be stored. The data is saved to <*install_root*>\backups*time_stamp* and the database data set is stored with the master set unless otherwise specified.

Notes: The *-dbUserName* and *-dbUserPwd* options do not apply to the Apache Derby database.

If your management server is running on AIX ensure that the Bash shell is installed.

The database data is stored in a format specific to the type. You cannot restore data from one database type to another (that is, from an Apache Derby database to a DB/2 database).

If you have a remote database, the **smsave** command produces two data sets, one on the remote database server and another on the IBM Systems Director Server. These data sets are mated sets. You *must* maintain and restore these two data sets together.

The IP address of the management server and the database server can change from the original installation without any adverse effects.

16.2.10 smstart

The **smstart** command is used to start the IBM Systems Director Server processes on AIX and Linux management servers.

16.2.11 smstatus

Use the **smstatus** command to check the status of the IBM Systems Director Server running on an AIX or Linux system. If you run **smstatus -r** the command will continue to run, showing any changes in status.

16.2.12 smstop

The **smstop** command is used to stop the IBM Systems Director Server processes on AIX and Linux management servers.

16.2.13 winevent (Windows only)

The **winevent** command is used to simulate a hardware alert on a Platform Agent. When you run **winevent** you will select from a list of possible events to generate and the severity of the event you want to send. This is a simple way to test how an IBM Systems Director system would react to a hardware alert.

16.3 smcli: Server-based command-line interface

The **smcli** tool allows you to interact with an IBM Systems Director Server from a command line rather than through the Web console. The **smcli** tool is installed by default on the IBM Systems Director Server and must be run from there. Also, **smcli** must be run as a smadmin user. If you are not logged on as smadmin or if your IBM Systems Director Server uses Lightweight Directory Access Protocol (LDAP) authentication rather than operating system authentication, you must specify the user name and password of an smadmin user.

Notes: If your IBM Systems Director Server uses LDAP authentication, it cannot validate the group membership of the currently logged on user. This is why you must specify credentials when you run **smcli**.

If you specify a user name (with the -user option) but not a password when running **smcli** you will be prompted for a password.

If you are running the management server on Windows 2000 or Windows Server 2003 (pre-R2), you must have the msvcr80.dll installed. The easiest way to get this file is to install the Microsoft Visual C++® 2005 SP1 Redistributable Package (x86), available from:

http://www.microsoft.com/downloads/details.aspx?FamilyID=200b2fd9-ae1a-4a14-984d-389c36f85647

If this link is not available, search the following Microsoft site for *msvcr80* for information about downloading and installing this file:

https://www.microsoft.com/downloads

16.3.1 Command bundles

Commands in the **smcli** tool are grouped together into bundles. If you run the command **smcli lsbundle** you will see a list of bundles and commands. If you check this list you will find that the **list** command is included in the snmp, event, scheduler, and template bundles. This is important since if you use the **list** command **smcli** will have no way of knowing which bundle's commands you want to list.

16.3.2 Example

One of the reasons why you may need to use **smcli** is to authorize additional user groups to the IBM Systems Director Server. If you are logged in as smadmin you could authorize a new group by issuing the **smcli** command seen in Example 16-4.

Example 16-4 Sample authorize group

```
C:\>smcli authusergp MySMUsers
DNZCLI1033I : The group MySMUsers was successfully authorized.
```

Figure 16-2 shows that the MySMUsers group has been successfully creating using the above **smcli** command.

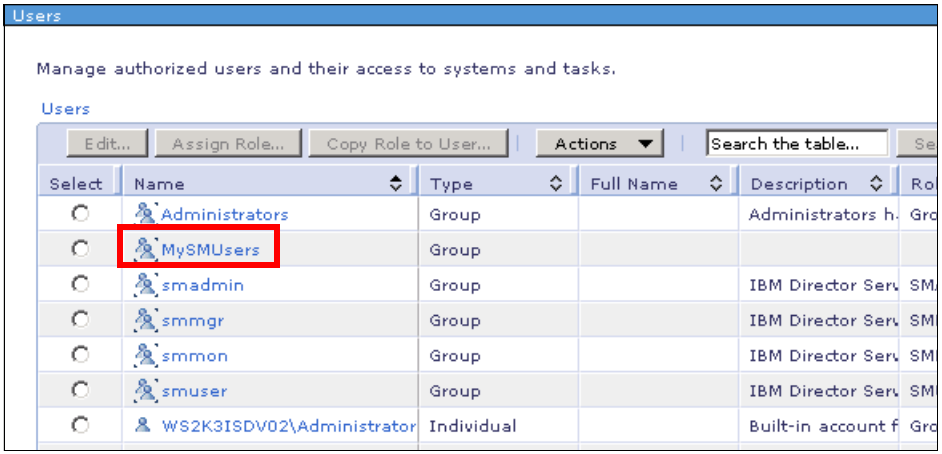


Figure 16-2 New user group authorized

16.4 mpcli: Hardware command line

You can interact with IBM management hardware either by running **mpcli**, which is installed on the IBM Systems Director Server, or by using the Hardware Command Line link on the Remote Access page of IBM Systems Director. Either way, you will find yourself at the mp> prompt.

Tip: If you start **mpcli** using the Hardware Command Line link, you will be automatically logged into the management processor of the system that you targeted.

Once at the mp> prompt, you can get help using the command-line interface by entering **help-cli**. If you want to use **mpcli** in a script, you can specify an input file using the syntax **mpcli -input *<filename>*** and it will read and execute the commands in the file. Alternately, you can pipe a command to **mpcli** (**echo help-cli | mpcli**).

You can get a list of available commands by typing **help-cmd** within this command-line interface. If you want more detailed information for a specific command, try **help-cmd <command>** (referred to as the **help-cmd** family in the **help-cli** command).

Example 16-5 shows how to change the password for a management processor using **mpcli**.

Example 16-5 Changing password with mpcli

```
mp>changepw -h 192.168.70.101 -u USERID -op PASSWORD -np mynewpass
SUCCESS: changepw -h 192.168.70.101 -u USERID -op PASSWORD -np mynewpass
```

Here is a handy way to change the password on multiple IBM management processors:

1. Create a text file called `ipaddr.txt` with a list of IP addresses for management processors, as shown in Example 16-6.

   Example 16-6 List of Management processor IP addresses in file ipaddr.txt

   ```
   192.168.70.101
   192.168.70.125
   ```

2. Run one of the following commands in the same directory as the text file:
   - On Windows:

     ```
     for /f %i in (ipaddr.txt) do echo changepw -h %i -u USERID -op
     PASSWORD -np mynewpass | mpcli >> changepw.log
     ```

   - On Linux:

     ```
     for IP in ‘cat ipaddr.txt‘; do echo changepw -h $IP -u USERID -op
     PASSWORD -np mynewpass | MPCLI >> changepw.log
     ```

     Note: With the Linux command you will see errors stating that there is an invalid argument. These are because the bash shell is confused about the pipe (|) in the command. However, the command does work properly.

   This command loops through the addresses, changes the password from PASSW0RD to mynewpass, and records the output to the `changepw.log` file, as shown in Example 16-7.

   Example 16-7 Output of the for command described above

   ```
   mp>mp>SUCCESS: changepw -h 192.168.70.101 -u USERID -op PASSWORD -np
   mynewpass
   mp>mp>SUCCESS: changepw -h 192.168.70.125 -u USERID -op PASSWORD -np
   mynewpass
   ```

The examples included here are intended to help make your systems management chores a bit easier and inspire you to explore the capabilities of the command line as an adjunct to the IBM Systems Director Web interface.

17

Scenarios

This chapter examines a number of real-world scenarios, providing a framework within which we explore the application of various functions of IBM Systems Director in a logical manner. Here we describe the best practices that we have learned to apply from our own experience, as well as those of the many clients with whom we have worked. We provide these example scenarios in order to describe how multiple IBM Systems Director tools can be used together in the real world to provide a solid systems management environment.

The scenarios covered include:

17.1 Hardware alerting

One of the most basic requirements of any systems management solution is to notify IT administrators when hardware problems occur in the environment. IBM Systems Director includes many features that have been designed with this capability in mind. In fact, Systems Director can alert you to hardware problems *before* they actually occur, monitoring systems for industry standard Predictive Failure Alert (PFA) and Self-Monitoring, Analysis, and Reporting Technology (SMART) events.

This scenario describes how to use IBM Systems Director to monitor IBM System x and BladeCenter servers for potential hardware problems and receive notification of imminent hardware failure before a failure occurs.

17.1.1 The problem

Our company owns many IBM System x and BladeCenter servers, which are located all over the world. Although many of these systems are housed in remote locations, our IT skills are focused in our headquarters data center. We do not employ the technical resources necessary to support all our remote locations on a full-time basis. It is critical for us to know if any of our remote servers are experiencing potential hardware issues. This would allow us to send well-prepared IT personnel out to remote locations to fix issues as they arise.

17.1.2 The solution

Since IBM Systems Director offers the ability to monitor hardware and also can be configured to send automated notifications when certain events occur, we decide to use these capabilities to monitor for hardware PFA events coming from our IBM System x servers.

To create an Event Automation Plan to monitor PFA events:

1. Expand **Automation** in the Navigate tasks area of the IBM Systems Director Web interface and click **Automation Plans**. The Automation Plan windows opens.
2. Click **Create** to start the Automation Plans wizard.
3. Click **Next** if the welcome page appears.
4. Enter a name for the Event Automation Plan. In our example, we type `Monitor PFA events on System x and Blade servers`.
5. Enter a description for the Event Automation Plan. In our example, we type `Monitor PFA events on System x and Blade servers`. Click **Next**.

6. We now choose the systems that we want to monitor. Select **Groups by System Type**, which expands this group.
7. Select **System x** and select **BladeCenter Systems**, as shown in Figure 17-1, then click **Add**.

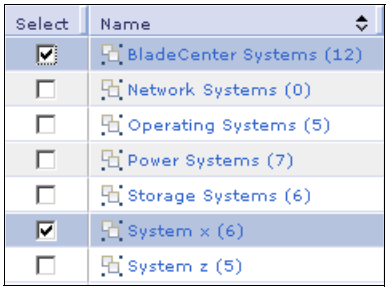


Figure 17-1 Select System x and BladeCenter Systems

8. Once the groups have been added to the Selected list, click **Next**.

9. From the Events drop-down menu, select **Advanced Event Filters**, and then select **Hardware Predictive Failure Alert events**, as shown in Figure 17-2. Click **Next**.

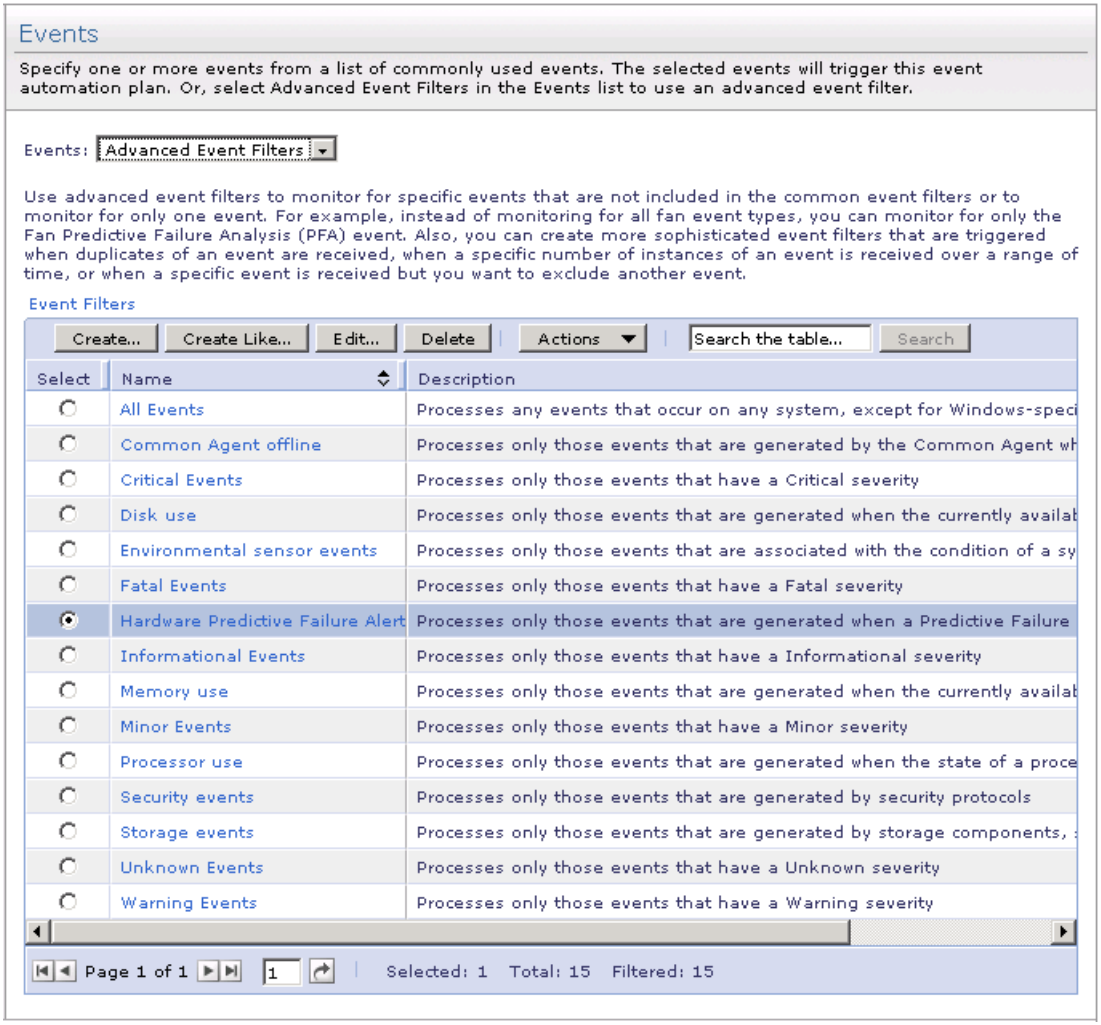


Figure 17-2 Selecting Hardware Predictive Failure Alert events from the list of Event Filters

10. Click **Create** to customize a new event action.

11. Select **Send an e-mail to a mobile phone**, as shown in Figure 17-3.

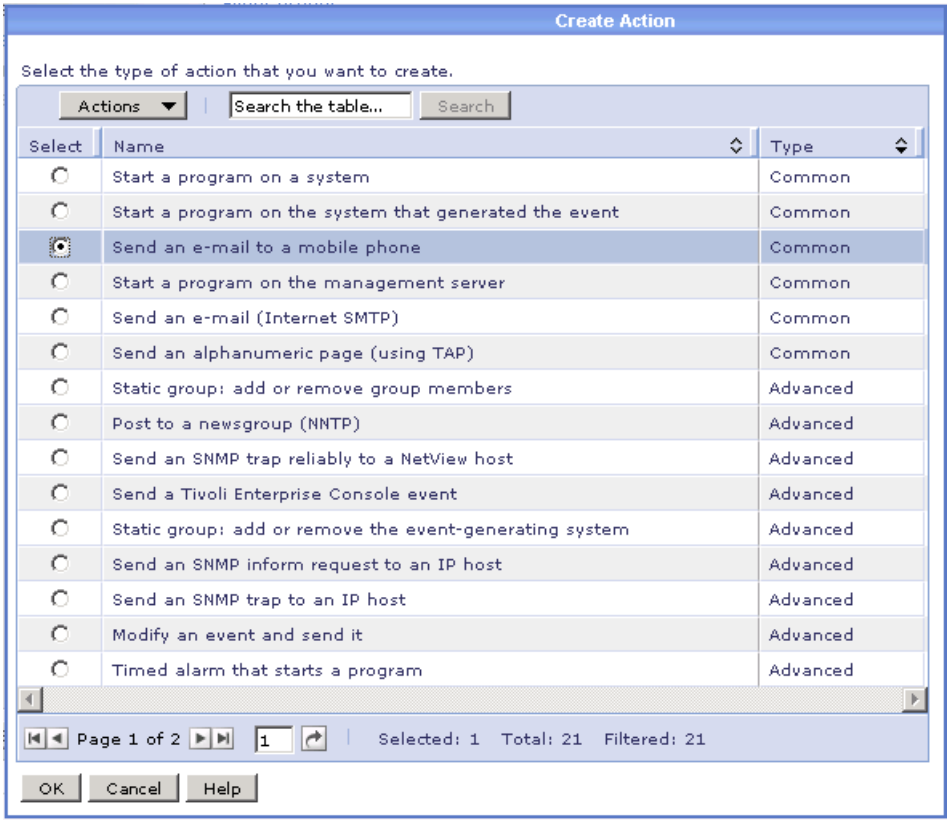


Figure 17-3 Selecting the action to perform

12. Complete the required fields. You can see our entries in Figure 17-4. When finished, click **OK**.

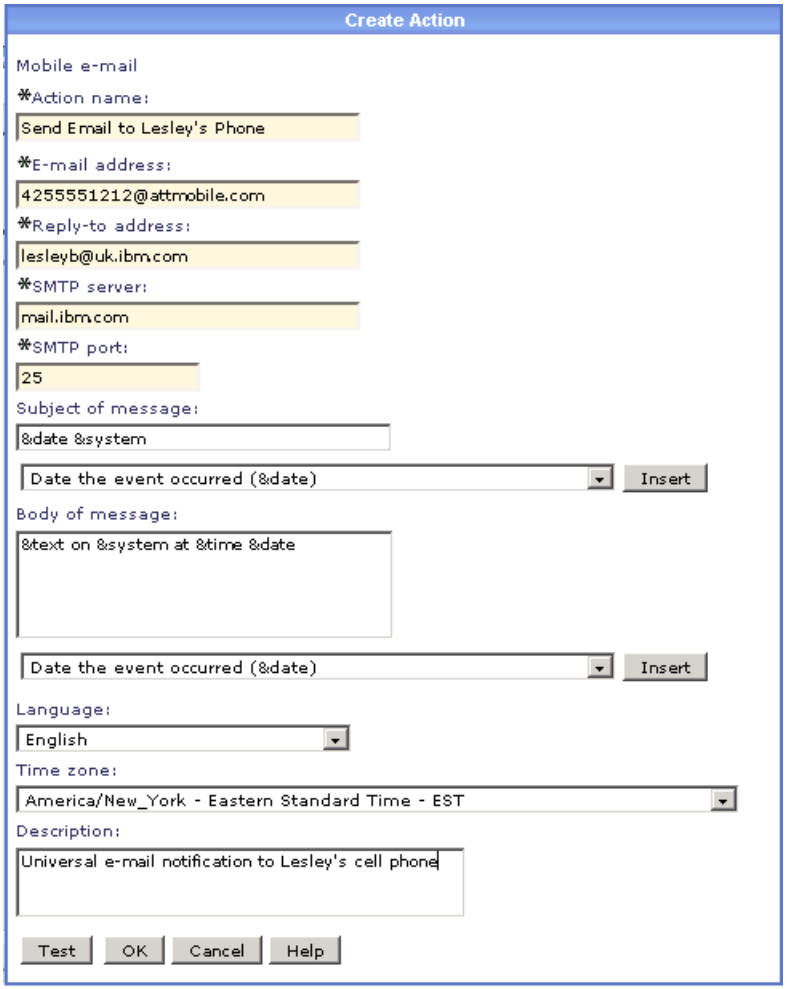


Figure 17-4 Creating the custom action

13. From the actions available, select **Add to the event log** and the new event action just created (in our example, Send Email to Lesley's Phone), then click **Next**.

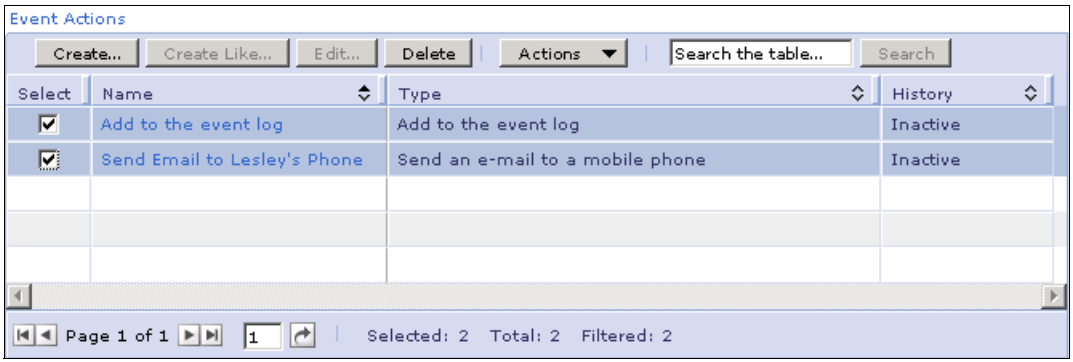


Figure 17-5 Selecting event actions

14. Click **Next** to accept the default time range of **All the time** and continue.
15. Check that the summary information is correct, as shown in Figure 17-6, and click **Finish** to create and activate the Event Automation Plan.

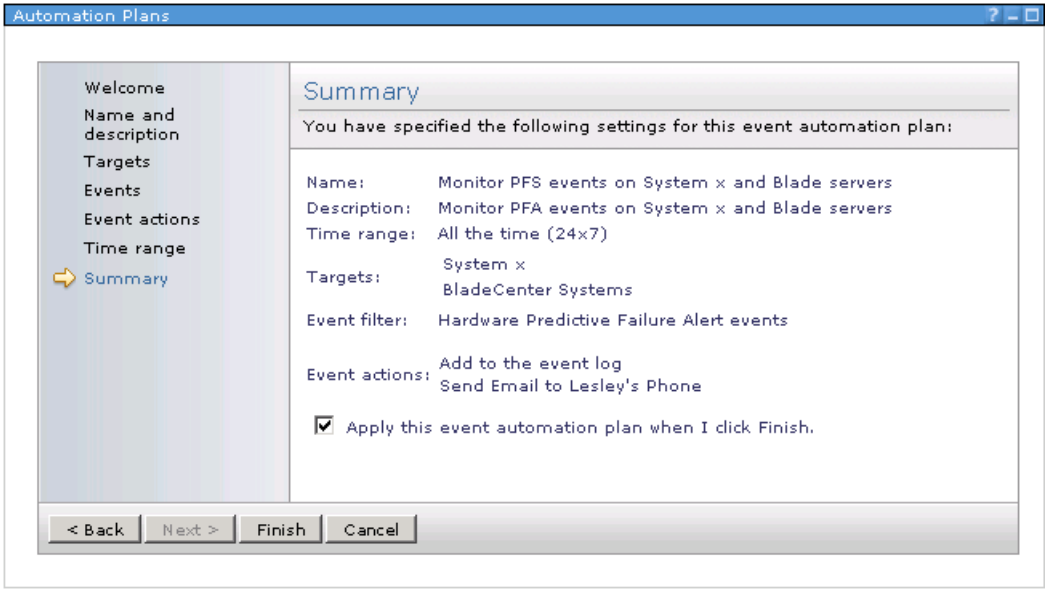


Figure 17-6 PFA Event Automation Plan summary

The Event Automation Plan now shows up in the list of Event Automation Plans, as shown in Figure 17-7.

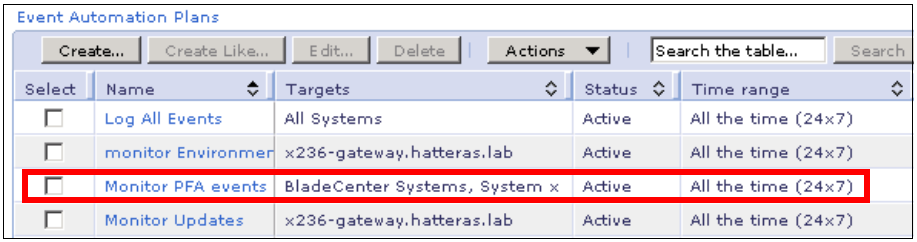


Figure 17-7 Monitor PFA Event Automation Plan

Once created and activated, this Event Automation Plan sends an e-mail notification to the mobile phone of a staff member whenever a predictive failure alert event is detected on any of our IBM System x or BladeCenter servers. We can then look into the details of the problem and plan a trip to a remote site if necessary, with the proper replacement parts in hand.

17.1.3 Extending this scenario

We can monitor for many more conditions in addition to PFA events being generated by our IBM servers. We can monitor for failed hard drives, or monitor hardware environments (fan speed, temperature, and so on) to ensure that everything is running optimally.

We can add hardware resource monitors and thresholds, as well. Items like CPU utilization, memory usage, and others provide excellent indicators of system effectiveness and may let us know when we must add or replace particular servers. Finally, operating system and software monitors can be added to make our monitoring complete.

17.2 Update management

Keeping the firmware, Basic Input/Output System (BIOS), and drivers up to date on systems can be a very challenging and time-consuming chore. In addition to these types of updates, it can be important to update systems management software, such as agents, running in the environment, especially when major new versions become available. IBM Systems Director includes features that make the task of keeping systems current much easier and more straightforward to accomplish.

This scenario describes how you can use Update Manager to perform remote updates to your servers. Specifically, we show how you can use this plug-in to upgrade existing IBM Director 5.20.x agents to IBM Systems Director Common Agent.

17.2.1 The problem

We have been using IBM Director to manage our systems for a few years. Our systems currently are running IBM Director 5.20.3 agents. Now that we have downloaded IBM Systems Director and have tested it for a reasonable period of time, we must upgrade the older agents to the new IBM Systems Director Common Agent. We are responsible for multiple sites, but have insufficient staff to allow us to travel to each site to perform this update locally on each server.

17.2.2 The solution

We use IBM Systems Director Update Manager to perform the upgrade of Director 5 agents to IBM Systems Director Common Agent remotely. We now have the IBM Systems Director 6.1 management server in production. We have also discovered all our Director 5 agents and have gained access to these systems by using the request access function.

To upgrade an IBM Director Agent 5.20.x to IBM Systems Director 6.1 Common Agent:

1. Click **Navigate resources** in the Navigate tasks area of the IBM Systems Director Web console.
2. Locate the system (in our example, system ws2k3cav04) or group of systems that will be upgraded to IBM Systems Director Common Agent.

3. Either right-click the system (**ws2k3cav04**) and click **Release Management** → **Install Agent** (shown in Figure 17-8), or highlight the system and select **Actions** → **Release Management** → **Install Agent**.

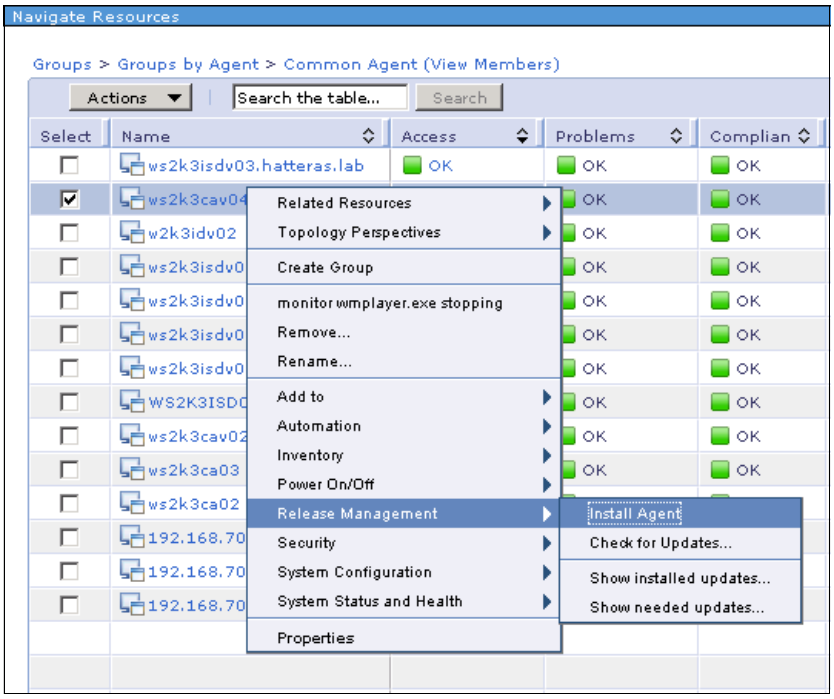


Figure 17-8 Right-click to select Release Management → Install Agent

4. The Agent Installation Wizard opens. Click **Next** at the welcome page.
5. From the list of packages available select **Common Agent Packages**.

6. Select the Link to the appropriate Common Agent package specific to the operating system installed. In our example, we install the Windows Common Agent package, as shown in Figure 17-9. Click **Add** to add this package to the Selected packages list. Click **Next**.

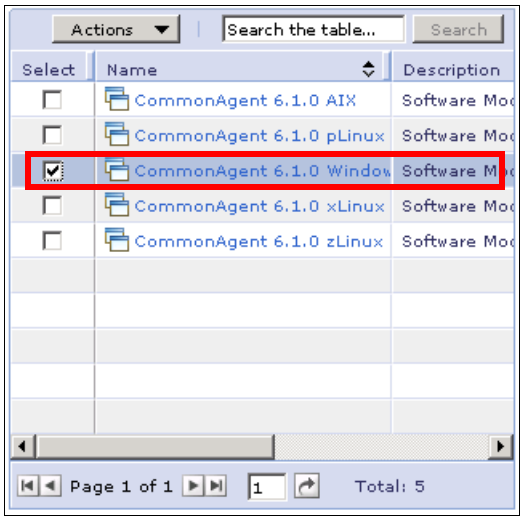


Figure 17-9 Select Common Agent package specific to OS installed on systems

7. Confirm that the correct target is selected and add additional targets if required, as shown in Figure 17-10. Click **Next**.

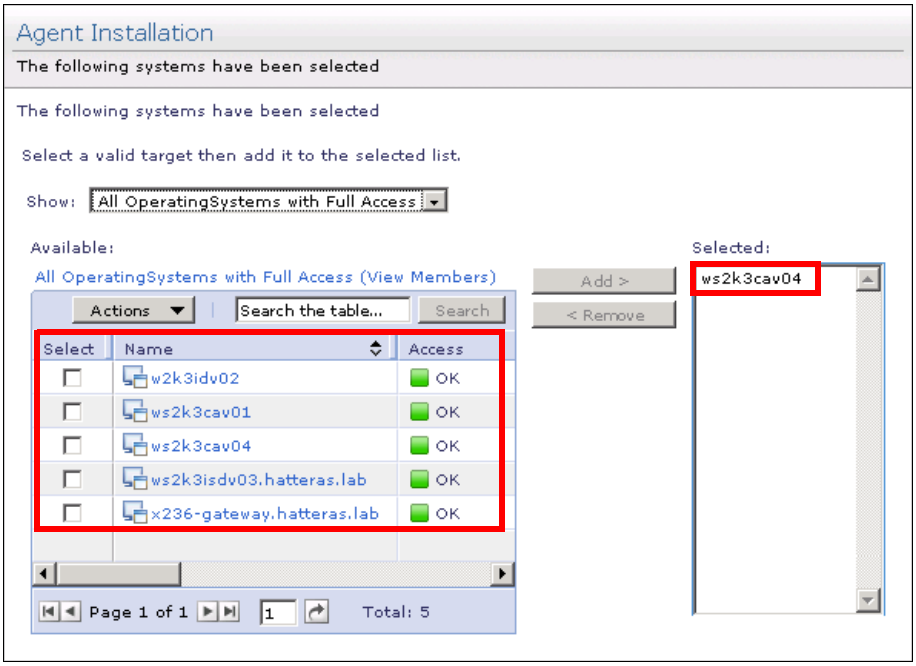


Figure 17-10 Targets available for the agent install: Single target selected

8. We are presented with a summary view, as shown in Figure 17-11. Verify that the configuration is as desired and click **Finish**.

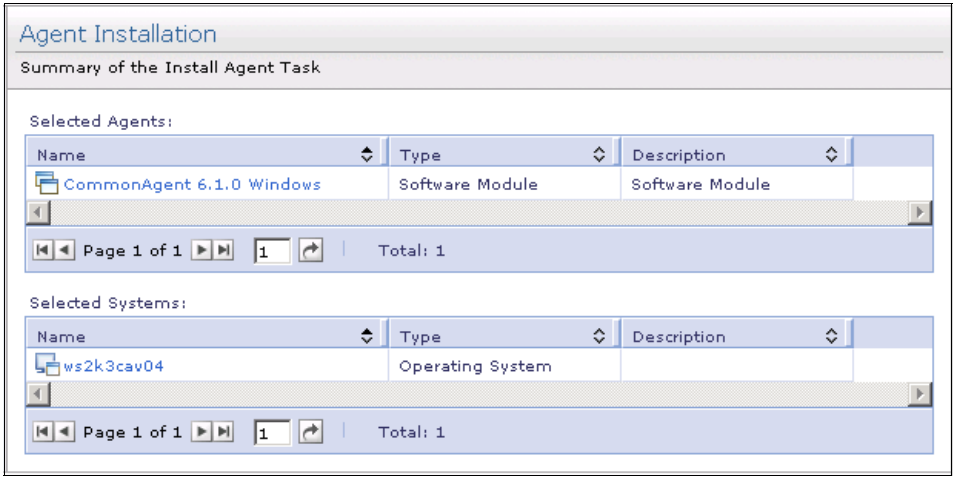


Figure 17-11 Agent install wizard summary

9. Select whether the tasks will be run now or scheduled to run in the future. In our example, shown in Figure 17-12, we select **Run Now**. Click **OK** to confirm the current time selection and start the task.

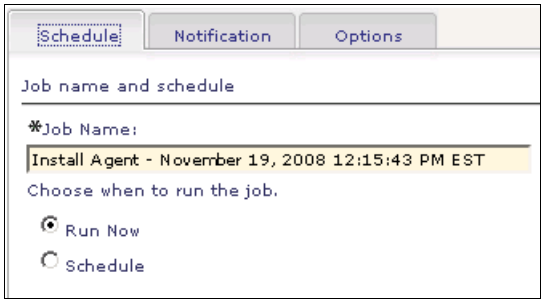


Figure 17-12 Agent install run option

10. A message is displayed, as in Figure 17-13, to indicate that the job has been started successfully. To view the progress of the job, click **Display Properties**.

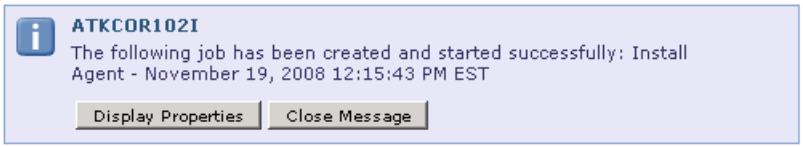


Figure 17-13 Job created and started message

11. Once the job has started successfully we want to check the status of the job process. (The initial indicator means that the job has *started* successfully, but does not tell us how it is progressing.) To check the current status, close the job view page, expand **Task Management** in the Navigate tasks view, and click **Active and Scheduled jobs**. The Active and Scheduled Jobs page opens, as shown in Figure 17-14.

Figure 17-14 Active and Scheduled Jobs page showing progress of tasks

12. Once the job (in our example, “Agent Installation@Wed Nov 19 12:20:11 EST 2008,” shown in Figure 17-14 on page 753) is 100% complete, close this view and return to the Navigate Resources page.
13. Locate the system or group of systems that were updated. IBM Systems Director Server no longer has access to these systems, as shown in Figure 17-15.

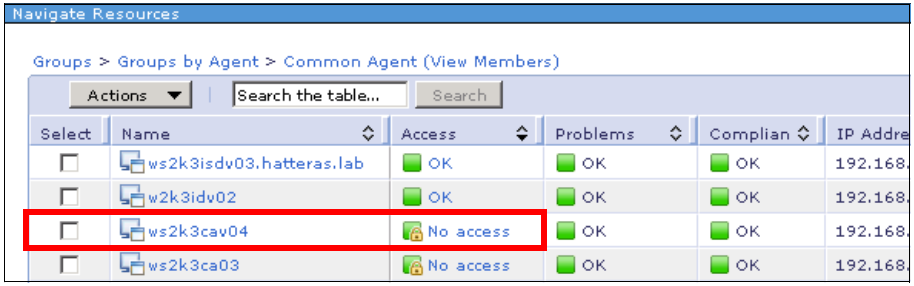


Figure 17-15 Agent access has changed to No access

14. To request access to the systems, click the **No access** link, which opens the Request Access page, as shown in Figure 17-16.

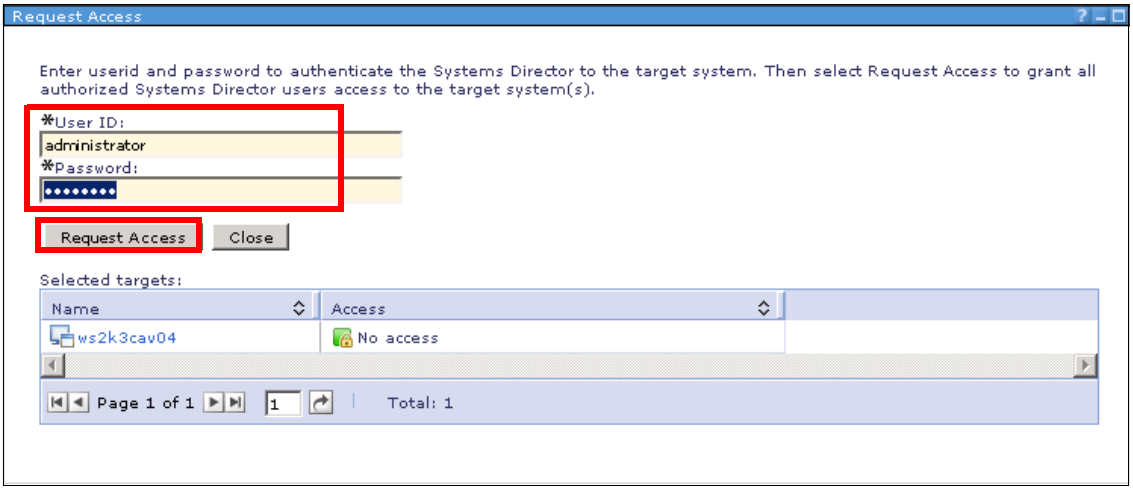


Figure 17-16 Request Access page

15. Insert the appropriate credentials and click **Request Access**.
16. The state displayed in the Access column changes to OK as the Common Agents register with the Agent Manager used by the management server and access certificates are exchanged. Click **Close**.

17. The systems are now running IBM Systems Director Common Agent and are ready to be managed. On the **Navigate Resources** page, select the system (in our example, ws2k3cav04) to see the changes in the general information about this system, as shown in Figure 17-17.

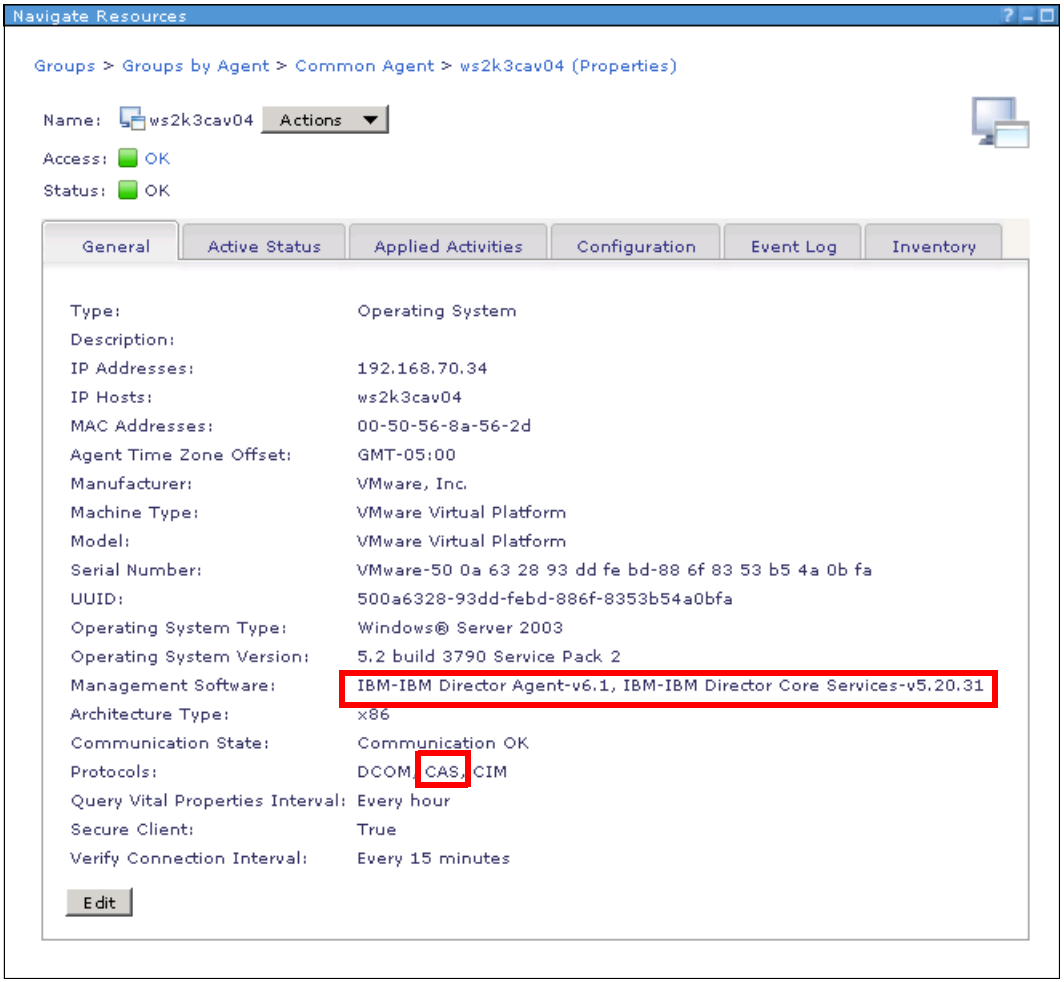


Figure 17-17 Changes seen once Common Agent has been installed

17.2.3 Extending this scenario

By upgrading the management agent on multiple systems at the same time, a single administrator could perform these updates for the entire company, saving time and money, since there is no need for travel to remote sites. We could even schedule the upgrades to run overnight, so there is no downtime or disruption in

service. Our servers would remain up and running the next day when we arrive at the office, with new IBM Systems Director Common Agents installed.

17.3 Basic monitoring

IBM Systems Director provides a large and robust set of tools to monitor systems and notify IT administrators when problems occur. This scenario describes how you might go about performing basic system monitoring in a typical IT environment.

17.3.1 The situation

Our company has just purchased a new Windows file and print server after problems with its last server's availability. Our IT manager was able to convince senior management to pay for the new hardware based, at least partly, on the commitment that the previous poor availability issues would be resolved. We have been given the task of *keeping an eye* on the new server so that the executives are kept happy.

17.3.2 The solution

In addition to getting alerts about hardware problems (see 17.1, "Hardware alerting" on page 742, for a hardware alerting scenario), we decide to monitor the overall load of the server and any critical processes and services. This will allow us to deal with any performance or availability issues quickly, preferably before they happen.

First, we must decide what we want to watch on the server. We are looking for signs that the server is either running out of resources or that some critical process is not available.

Configuring IBM Systems Director

The first thing that we want to do is make sure that we get a good overview of the system when we log into Systems Director. To do this we navigate to the Health Summary page and add it to My Startup Pages (Figure 17-18).

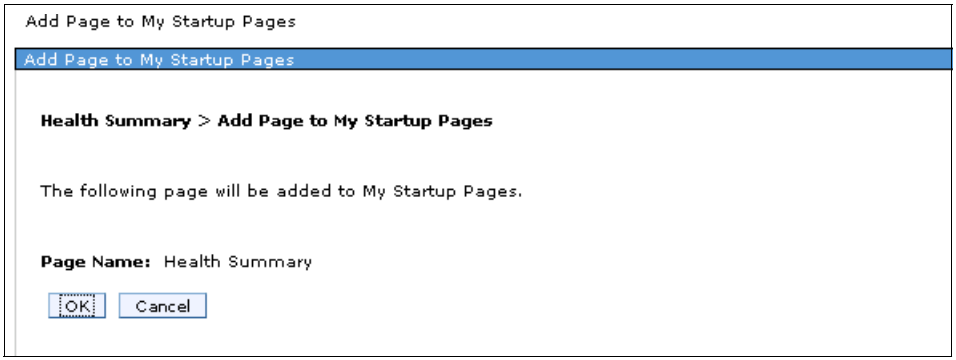


Figure 17-18 Add page to My Startup Pages

Next we add the file server to the favorites group so that it appears in the Health Summary page even if there are no problems. We add a couple of monitors to the Dashboard to keep an eye on them as well (Figure 17-19). We also modify the favorites group so that Access, Problems and Compliance are the first three columns. This will make it very easy to identify issues with a glance at the Web console.

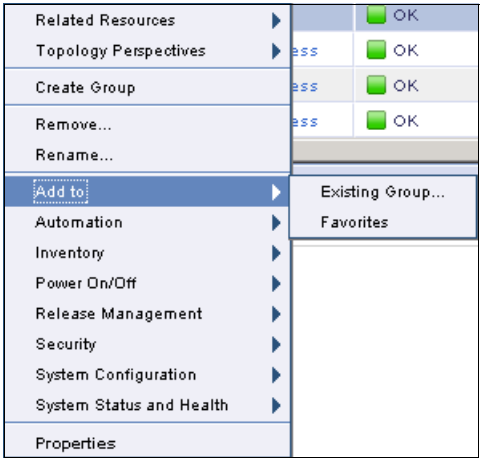


Figure 17-19 Add server to favorites

And lastly, we set the verify connection interval down to 5 minutes so we are notified more quickly if this critical system goes offline (Figure 17-20).

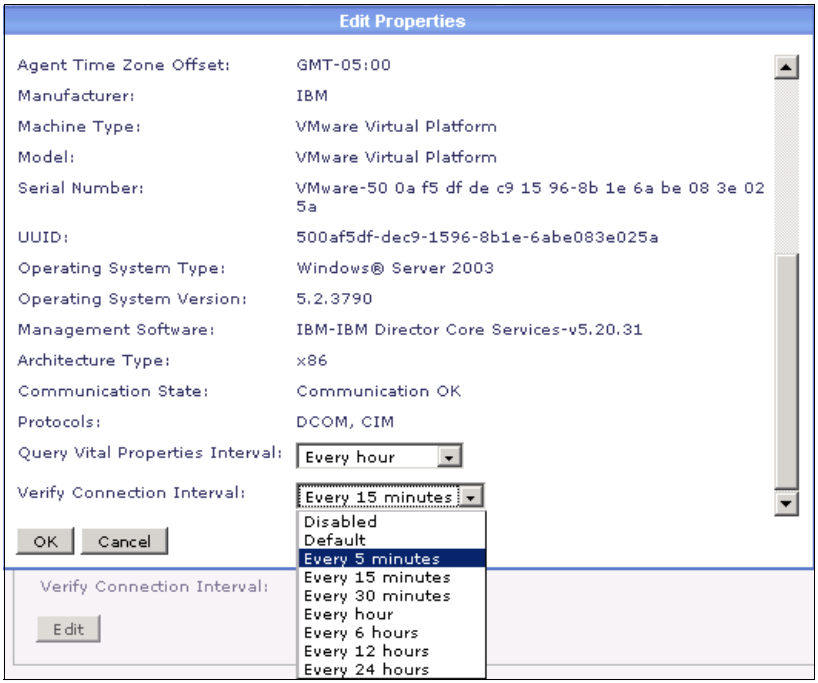


Figure 17-20 Setting the verify connection interval

Overall system load

One of the things that we want to watch is the overall load on the server. We decide to start with CPU, memory, disk, and network. To do this, we create a monitor view and set up thresholds to monitor these areas, like the one shown in Figure 17-21.

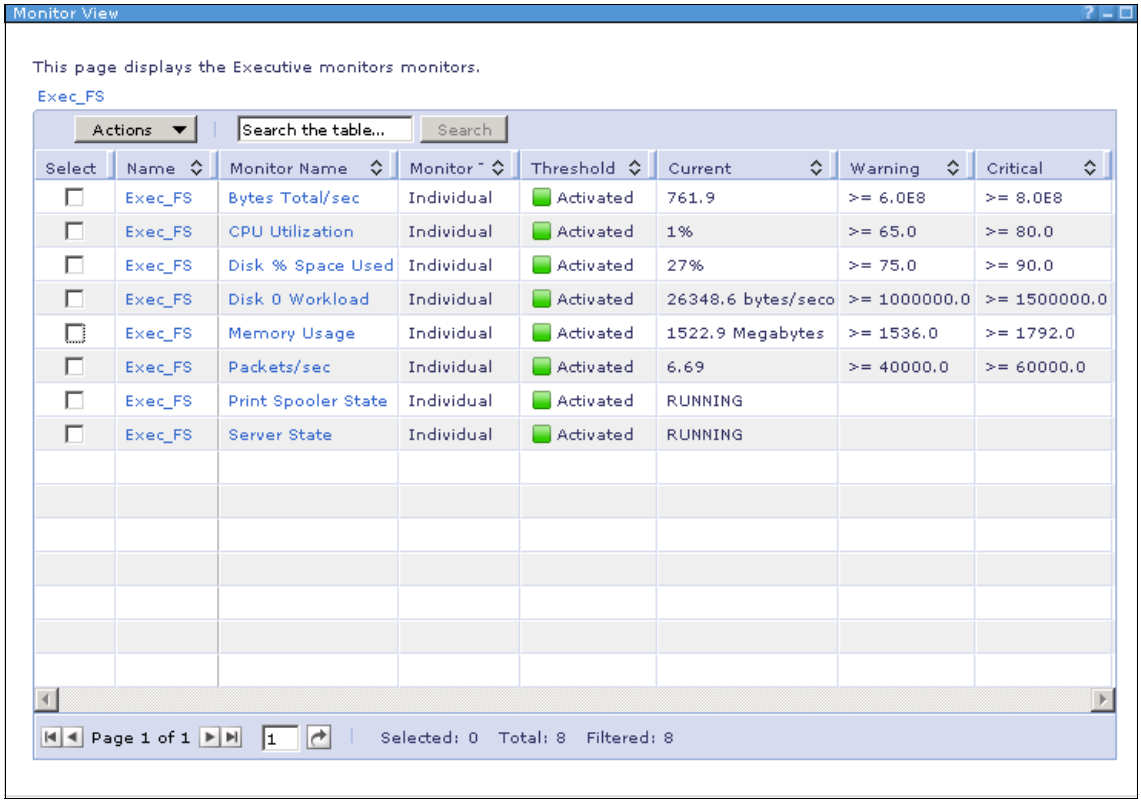


Figure 17-21 Monitor view with thresholds set

Critical processes and services

In Figure 17-21 on page 759 you see that we have created and activated thresholds on the system load counters. We have also enabled thresholds on two critical Windows services: Print spooler and server. Figure 17-22 shows how we configured the print spooler service threshold. We used the same values for the server service.

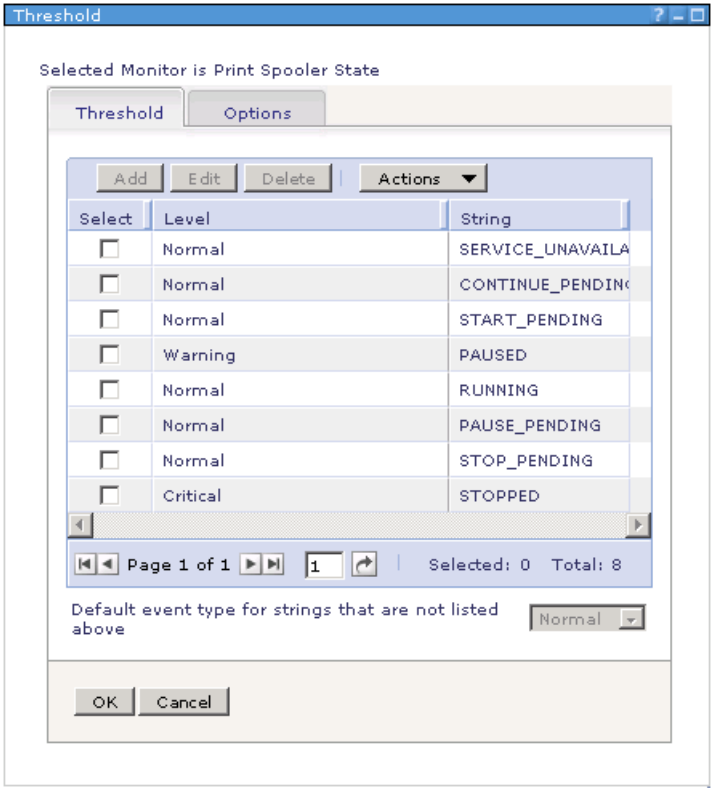


Figure 17-22 Print spooler service threshold

Now when we log into the IBM Systems Director Web interface we see the Health Summary page (Figure 17-23), which gives us an immediate overview of the status of this server.

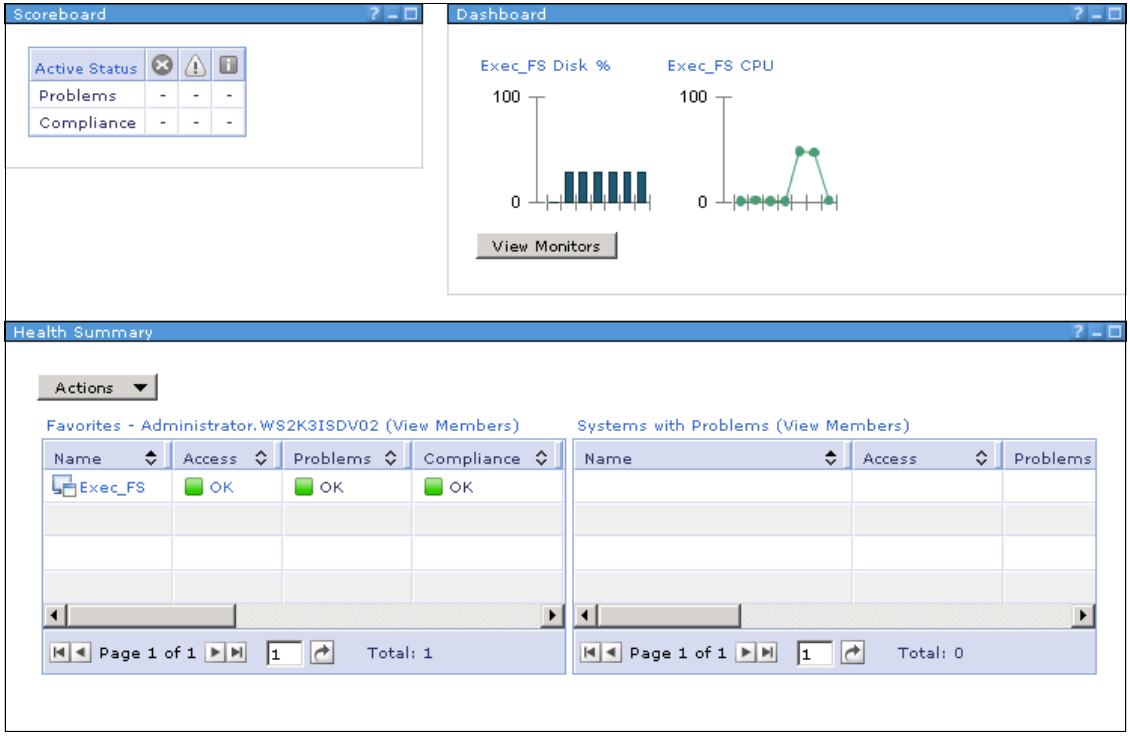


Figure 17-23 Health Summary page

After getting the IBM Systems Director Web interface configured to our satisfaction, we turn our attention to setting up alerts when events occur. Figure 17-24 shows the summary of the Event Automation Plan that we create to generate these alerts.

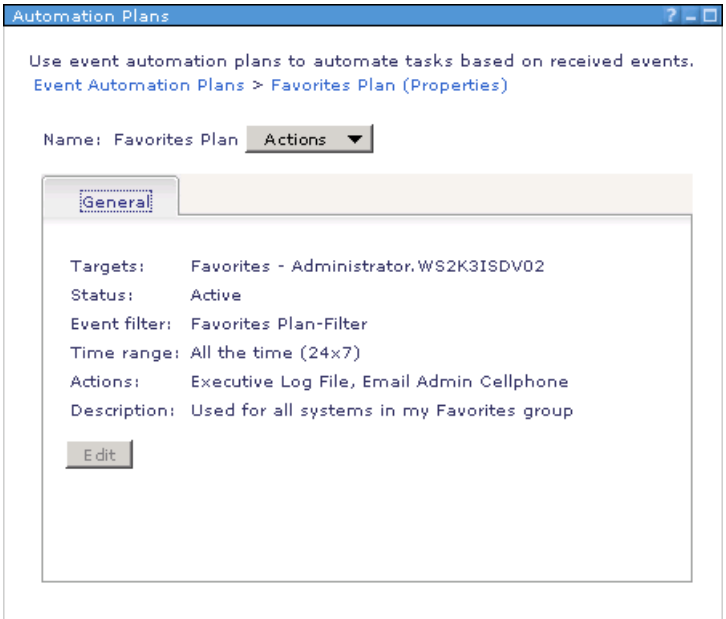


Figure 17-24 Event Automation Plan

For this Event Automation Plan we create a filter call favorites filter, which filters events based on severity. Then we apply the plan to our favorites group and add a customized action to send SMS e-mail to our cell phone when problems occur. As always, we add the default action to add all events to the IBM Systems Director event log. This gives us the ability to look back through the history of performance and problems on this system.

17.3.3 Extending this scenario

Other things we would consider doing to keep this server running at peak performance include:

- Monitoring critical processes
- Adding other actions to our Event Automation Plan
- Putting a compliance policy in place
- Scheduling regular download/installation of updates in Update Manager
- Limiting the number of users who can access this system

17.4 Process management

The process management capabilities of IBM Systems Director provide an excellent way to monitor processes and their behaviors in your environment. This scenario makes use of those capabilities to monitor the status of regularly scheduled backup jobs that run on a Linux file server.

17.4.1 The situation

Our company uses a backup program that starts as a scheduled job every evening. We have been given the task of monitoring the backup job that runs on a file server every evening. We must be sure that the backup job runs successfully each night, and also that it starts and stops on time.

17.4.2 The solution

IBM Systems Director provides functionality well-suited to addressing this challenge. In particular, the process management capabilities seem perfect for this task. We configure a process monitor on the file server for the backup program. This will tell us when the backup process starts and stops each night. We also establish a process monitor for the Crash_Dump program, which is run if the Backup program crashes.

You can see the process monitors that we have set up in Figure 17-25. As configured, these process monitors will generate events when the backup program starts or stops and when the Crash_Dump program starts. Using these monitors, we can configure IBM Systems Director to add an event log entry each time that one of these events occurs.

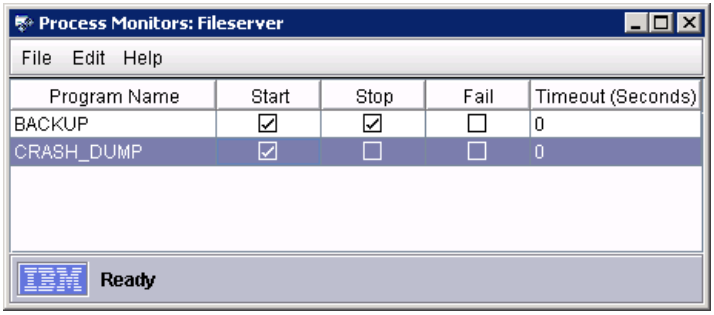


Figure 17-25 Process Monitors

Watching the backup processes

The first part of our task is to make sure that the backup job runs during the correct hours. Our corporate policy requires that backups be run between the hours of 10:00 p.m. and 4:00 a.m. the next day. If the backup job starts outside of this window, we want to be notified.

To establish this type of notification we create an Event Automation Plan that will use the process monitors that we have already created. Our Event Automation Plan, shown in Figure 17-26, will send an alert if the backup program starts or stops outside the time range specified by the corporate policy.

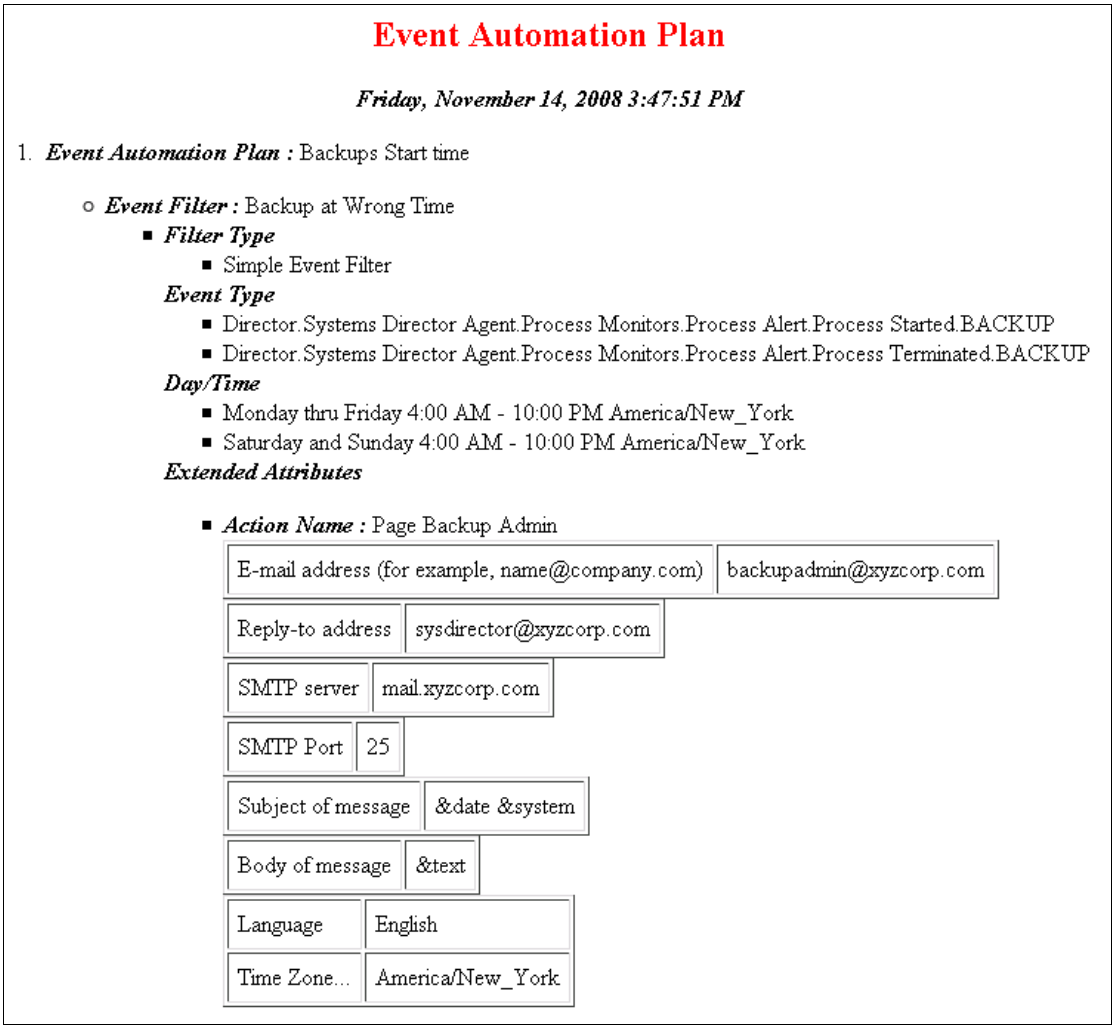


Figure 17-26 Backup start time Event Automation Plan

Notice that the event filter in this Event Automation Plan has a day/time range. This means that the plan will be triggered only if the process monitors for the backup program generate an event between the hours of 4:00 a.m. and 10:00 p.m., which would violate our corporate policy.

In addition to the alert we receive if a backup process starts or stops outside of our intended window, we want to receive notification if the backup takes more than 4 hours to complete. One way to accomplish this is to configure a pair of Event Automation Plans that work together. The first plan, shown in Figure 17-27, starts a 4-hour timer when it receives the event from the process monitor for Backup START.

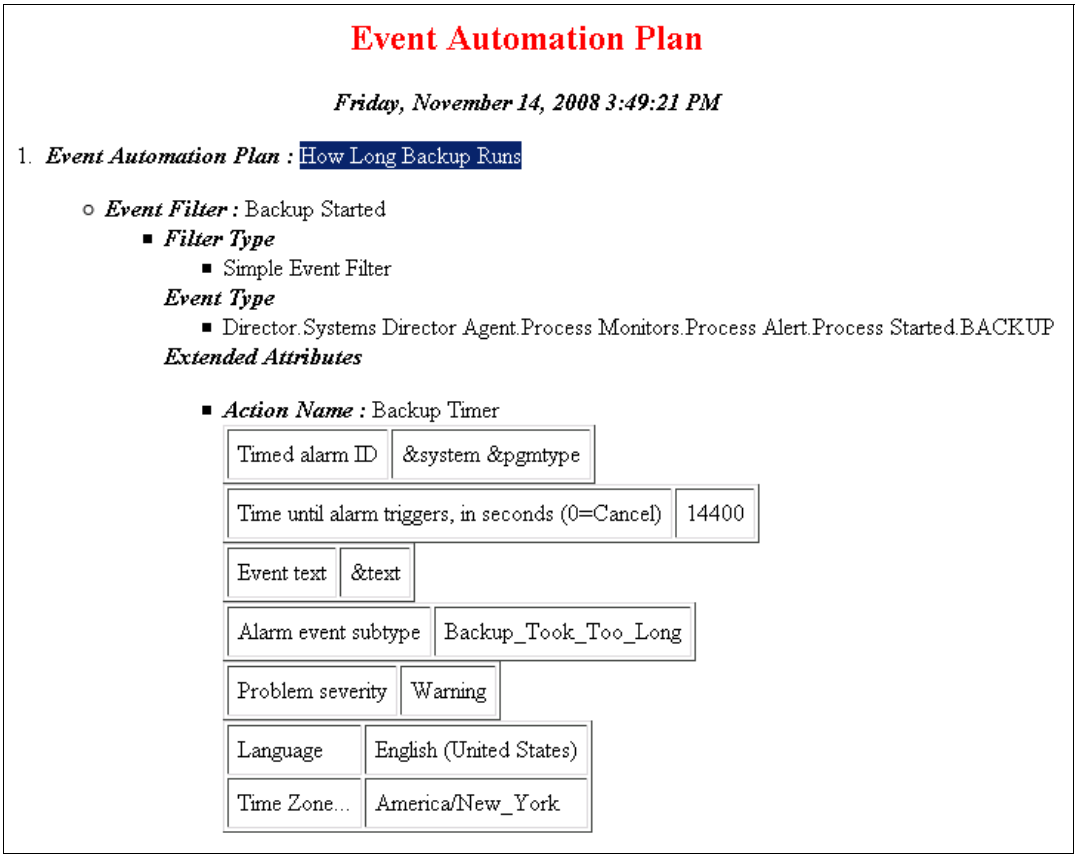


Figure 17-27 How long backup runs Event Automation Plan

When the timer expires, an alarm is triggered. This alarm is itself an event that can be used in other Event Automation Plans, as we will see.

Figure 17-28 shows the Event Automation Plan responsible for resetting the timer in the previous plan. When it receives the event from the process monitor for Backup STOP, it resets the countdown timer, preventing the alarm from being triggered. Since there is no alarm event, there is no trigger for the next plan that we discuss.

Figure 17-28 Backup complete

In Figure 17-29 we show the Event Automation Plan that is responsible for sending an e-mail notification to alert us if a backup job takes longer than 4 hours. This plan uses the alarm event generated by the *how long backup runs* plan shown in Figure 17-27 on page 765 to trigger the e-mail notification. However, if the backup job finishes in less than 4 hours, the *backup completed* plan shown in Figure 17-28 on page 766 resets the countdown timer so that no alarm event is generated and no e-mail message is sent.

Event Automation Plan

Friday, November 14, 2008 4:03:58 PM

1. ***Event Automation Plan :*** Backup took too long

   - ***Event Filter :*** Backup Took Too Long
     - ***Filter Type***
       - Simple Event Filter

     Event Type
     - Director.Alarm Triggered.Backup_Took_Too_Long

     Extended Attributes

     - ***Action Name :*** Page Backup Admin

E-mail address (for example, name@company.com)	backupadmin@xyzcorp.com
Reply-to address	sysdirector@xyzcorp.com
SMTP server	mail.xyzcorp.com
SMTP Port	25
Subject of message	&date &system
Body of message	&text
Language	English
Time Zone...	America/New_York

Figure 17-29 Backup took too long Event Automation Plan

Watching for system crash

Having handled the cases in which our backup job completes successfully (regardless of the time that it takes or the hours that it runs), we turn our attention to the possibility of a system crash during the backup process. One of the

features of backup is that it starts Crash_Dump automatically if there is a program error in order to gather logs to analyze the problem. This means that we can use the process monitor on Crash_Dump that we created earlier in this exercise.

Using the Event Automation Plan shown in Figure 17-30 we know that we will receive an immediate e-mail notification if the backup terminates abnormally and the Crash_Dump program starts.

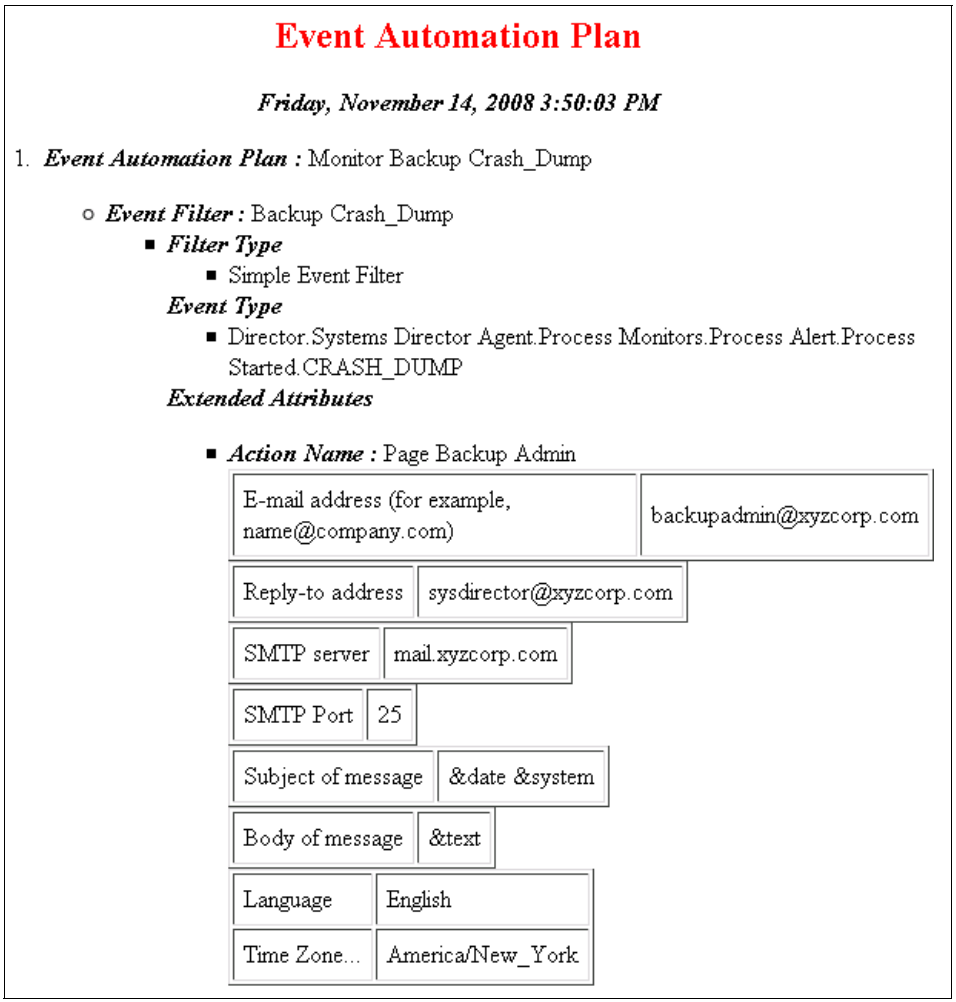


Figure 17-30 Monitor backup Crash_Dump Event Automation Plan

17.4.3 Extending this scenario

To address the challenges of this scenario, we start a timer when the backup job starts. This assumes that the job starts on time or shortly thereafter. We could write a script that calculates the maximum time that the backup job could run. Similarly, we could use a script to lower the priority of the backup program when the timer expires, thereby reducing the effects seen by users accessing our file server.

17.5 Unattended installation

This scenario describes how to use the IBM Systems Director Agent Installation Wizard to push the IBM Systems Director Agent and subagents to a VMware ESX Server and VirtualCenter-managed systems in a common virtualized VMware environment, thereby automating one of the most time-consuming processes in implementing an IBM Systems Director environment.

Focused on reducing this challenge, IBM Systems Director 6.1 supports the installation of Platform Agent, Common Agent, and the Virtualization Manager subagents to managed systems with a new installation wizard.

This installation can be achieved in a completely automated manner from the IBM Systems Director Web interface, using the Agent Installation Wizard to install agent and subagent packages on target-managed systems.

17.5.1 The problem

One of the most challenging aspects of implementing IBM Systems Director in an IT environment of any size has always been getting the Systems Director products installed on all managed systems. Traditionally, this has involved either manual installation of the agents on each system or a semi-automated approach.

In this scenario we work in an IT organization that has implemented a VMware virtual infrastructure that is critical to our environment. A VirtualCenter Server manages several ESX hosts and their many virtual servers. These virtual servers run different operating systems. We want to manage all our physical hosts using Common Agent and leverage the capabilities of Virtualization Manager, a plug-in that comes preinstalled in IBM Systems Director 6.1.

In previous versions of IBM Director the most common method of initial installation was to either manually install the IBM Director Agent on each system that was to be managed or to use Update Manager to push the agent. Other methods were used as well, but each had its own set of issues. For example,

rolling out system images that already include the agent code can be tricky because of how IBM Systems Director Server keeps track of managed systems internally. Similarly, implementing script-based silent installation methods can be complicated and confusing.

An ideal approach might be for the IBM Systems Director Server itself to discover all potentially manageable systems and to install appropriately managed system code on target systems selected by the administrator. Or identify the already supported hosts managed by Director 5 and Virtualization Manager, discover them in the new IBM Systems Director 6.1, run some uninstall commands on them, and then install them easily trough the Agent Installation Wizard.

This scenario addresses our need to install and see the VMs in our Virtual Center 2.5 and ESX 3.5.1 environment.

17.5.2 The solution

The solution is to push the agents from the management server. IBM Systems Director is installed with a number of agent packages that can be deployed to managed systems using the Agent Installation Wizard.

Before installing Common Agent on a managed system, ensure that the requirements applicable to your system have been met. Verify the following link to make sure that the hosts and the platform manager are ready to be installed for the very first time:

http://infocenterdev2.raleigh.ibm.com:8090/help/topic/director.install_6.1/fqm0_t_preparing_level2_managed_system.html

Importing agent packages

You can use the Agent Installation Wizard to install agent packages on managed systems, but first you must import them to your IBM Systems Director Server to be able to distribute the packages.

IBM Systems Director 6.1 can import agent packages that have been downloaded from the Web or obtained on physical media. These agent packages then can be distributed to managed systems using the Agent Installation Wizard.

The agent packages that IBM Systems Director uses are Tivoli Provisioning Manager automation packages with a file extension of tcdriver.

Use the following procedure to import one or more agent packages for distribution using the Agent Installation Wizard:

1. Copy the tcdriver package files to a directory on the management server, as seen in Figure 17-31. In this case we must import the Linux Common Agent for the ESX and the Windows Common Agent for the VMware Virtual Center.

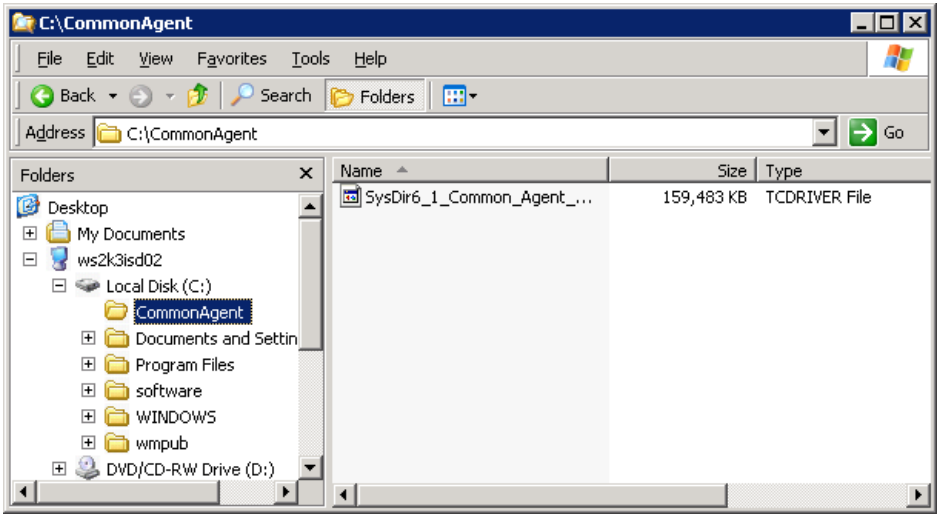


Figure 17-31 Copy the tcdriver file on a known management server directory

2. In the IBM Systems Director navigation area, click **Release Management** → **Agents**. The available agent package groups are listed, as shown in Figure 17-32.

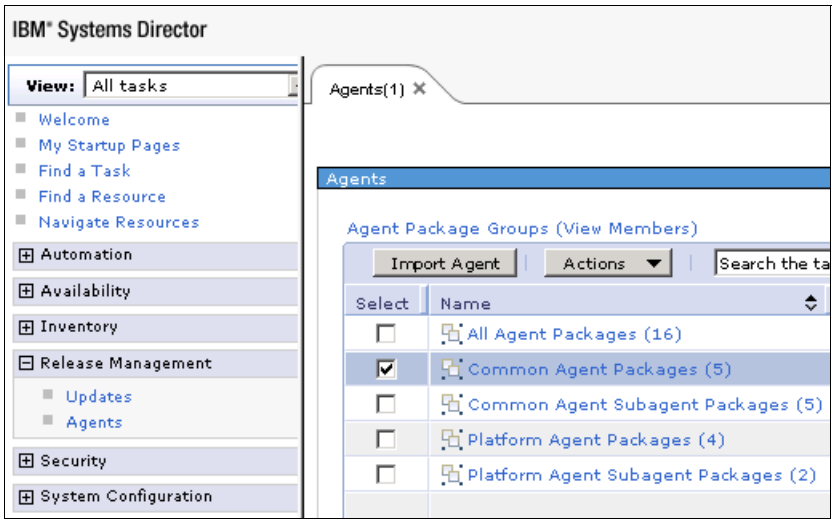


Figure 17-32 Available agent packages

3. Click **Import Agent**. The Import Agent window opens, as seen in Figure 17-33.

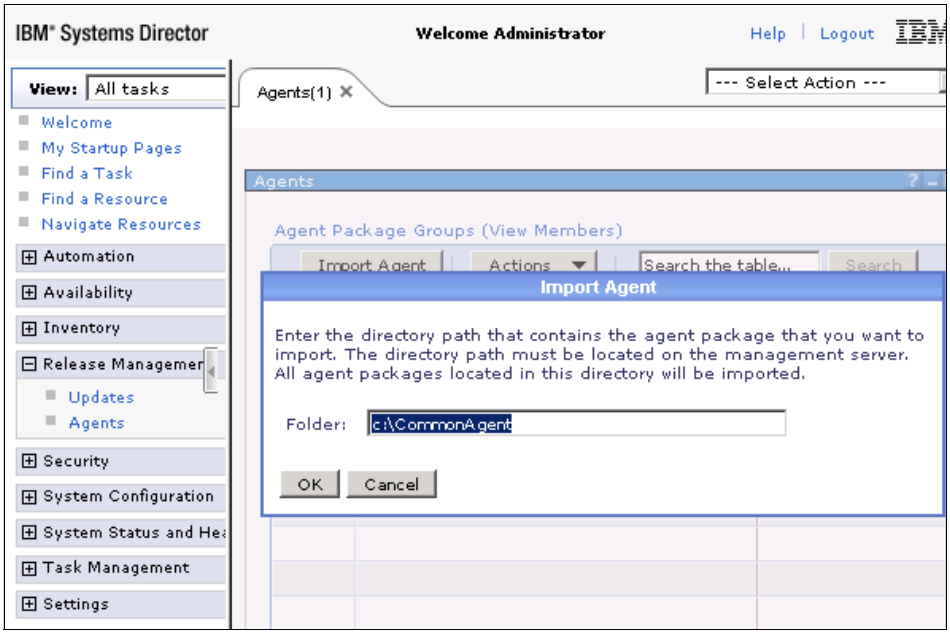


Figure 17-33 Specify the directory path that contains the agent tcdriver package

4. Type the path on the management server where you copied the package files in step 1, and then click **OK**.

All of the agent packages that are found in the specified path are imported, and a confirmation message appears indicating that the packages were successfully imported, as seen in Figure 17-34. If you must import more Common Agents packages later, you can repeat this same process every time.

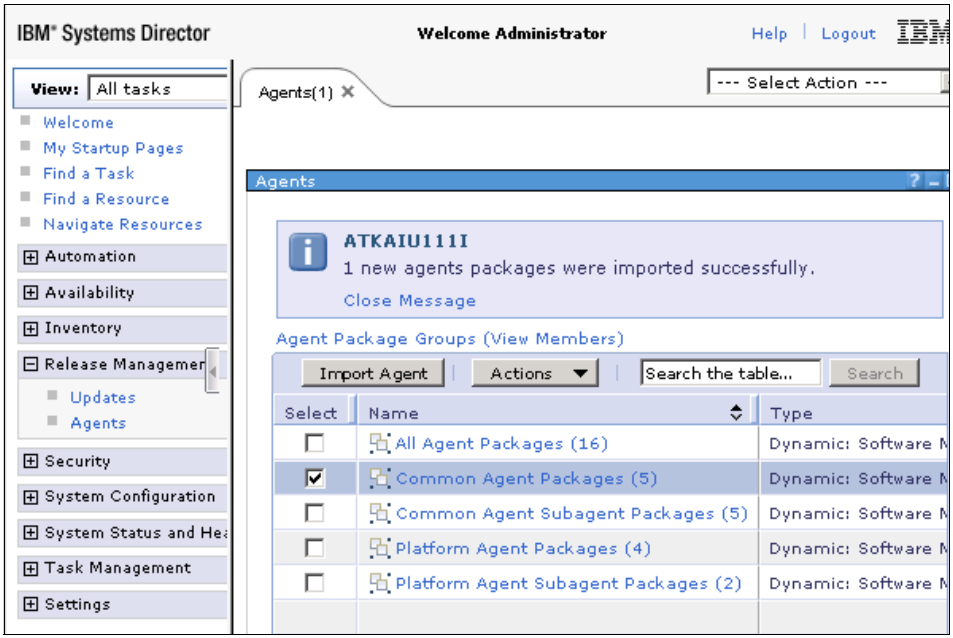


Figure 17-34 Agent package successfully imported

Tip: The imported packages might not appear in the agent package groups list immediately.

After the agent packages are successfully imported and appear in the agent package groups, you can install the packages using the Agent Installation Wizard.

Installing agents using the Agent Installation Wizard

The imported packages are located in the dynamic group *agent package groups* and can be accessed by clicking **Release Management** → **Agents** in the navigation area. You use the Agent Installation Wizard to select one of these agent packages to install and one or more systems on which to install the agent package. Then the wizard creates an agent installation job that can be run now or scheduled.

Note: You might need to configure certain VMware systems before you can install agents on them using the Agent Installation Wizard.

Managed systems running VMware ESX require the following configuration to ensure that agents can be installed using the Agent Installation Wizard:

1. On the VMware managed system, open the `/etc/ssh/sshd_config` file in a text editor.
2. Locate the following line:

   ```
   Ciphers aes256-cbc,aes128-cbc
   ```

3. Change the line to:

   ```
   Ciphers aes256-cbc,aes128-cbc,3des-cbc
   ```

4. Save and close the `/etc/ssh/sshd_config` file.
5. Stop and restart the ssh daemon. Type the following command:

   ```
   service sshd restart
   ```

1. Start the Agent Installation Wizard. You can start the wizard in multiple ways:
   - From the Welcome page, as seen in the Figure 17-35, click **Next**.
   - Right-click an agent package or a managed system and select **Release Management** → **Install Agent**.

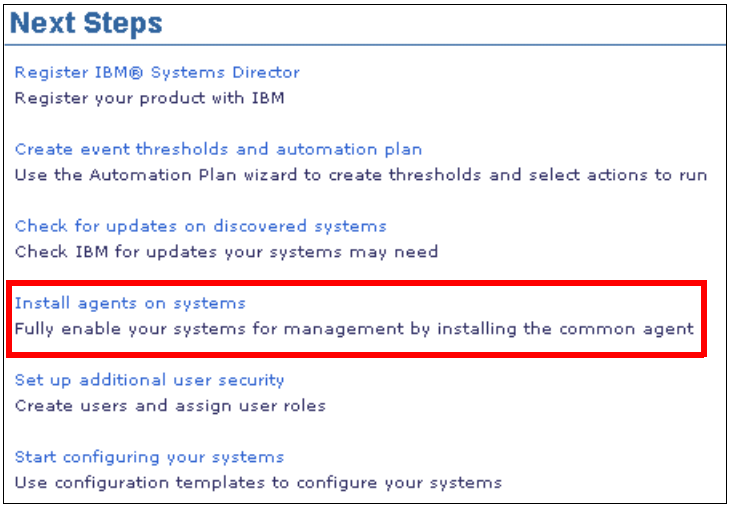


Figure 17-35 Install agents on systems from the welcome page

2. If the Agent Installation Wizard Welcome page appears, click **Next**.

3. In the Agent Installation Wizard Agents page, complete the following steps:
   a. Select the agent package that you want to install in the Available list. For this case we start working with a Windows 2003 EE with VMware Virtual Center. The same process would apply for the ESX hosts, but instead of Common Agent for Windows, will require Common Agent for Linux.
   b. Click **Add**. The selected agent package is displayed in the Selected list, as shown in the Figure 17-36. Click **Next**.

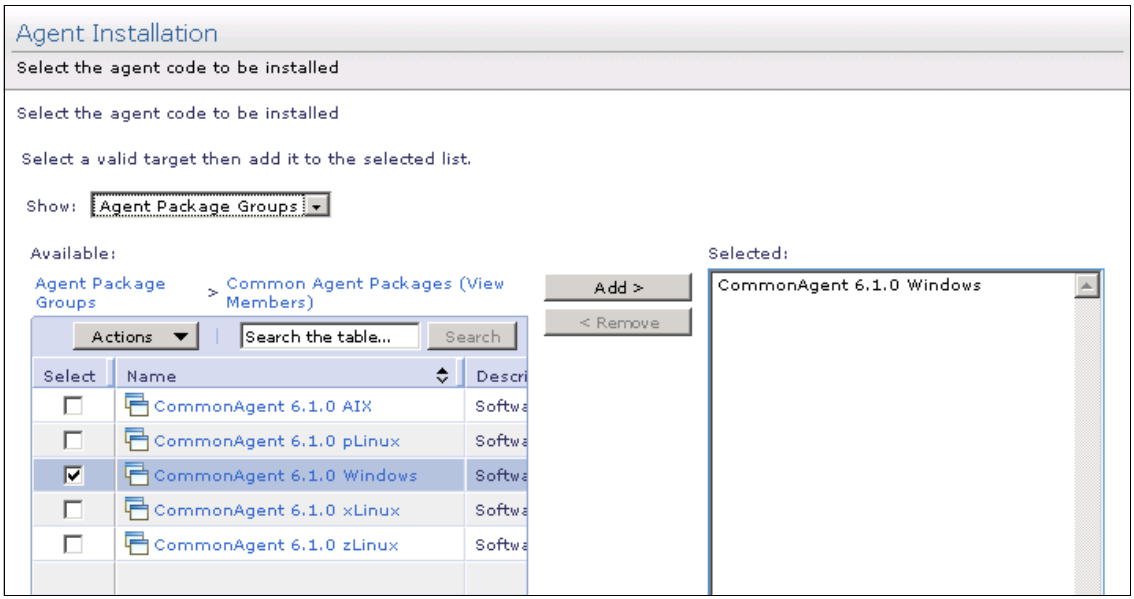


Figure 17-36 Agent package to be installed

Notes: Depending on how you started the Agent Installation Wizard, one or more agent packages might already be displayed in the Selected list.

The Agent Installation Wizard can install only one agent package at a time. If more than one agent package is displayed in the Selected list, you will not be able to advance to the Systems page.

4. In the Agent Installation Wizard Systems page, complete the following steps:
   a. Select the managed systems on which you want to install the agent package in the Available list. The system selected represents the Windows server with VMware Virtual Center and any other targets that may apply.
   b. Click **Add**. The selected systems are displayed in the Selected list (Figure 17-37). Click **Next**.

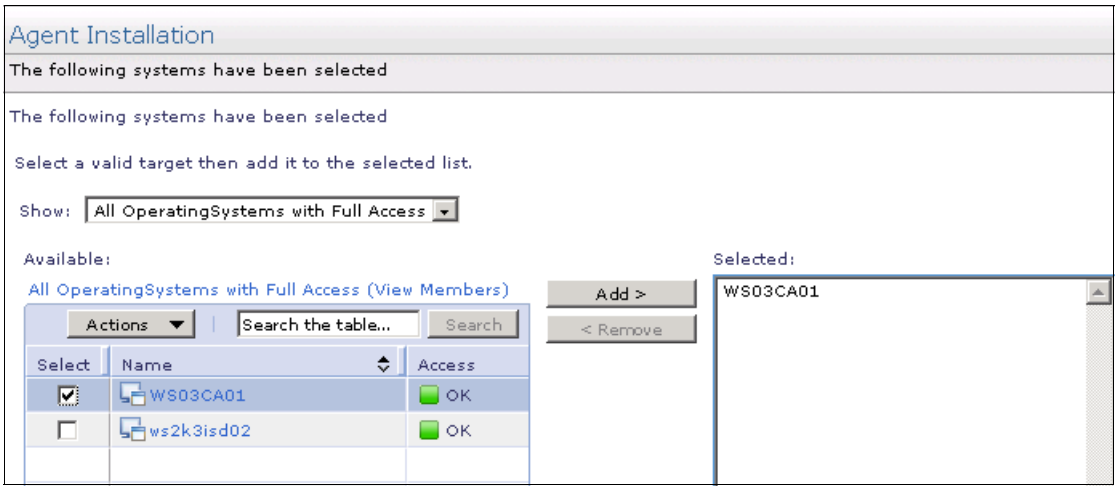


Figure 17-37 System to be installed

5. Depending on the agent package being installed, some selected systems might not be valid targets for installation. The wizard checks the selected systems for the following criteria to ensure that the systems are valid targets for installing the selected agent package before allowing you to continue:
   - Operating system family
   - Operating system version
   - Operating system distribution
   - Operating system name
   - Server architecture

6. In the Agent Installation Wizard Summary page, shown in Figure 17-38, review the Selected Agents and Selected Systems lists to ensure that they are correct.
   - If the selections are not correct, click **Back** and make the necessary changes.
   - If the selections are correct, click **Finish**.

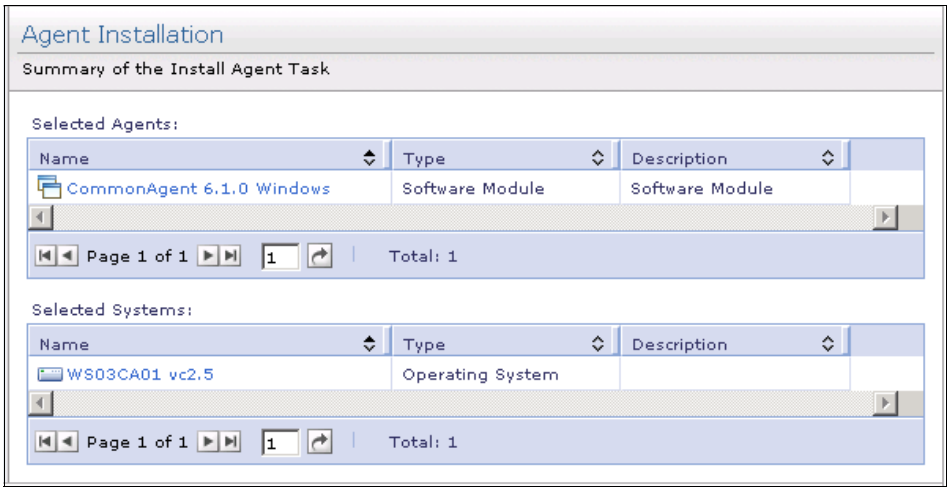


Figure 17-38 Summary of the install agent task, package, and system selected

After you click **Finish**, the Run - Install Agent window opens.

7. In the Run - Install Agent window, click the **Schedule** tab. On this page you can choose to run the job immediately or schedule the job to run at a later time, as you can see in Figure 17-39.

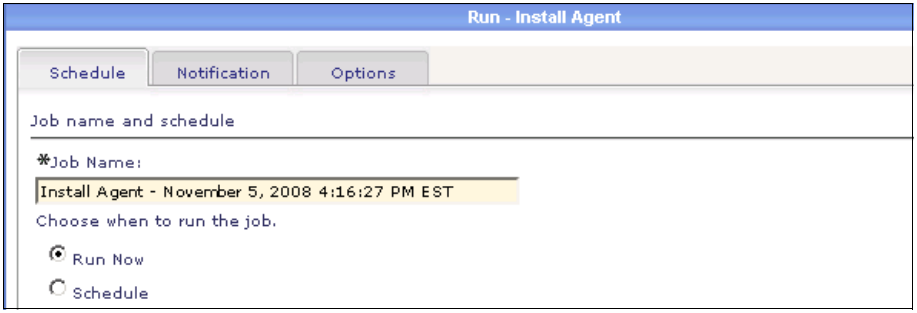


Figure 17-39 Install Agent IBM Systems Director job

8. Click **OK** to save the job.

If the job is created successfully, a message is displayed on the page from which you started the Scheduler. If the job creation fails, a message is displayed in the Run window so that you can correct the job, as seen in Figure 17-40.

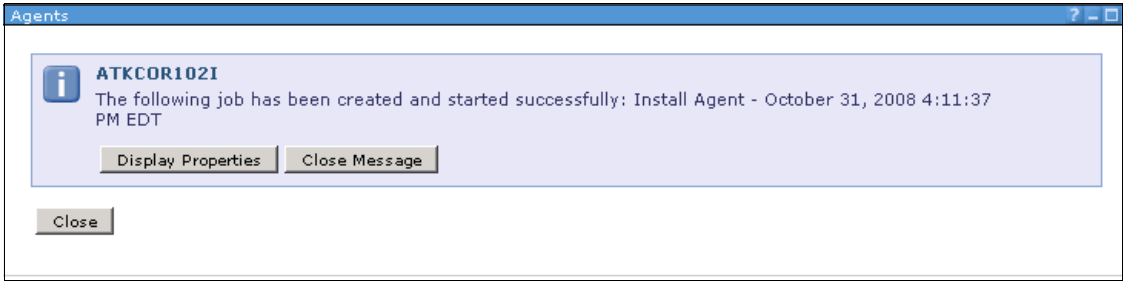


Figure 17-40 Install agent job is created

The job created by the Agent Installation Wizard will transfer the agent self-extracting script and the agent response file into the `/tmp` directory on the target system. After the files are copied, the installation file sets are extracted into the /tmp/extract_XXXXXX directory and installed. The files are then removed after a successful installation.

You must ensure that there is sufficient space on the target system to copy the self-extracting script and extract the file sets. Refer to the space requirements as specified in “Hardware requirements for systems running Common Agent or Platform Agent” at the following IBM Systems Information Center link:

`http://infocenterdev2.raleigh.ibm.com:8090/help/topic/director.plan_6.1/fqm0_r_supported_hardware_and_software_requirements.html`

You can view the status of the agent installation job by clicking **Task Management** → **Active and Scheduled Jobs**, as you can see in Figure 17-41.

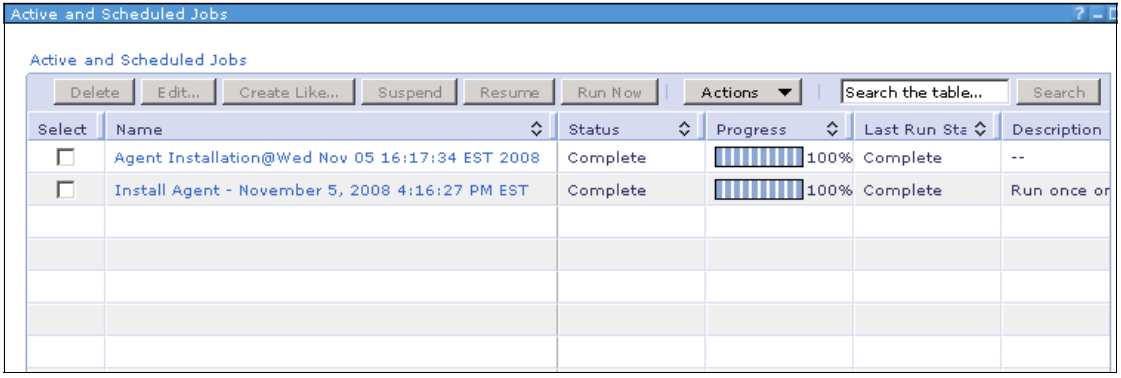


Figure 17-41 Agent successfully installed from the Installation Wizard

As you can see in Figure 17-42, now the Common Agent is installed in the system selected. In this case the Windows 2003 EE with VMware VirtualCenter was an agentless system.

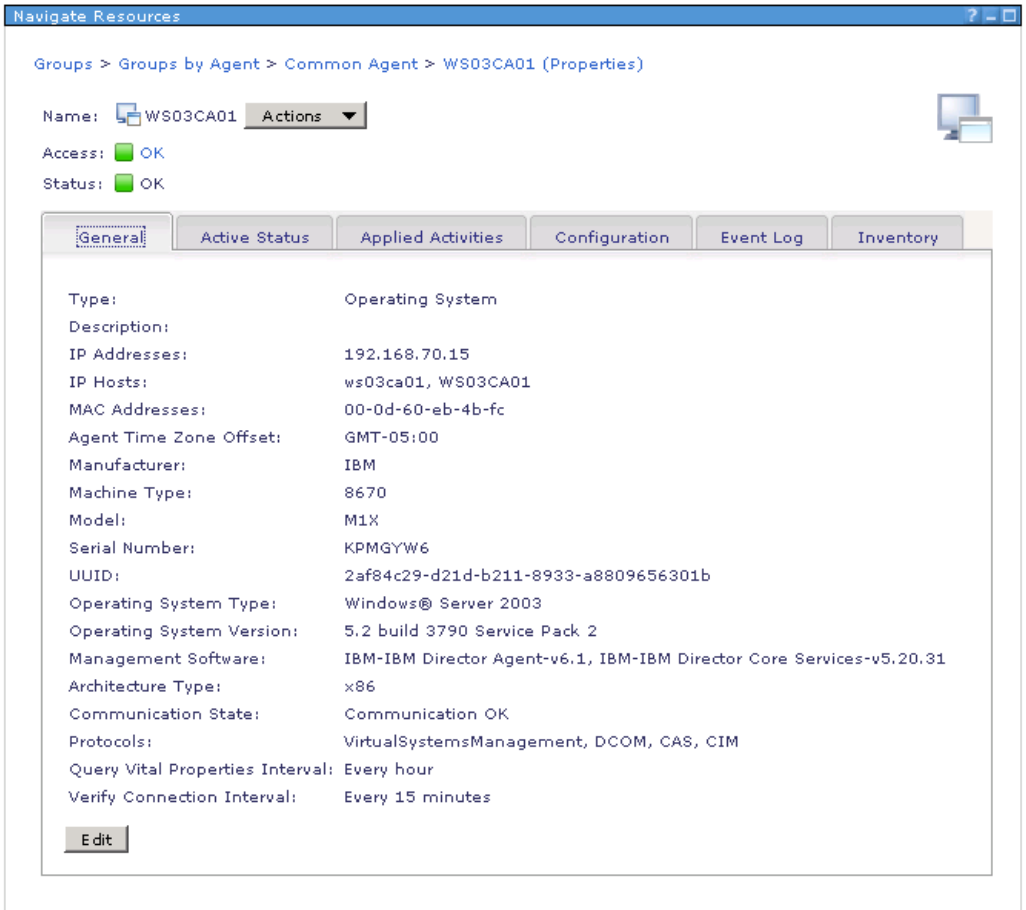


Figure 17-42 Common Agent installed in a Virtual Center 2.5: DCOM, CAS, and CIM are the protocols managing the machine

Pushing the Virtualization Manager subagents

You can access and install Virtualization Manager subagents from the Release Management section of the IBM Systems Director Web interface.

In the case of this scenario the Common Agent in the VMware Virtual Center is already installed on the system and we plan to install the IBM Systems Director Virtualization Manager subagent to be able to manage the ESX hosts.

To install the IBM Systems Director Virtualization Manager subagent on the Virtual Center or any other host system using the installation wizard:

1. In the IBM Systems Director navigation pane, expand **Release Management**, as shown in Figure 17-43.

Figure 17-43 Release Management function from the main panel

2. Click **Agents**.
3. On the Agents page, click **Common Agent Subagent Packages**. Figure 17-44 appears.

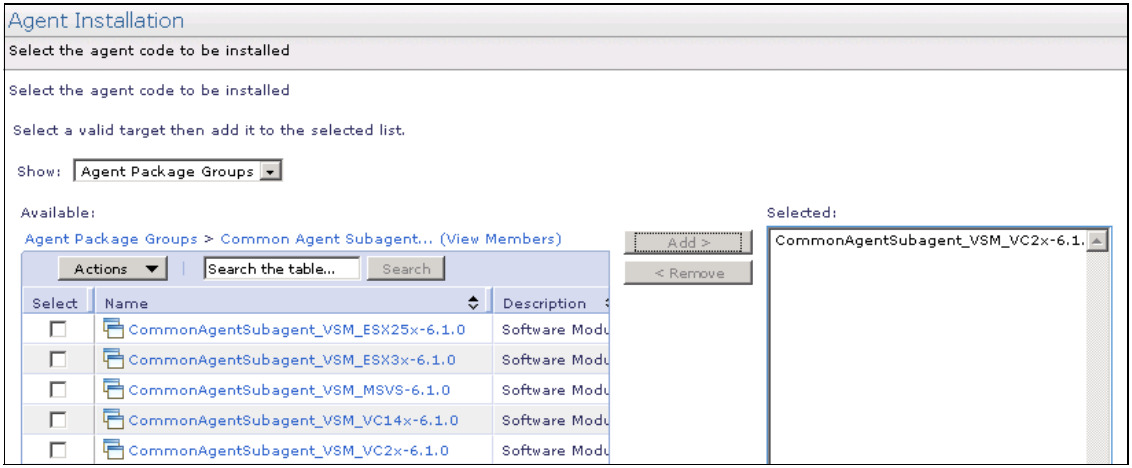


Figure 17-44 Selecting an ESX3x Common Agent package to be installed

4. From the Common Agent Subagent Packages view, select the subagent that you want to install. You can choose from the following list of subagent packages:
   - Subagent for VMware ESX Server 3.x and 3.5.x CommonAgentSubagent_VSM_ESX3x-6.1.0
   - Subagent for Microsoft Virtual Server CommonAgentSubagent_VSM_MSVS-6.1.0

- Subagent for VMware VirtualCenter 1.4.x
  CommonAgentSubagent_VSM_VC14x-6.1.0
- Subagent for VMware VirtualCenter 2.x and 2.5.x
  CommonAgentSubagent_VSM_VC2x-6.1.0

Note: Xen hosts do not require a Virtualization Manager subagent to be installed. All Xen virtual server management capabilities are provided through the Platform Agent (which includes the Xen CIM Provider, and it is installed automatically only when a Xen kernel is detected in a Platform Agent target).

5. When you have selected the subagent that you want to install, click **Actions** from the menu bar and select **Release Management** → **Install Agent**.
6. Complete the instructions in the installation wizard to install the appropriate Virtualization Manager subagent on your host system, as shown in Figure 17-45.

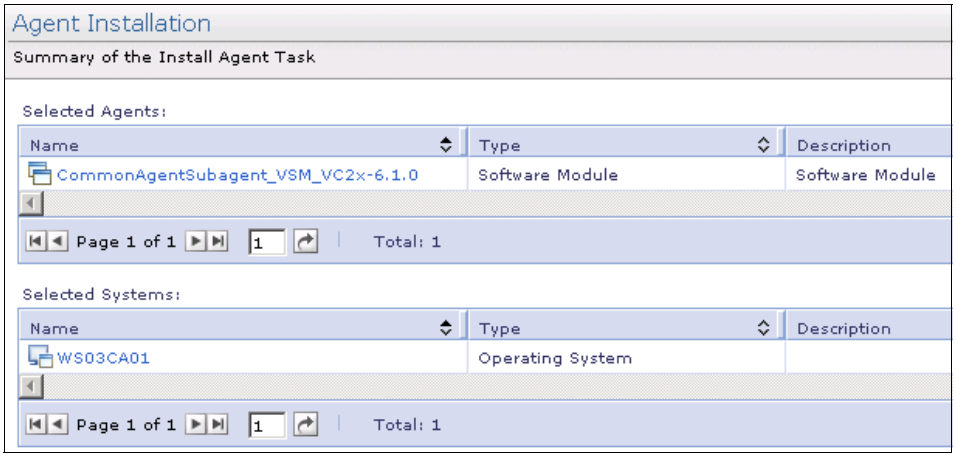


Figure 17-45 Install Sub Agent summary after selecting the package and the target system

7. Verify that the installation has completed in the Active and Scheduled Jobs window, as shown in Figure 17-46.

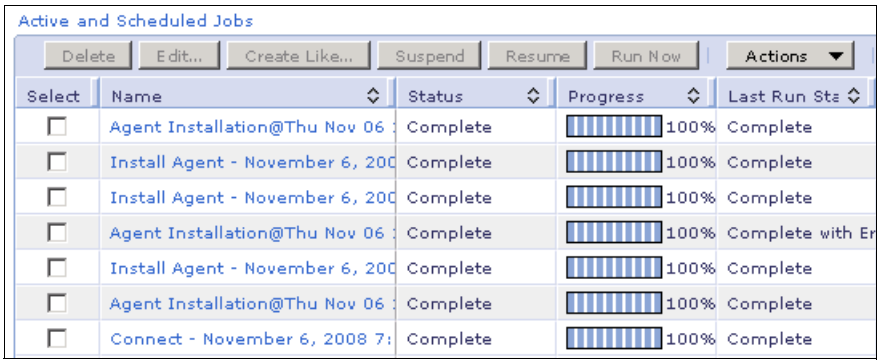


Figure 17-46 Agent installation jobs are completed without errors

8. When the installation is complete, right-click the host system in Navigate Resources window and select **Security** → **Verify Connection**, as seen in Figure 17-47. When this task is complete, you can access Virtualization Manager tasks.

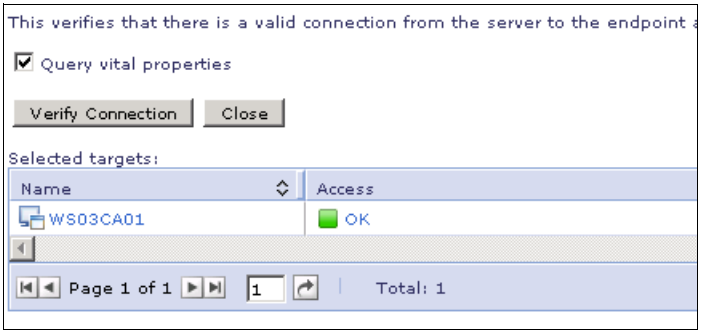


Figure 17-47 Once the agent has its connection verified the Sub Agent must be able to be used

9. Virtualization is now enabled. Verify the properties in the Virtual Center Server (not in the operation system object) and check that your system already has additional properties, as shown in Figure 17-48.

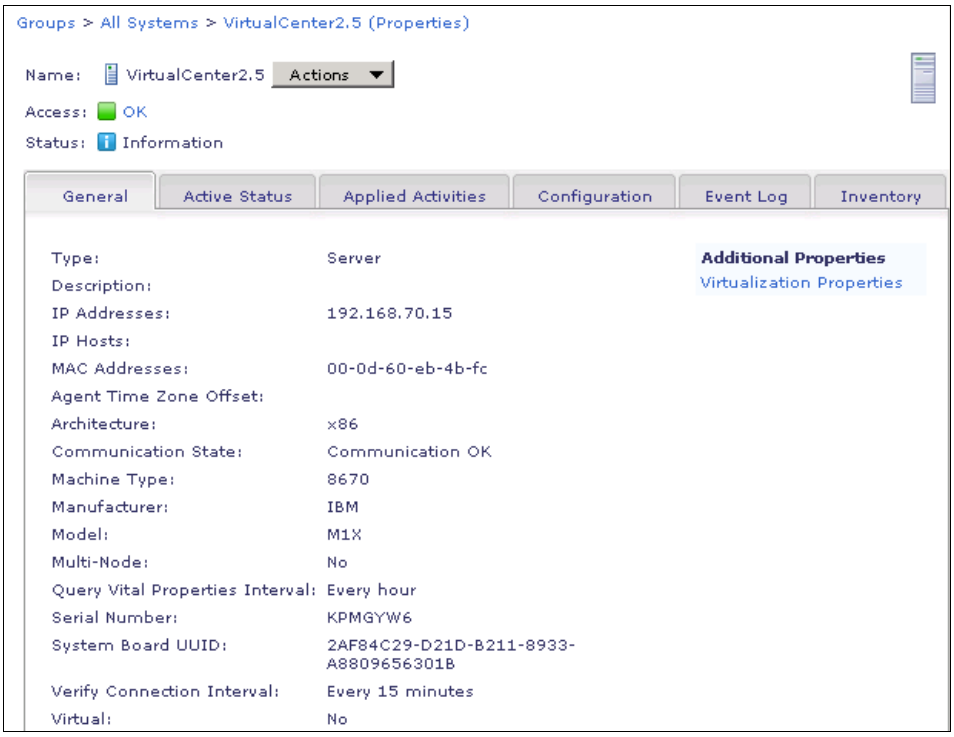


Figure 17-48 Virtual Center Server endpoint properties now have Virtualization Properties

Clicking Virtualization Properties shows a window similar to Figure 17-49.

Figure 17-49 Virtual Center Virtual Properties

For Virtual Center, once you have the ESX hosts added to the Virtual Center and discovered from the IBM Systems Director 6.1 server, you must execute the connect task in the Virtual Center endpoint to let IBM Systems Director manage

the ESX hosts through the sub agent in the Virtual Center, as shown in Figure 17-50

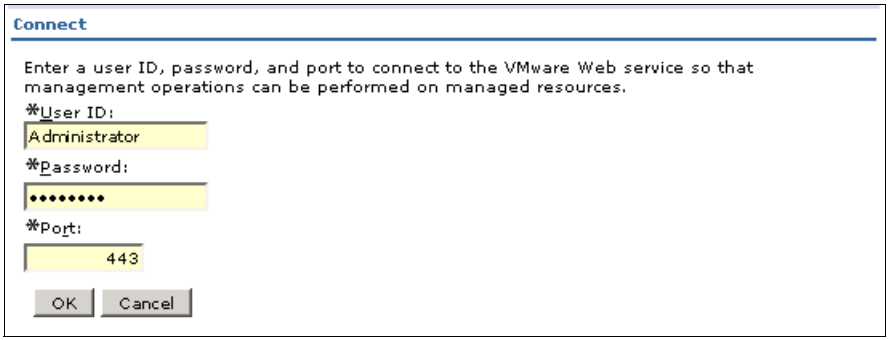


Figure 17-50 Connect to VMware Web service to perform management operation in managed resources

You can also see that, although the ESX Server does not have Virtualization Manager installed, after doing the connect it will have virtualization properties, as shown in Figure 17-51.

Virtualization Properties

Category	Property Name	Property Value
Vendor Information		
	Vendor:	VMware ESX
	Version:	3.5.0
	Vendor URL:	C:\Program Files\VMware\Infrastructure\Virtual Infrastructure Client\Launcher\VpxClient.exe
	Virtualization Parent:	/ITSO Datacenter/host/ITSO Cluster
Processor		
	Physical CPU Count:	4
Memory		
	Memory (MB):	8191
Disk		
	VMFS Volume Labels:	hatteras:storage1
	VMFS Volume Labels:	esxgenstore-3
	VMFS Volume Labels:	esxgenstore-2
	VMFS Volume Labels:	esxgenstore
Network		
	Network Labels:	VM Network
Additional Information		
	Virtual Server Count:	0
	Maintenance Mode:	Off
	Dynamic Relocation Enabled:	true
	Relocation IP Address:	10.1.1.3
	Relocation Gateway:	255.255.255.0
	Relocation Network Label:	VMotion

Figure 17-51 ESX Virtualization Properties in the server endpoint once it is connected to the Virtual Center

Figure 17-52 shows the map view of the virtualized environment.

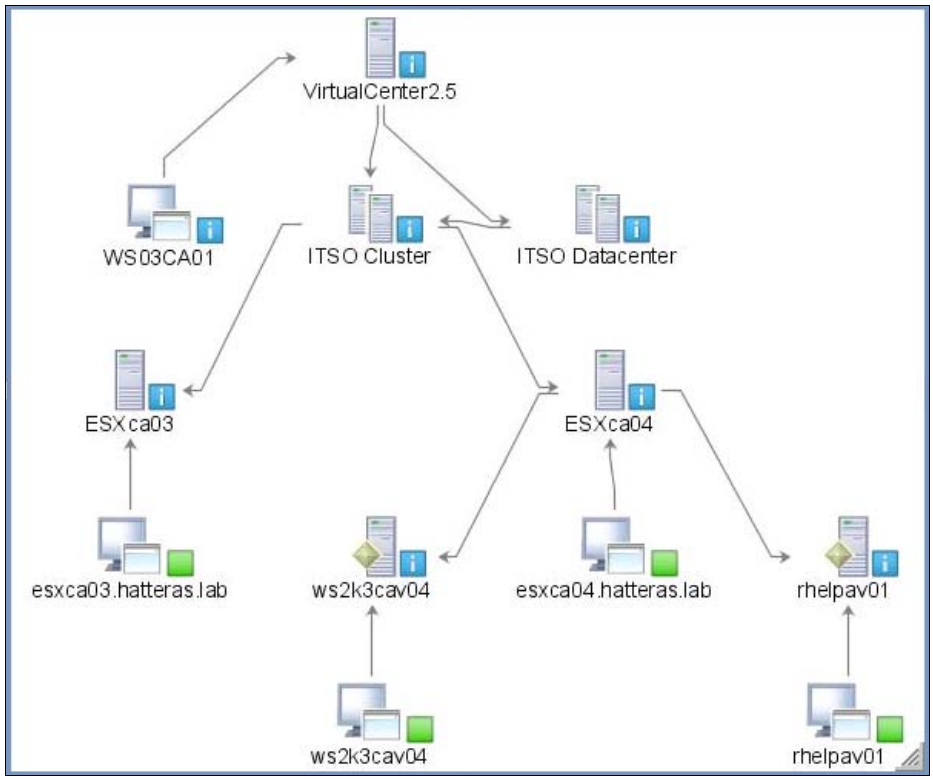


Figure 17-52 Virtual and physical VMware environment managed by IBM Systems Director 6.1 and Virtualization Manager

Now that the simplified Agent Installation Wizard has helped us to install the environment with the required IBM Systems Director products, the customer can start thinking about the particular hardware events that he would like to monitor from IBM Systems Director, such as the Predictive Failure Alert (PFA) events.

A VMware ESX host can indicate that a hardware failure is imminent and, as a result, execute an Event Automation Plan (EAP) driven by Virtualization Manager that would migrate all virtual servers from the effected host to other legal hosts, thereby providing a highly available environment. Other events would also be useful in creating EAPs for virtualized environments, but the ability to receive PFAs would be critically important, since the event is generated before the hardware actually fails.

For more information about this refer to the scenario in 17.6, “Virtualization management” on page 793.

17.5.3 Extending this scenario

If you want to uninstall several ESXs managed by a Virtual Center or any IBM Director 5 Agent in your environment you can discover them into the new IBM Systems Director 6.1, request access, and use the Command Automation IBM Systems Director function to define the uninstall commands needed to clean all the Director 5 Agents easily and install them with the new Common Agent trough the Agent Installation Wizard.

Note: In the case that the Director 5 Agents have installed Virtualization Manager, make sure that you add the required uninstall command for this product extension after stopping the services.

In this particular case you can use the diruninstall script to uninstall Director 5 on a ESX Linux for System x managed by a VMware Virtual Center.

The diruninstall script is located in the *install_root*/bin directory, where *install_root* represents the root directory of your IBM Director installation. In this example we have the path <install_root> as /opt/ibm/director, given that this is the default install path.

By default, this script removes all IBM Director components. You can modify the script to remove specific components.

Note: To uninstall any Director 5 product, you must stop the services first.

- The following command is used to stop the Director 5 Agent:

  ```
  install_root/bin/twgstop
  ```

- The following command is used to uninstall Director 5 Agent and all its components:

  ```
  install_root/bin/diruninstall
  ```

- And a last recommendation to automate this process would be the use of the following command to erase the IBM Director 5 Agent folders and have a clean system:

  ```
  rm -rf /opt/ibm/
  ```

Running a command definition

You can run a command definition using the Command Automation task on the IBM Systems Director 6.1Web interface.

As an alternative to using the Process Management task on the IBM Systems Director Web interface, you can also specify the process task as an action in an event action plan.

To run a process task:

1. In the IBM Systems Director Web interface navigation area, click **Navigate Resources**.
2. Navigate to the resource for which you want to create a Command Automation task, as shown in Figure 17-53.

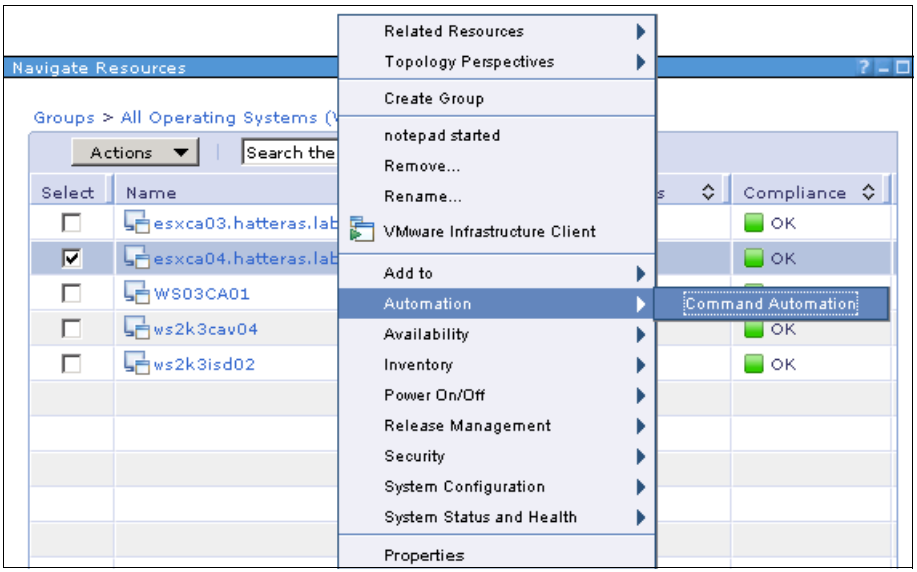


Figure 17-53 Command Automation launched from one of the ESX hosts

3. From the Navigate Resources table, right-click the resource and select **System Status and Health** → **Automation** → **Command Automation**. The Command Automation task is displayed.

4. Select the command definition already created or create a new one (Figure 17-54).

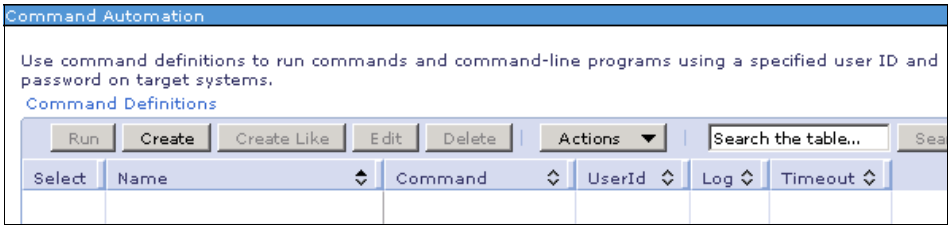


Figure 17-54 Selecting the command definition to run or creating a new one

5. Click **Create**.
6. Specify information about the command-line operation, as shown in Figure 17-55:
   a. In the Command field, type the fully qualified file name and command syntax. In this case we want to stop the Director 5 Agent. Once stopped, we launch the **`diruninstall`** command, and as soon as it finishes the IBM folders stored in the Linux host are deleted.
   b. Select the **Log** check box. This is because the command produces text-based output.
   c. Optional: If you want to run the process using an alternate user account and override the default user ID, you can specify a user ID and password in the Login group box.

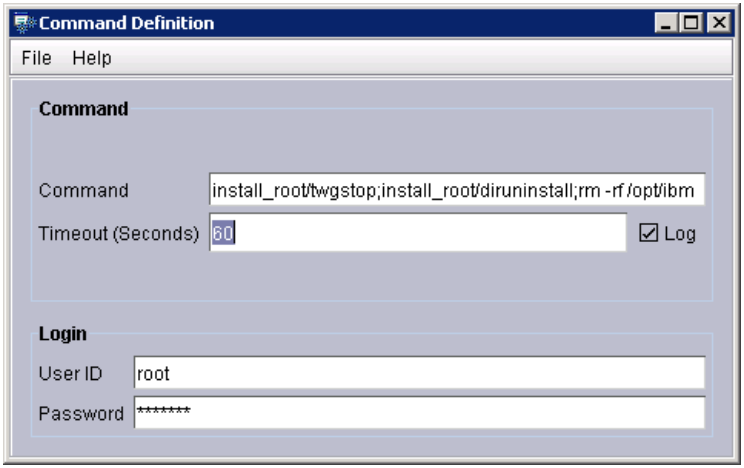


Figure 17-55 Defining a new command definition

7. Click **File** → **Save As** to save the process task.

8. In the Save As window, type a name, as shown in Figure 17-56.

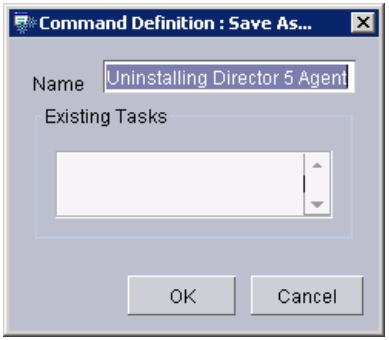


Figure 17-56 Typing the new command definition name

Note: The name for a process task includes the following information:

- Type of the process task that is to be run
- Name of the process task that is to be run
- Types of managed systems with which the process task will work correctly

9. Click **OK**. The new command definition is displayed under Command Automation in the IBM Systems Director Web interface, as shown in Figure 17-57.

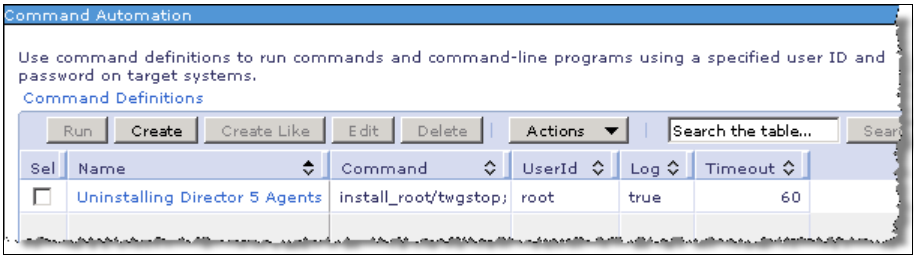


Figure 17-57 The command definition is ready

10. Select the entry and click **Run**.

11. Select the targets on which the job will run, as shown in Figure 17-58.

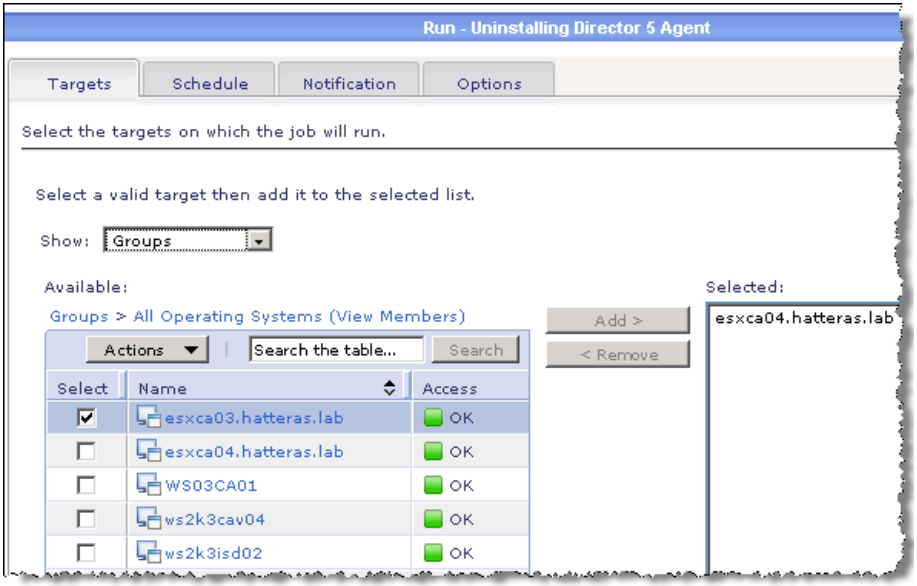


Figure 17-58 ESX targeted to be uninstalled via Uninstalling Director 5 Agent command

12. Click **OK**. Uninstalling Director 5 Agent is executed, as seen in Figure 17-59.

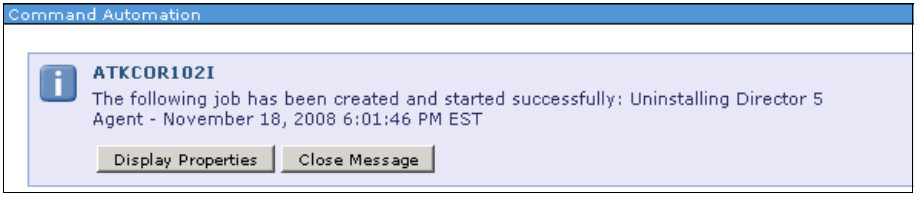


Figure 17-59 Job created from Command Automation is executed in all targeted systems

13. Once the job with the commands defined has been executed and completed, as shown in Figure 17-60, the ESX hosts will be ready to be installed via the Agent Installation Wizard or any other desired installation way.

Figure 17-60 Command automaton job completed

17.6 Virtualization management

A VMware ESX host configured in an IBM Systems Director 6.1 environment can indicate that a hardware failure is imminent and, as a result, execute an Event Automation Plan (EAP) driven by Virtualization Manager. The EAP would relocate all virtual servers from the affected host to other legal hosts, thereby providing a highly available virtualized environment.

Other events would also be useful in creating EAPs for virtualized environments, but the ability to receive PFAs is critically important, since the event is generated before the hardware actually fails.

Objectives:

- This scenario describes the Event Action Plan creation process sensitive to Predictive Failure Alerts in a specific ESX host belonging to a VMotion farm.
- The customer will use an action plan to trigger a preventive action in the hosts doing relocation on the affected virtual load to a safer host among their farm.

17.6.1 The problem

VMware tools offer resource management support for DRS and high availability, but they cannot realize any Predictive Failure Alert until the failure occurs and the virtual servers in the alerting hardware host are affected.

The customer might be running light database applications, Web services, SMTP mail servers, software repositories, or printing services, or a testing bad environment on the virtual servers hosted in the ESX machines, with no way to afford a slowdown in production for IT management reasons.

In this scenario we have two VMware ESX hosts, each with one virtual server. One of these ESX hosts reports failure alerts, and the other ESX host is the *safer* host (able to receive virtual servers from other hosts in trouble and keep them running without trouble). This could work in both directions with the appropriate EAP referring to the other target systems.

17.6.2 The solution

Based on the objectives listed above, we configure EAPs to alert us in the event of problems in our managed environment. This ensures that actions necessary to recover systems are taken immediately, thereby maintaining high availability.

Note: The following example was done with two ESX 3.5.2 hosts and a Virtual Center 2.5, and the IBM Systems Director 6.1 products have been installed as described in Chapter 4, “Installation and configuration” on page 163, and 17.5, “Unattended installation” on page 769.

Only one of the two EAPs required a fully automated PFA action plan, which is detailed in this section and will be applied to the ESXca03 sever. The second EAP has a different targeted ESX host to sense the PFA event and a different safer host in the relocation plan.

We proceed with through the following steps:

1. Prerequisites
2. Creating the EAP
3. FPA event arrivals and verification of the EAP results

Prerequisites

We assume that you have set up the following:

- The ESX host and virtual servers are installed and discovered in IBM Systems Director 6.1, as highlighted in Figure 17-61.

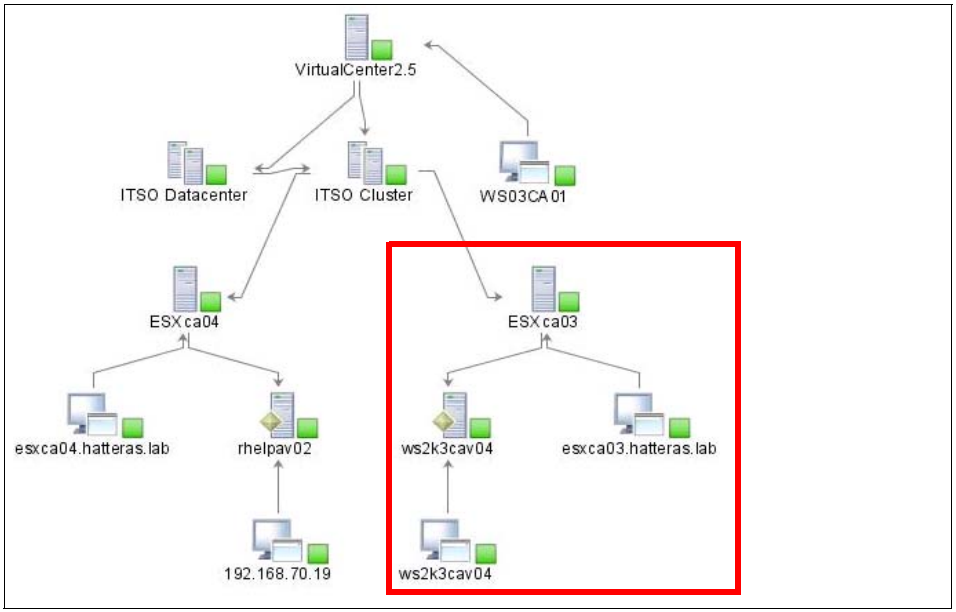


Figure 17-61 VMware environment is discovered in IBM Systems Director server

- Virtualization Manager metrics are working for the ESX host and virtual servers. You can verify this in the Virtual Server and Host view, as in Figure 17-62.

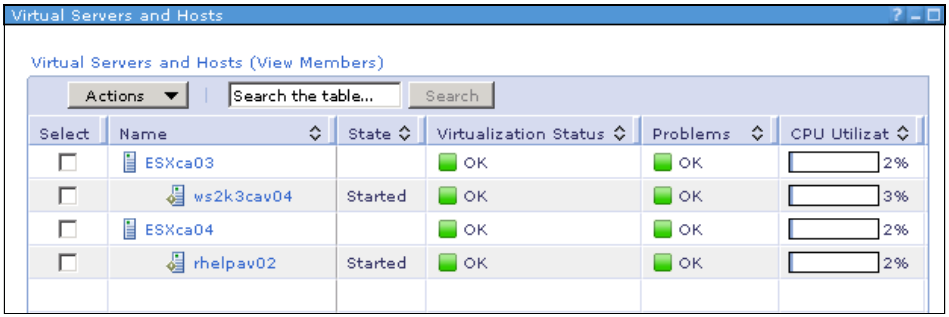


Figure 17-62 Virtualization Manager metrics available in the managed resources

Create the automation plan using the EAP wizard

To create the Event Automation Plan:

1. From the navigation tree click **Automation Plans**, as shown in Figure 17-63.

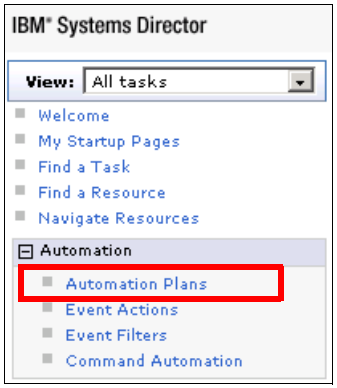


Figure 17-63 Launch EAP wizard from the navigation tree

2. Click **Create** to launch EAP wizard, as shown in Figure 17-64.

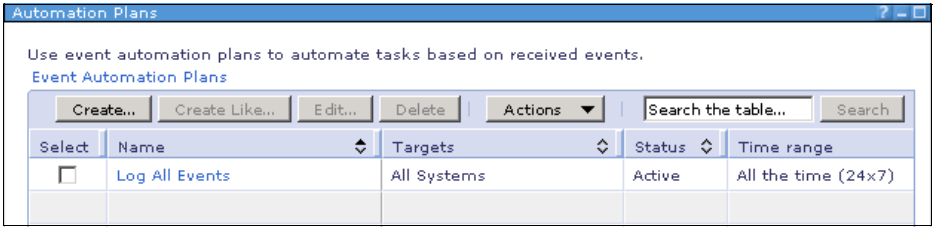


Figure 17-64 Create a new EAP or create it like another already created EAP

3. Click **Next** on the Welcome panel, as shown in Figure 17-65.

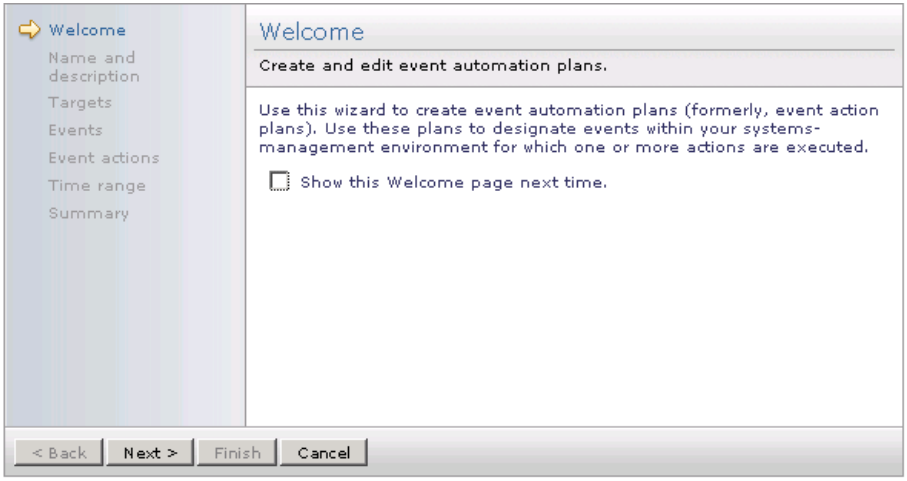


Figure 17-65 EAP Welcome panel

4. Enter an EAP name and description, as shown in Figure 17-66.

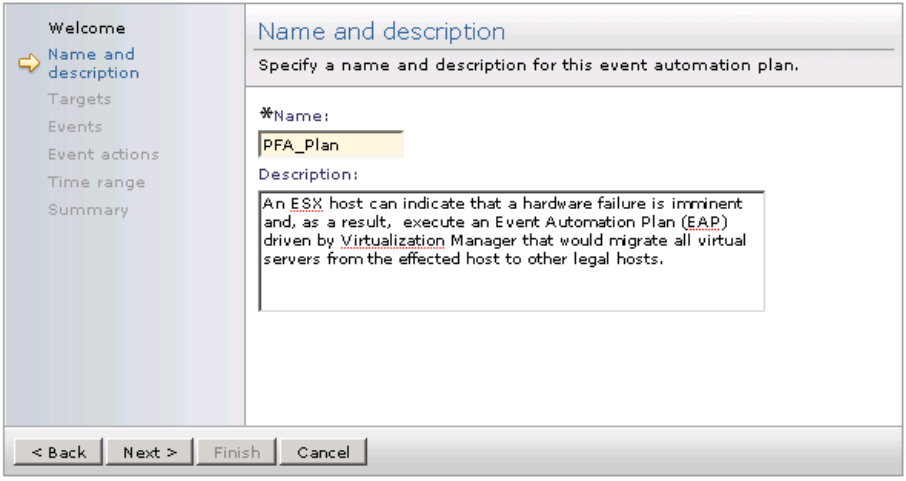


Figure 17-66 Specify a name and description

5. Select the target system that will generate the FPA alert. We select the ESXca03 Host Server Managed End Point (MEP). Make sure to select this and not the operating system MEP, as shown in Figure 17-67.

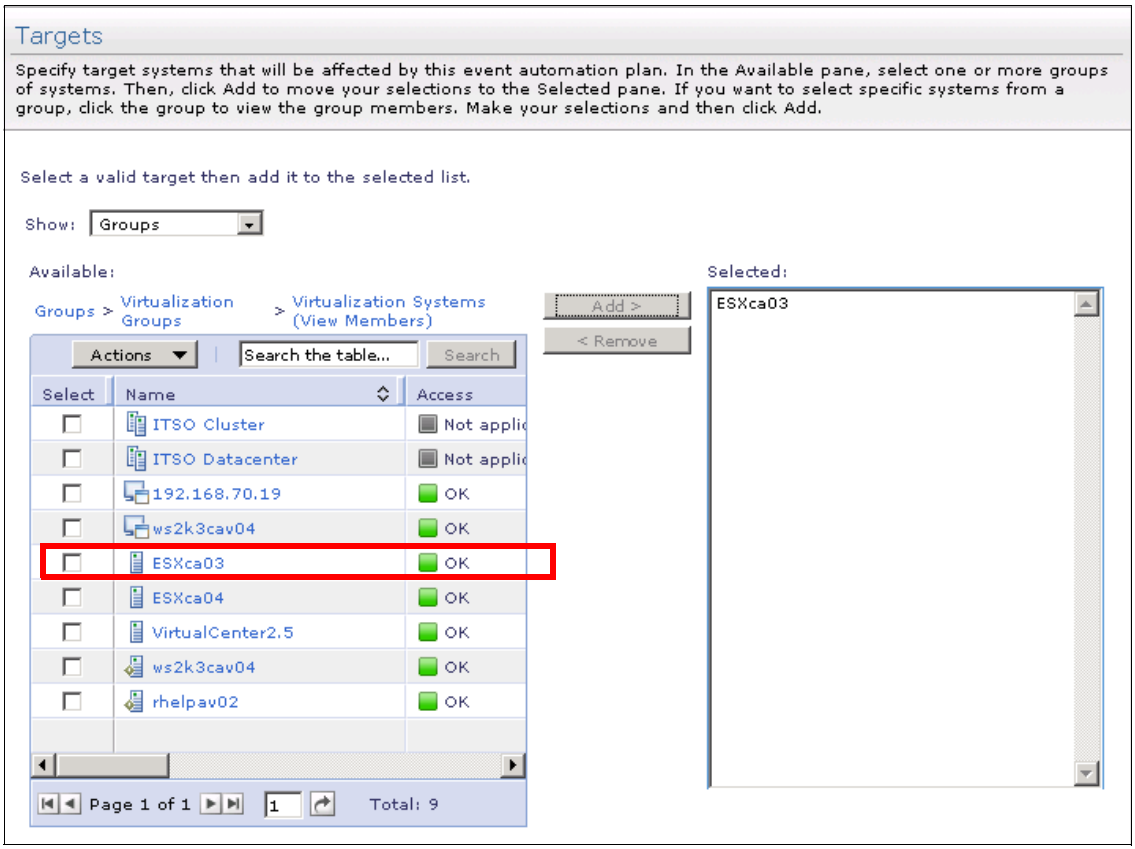


Figure 17-67 Select the target system to be monitored (we will catch its FPA alerts)

Note: You must make sure that the correct target is selected. It must be a valid Server MEP that is showing Virtualization Manager metrics in the virtual server and host view.

6. Now we select the event filter. Select **Advanced Event Filters** from the Events drop-down, as shown in Figure 17-68. Click **Next**.

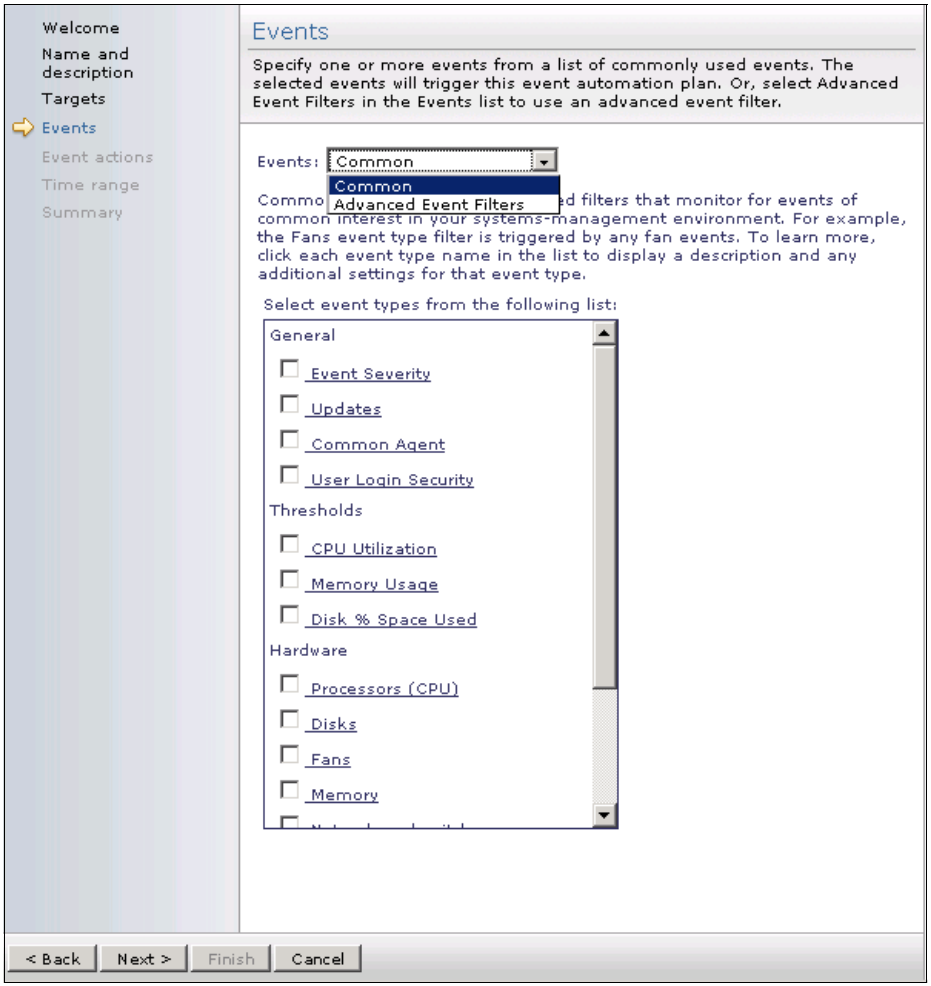


Figure 17-68 Select advanced event filter

7. On the Advanced Events Filter panel, select **Hardware Predictive Failure Alert events**, as shown in Figure 17-69. Click **Next**.

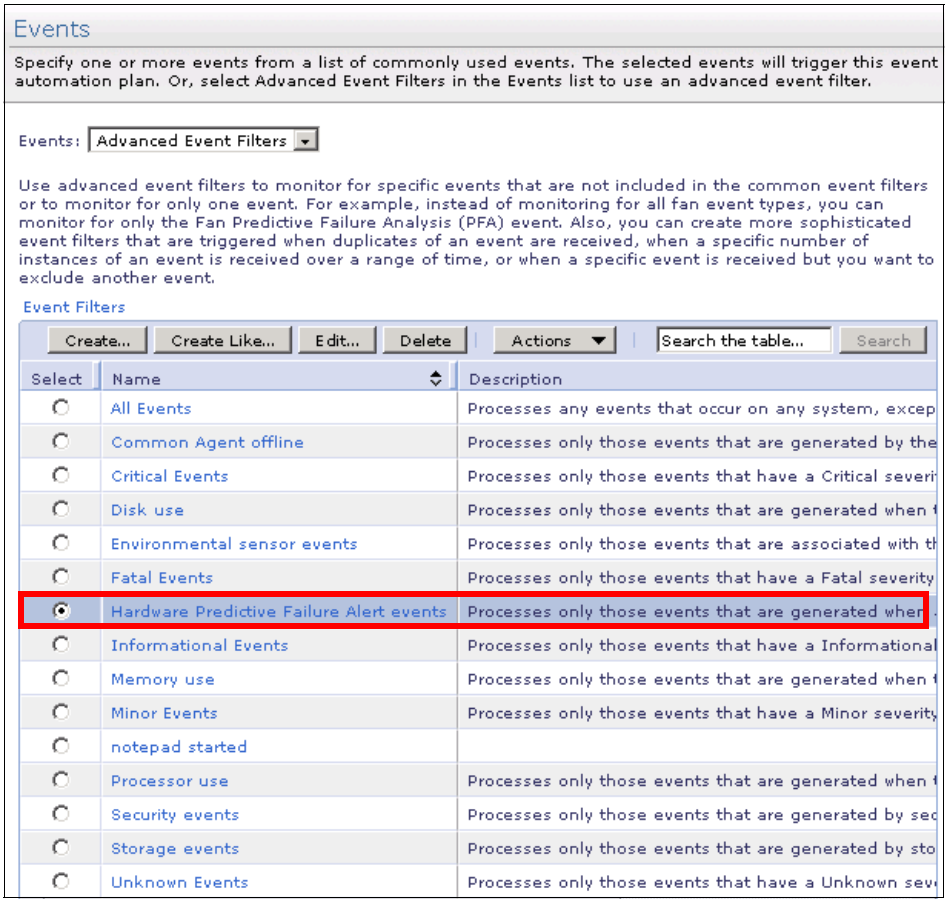


Figure 17-69 Selecting the hardware PFA event filter

8. Now we create the event action. Click the **Create** button to create a new Event Action, as shown in Figure 17-70.

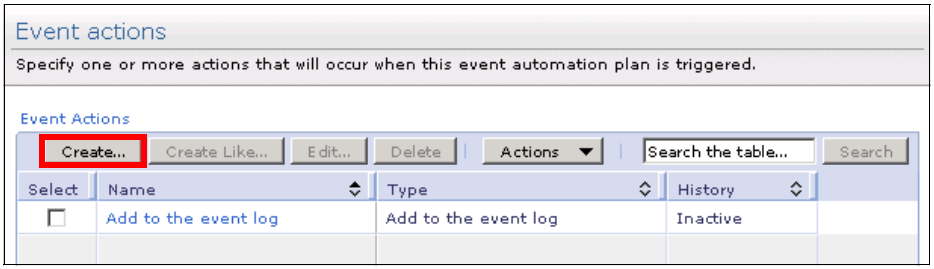


Figure 17-70 Pick an already created Event Action or create a new one

9. Select the **Start a task on a specified system that generated the event** action and click **OK**, as seen in Figure 17-71.

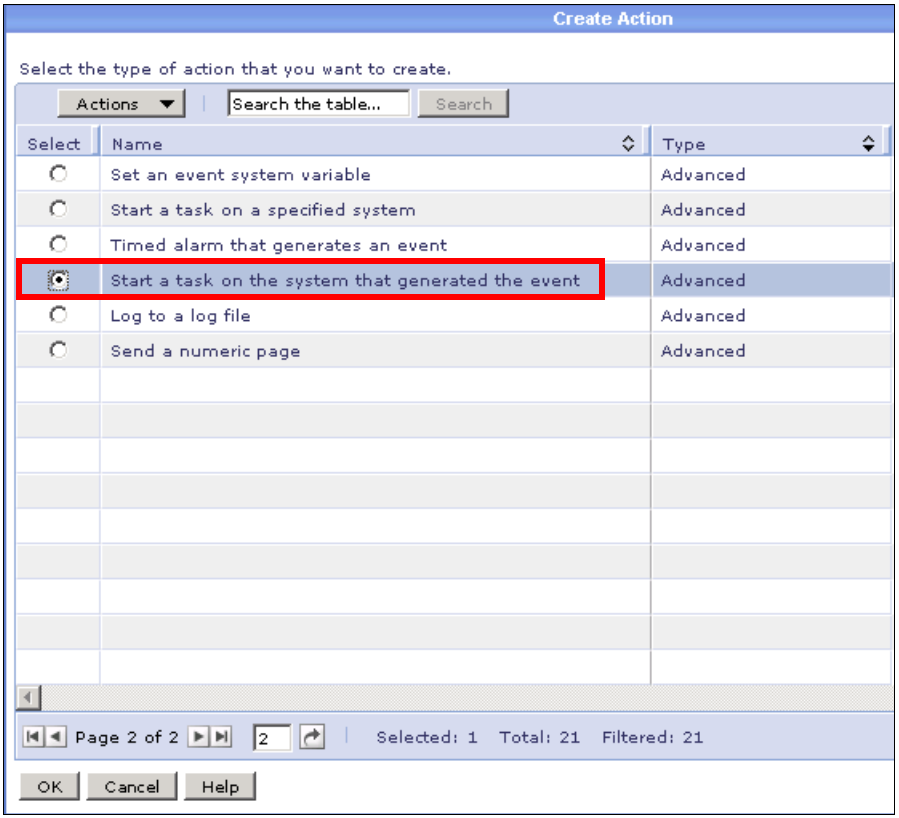


Figure 17-71 Select type of action that you want to create

As discussed in 12.7.9, “Relocating virtual servers” on page 623, we can create relocation plans and store them for use them in the future. In this example we assume that there is an relocation plan already created that will relocate (migrate) all the virtual servers in the ESX host target.

If you want to send virtual servers to two or more *safer* target hosts, there should exist a customized relocation plan for each one of those targets to be triggered by the same event action plan.

The relocation plan is that ESXca03 will migrate all the virtual servers to ESXca04, as you can see in Figure 17-72.

Figure 17-72 We have an already created Relocation Plan stored

10. The Customize Action panel is shown. Select the relocation plan predefined listed in the drop-down Customize Action menu, as shown in Figure 17-73.

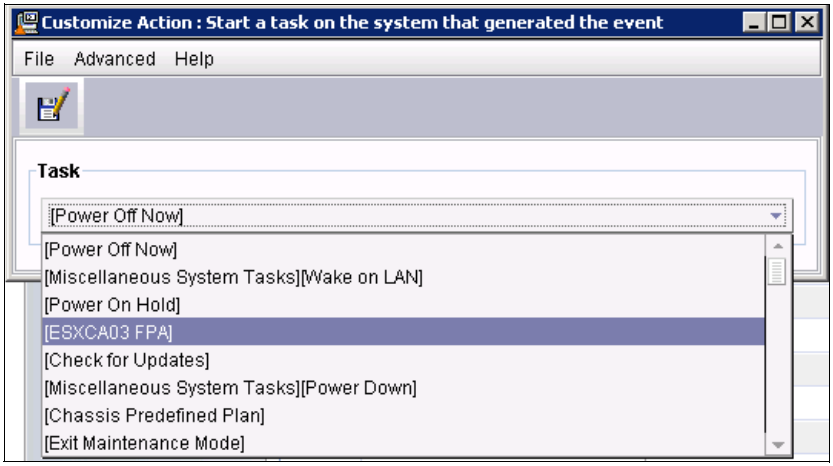


Figure 17-73 Selecting the relocation task defined in the relocation plan

11. Save the event action with a descriptive name and click **OK**, as shown in Figure 17-74.

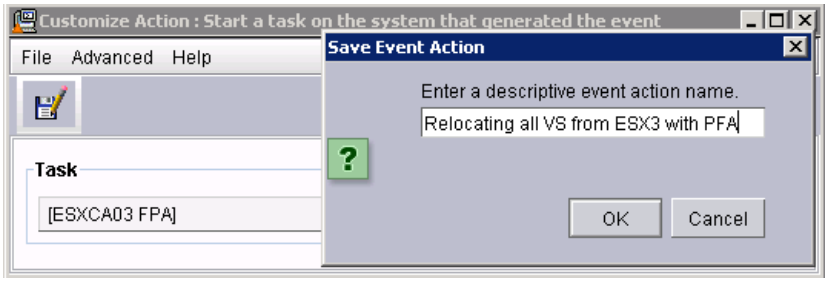


Figure 17-74 Event action plan name

12. Select the newly created event action on the Event Action panel, as shown in Figure 17-75, and click **Next** to keep walking through the wizard.

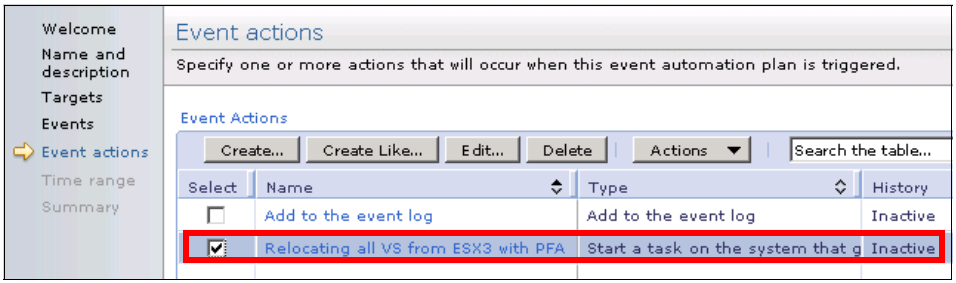


Figure 17-75 Selecting the event action in the EAP wizard

13. Since the PFA time range cannot be modified, as shown in Figure 17-76, click **Next**.

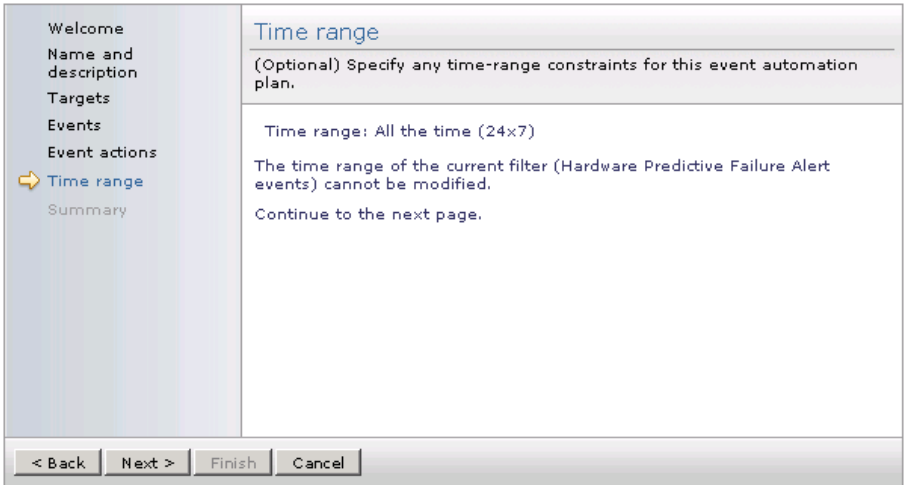


Figure 17-76 The time range panel is shown in the wizard

14. Verify the summary. Check the box **Enable this Event Automation Plan when I click Finish**, as shown in Figure 17-77.

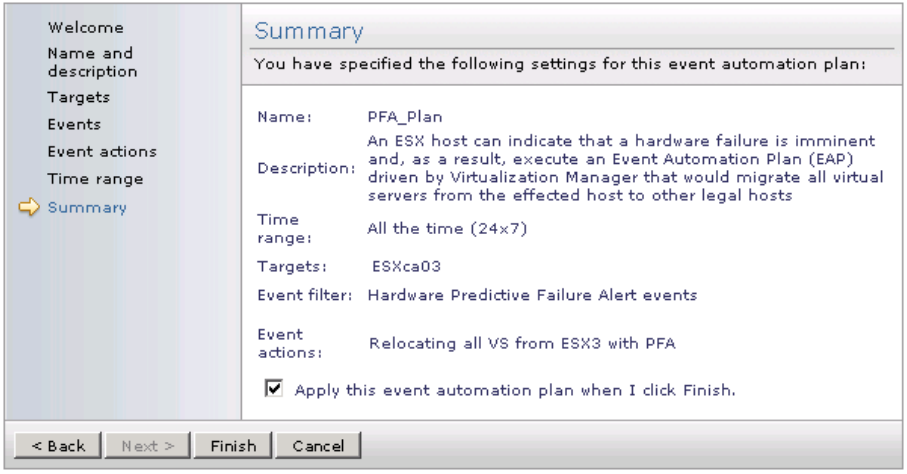


Figure 17-77 Event Automation Plan summary settings

15. Click **Finish**.

Now we have EAP created, activated, and ready to catch a PFA event from the ESXca03, as seen in Figure 17-78. When a PFA occurs, an event will be created that will match the event filter and thus trigger the event action specified in the EAP that we just created.

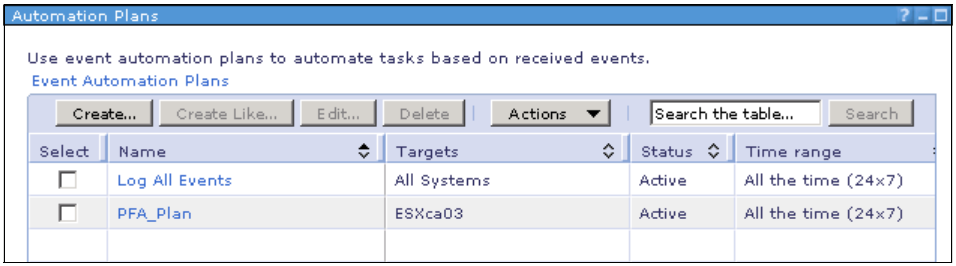


Figure 17-78 The new EAP is stored in the Automation Plans list

The EAP has properties that must match with the settings shown in the summary panel, as seen in Figure 17-79.

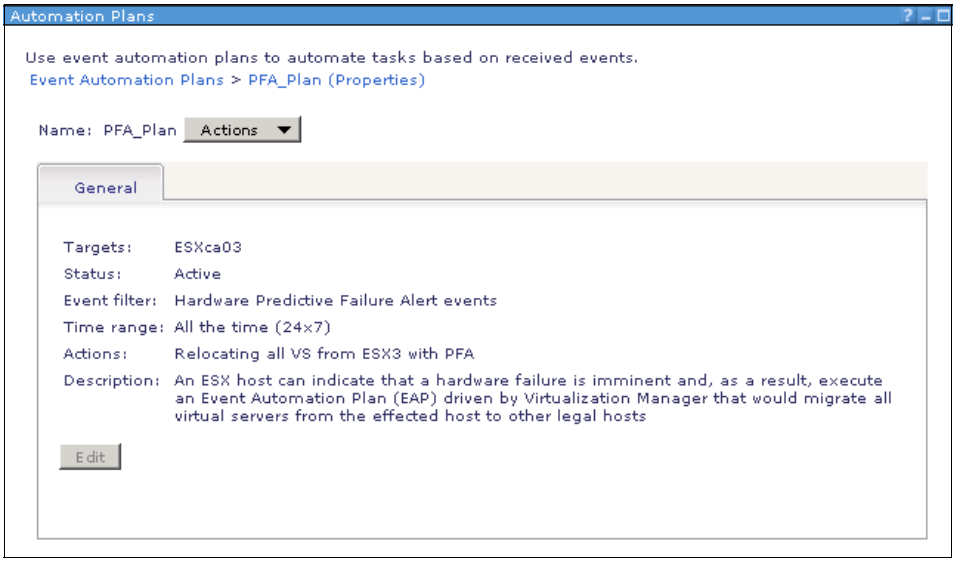


Figure 17-79 EAP properties

When the PFA event arrives

In the following example, the PFA event is Memory PF Event, as shown in Figure 17-80.

Figure 17-80 PFA event arrived to the IBM Systems Director server event log

The details of the event are shown in Figure 17-81.

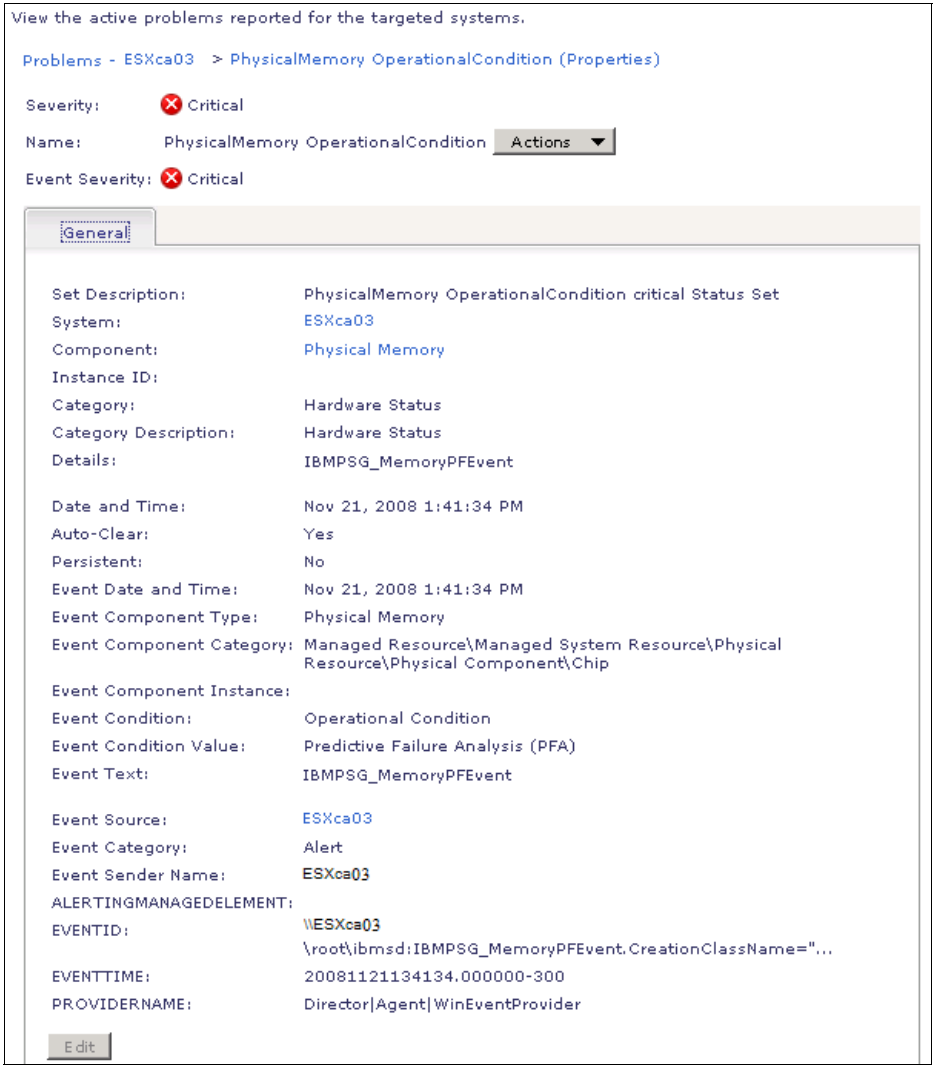


Figure 17-81 PFA event properties

As soon as this event arrived, the status manager display a critical icon in the severity column, alerting us and starting the EAP activities. The blue information icon displayed in the Virtualization Status column (Figure 17-82) reminds us that as soon as the relocation is finished, the ESX host affected will enter maintenance mode. This is shown in Figure 17-83.

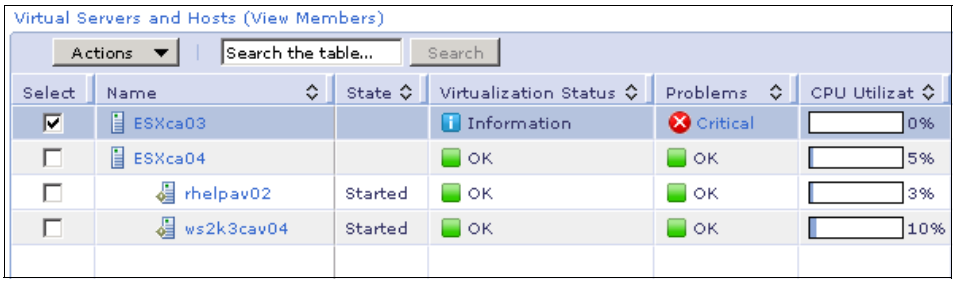


Figure 17-82 Hosts reflecting current status and virtual servers being migrated

In the Virtualization Status column select the information icon to display the name and the details of the problem exported for the target system. You then see Figure 17-83.

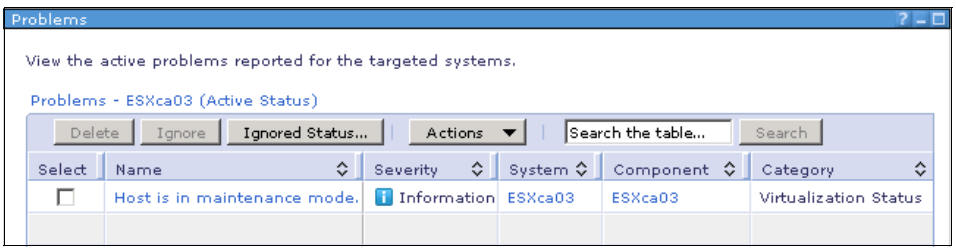


Figure 17-83 The affected host entered maintenance mode

Note: If you ignore or delete the *host is in maintenance mode* event from the host problem list, you will not be able to determine that the host is in maintenance mode. This is the only way to determine this status.

The IT staff might not be aware of this situation, but the common services that they used to have are running without any problem because IBM Systems Director with an Event Automation Plan has already taken care of the imminent failure in the monitored host by relocating all the virtual servers to the safer host, as shown in Figure 17-84.

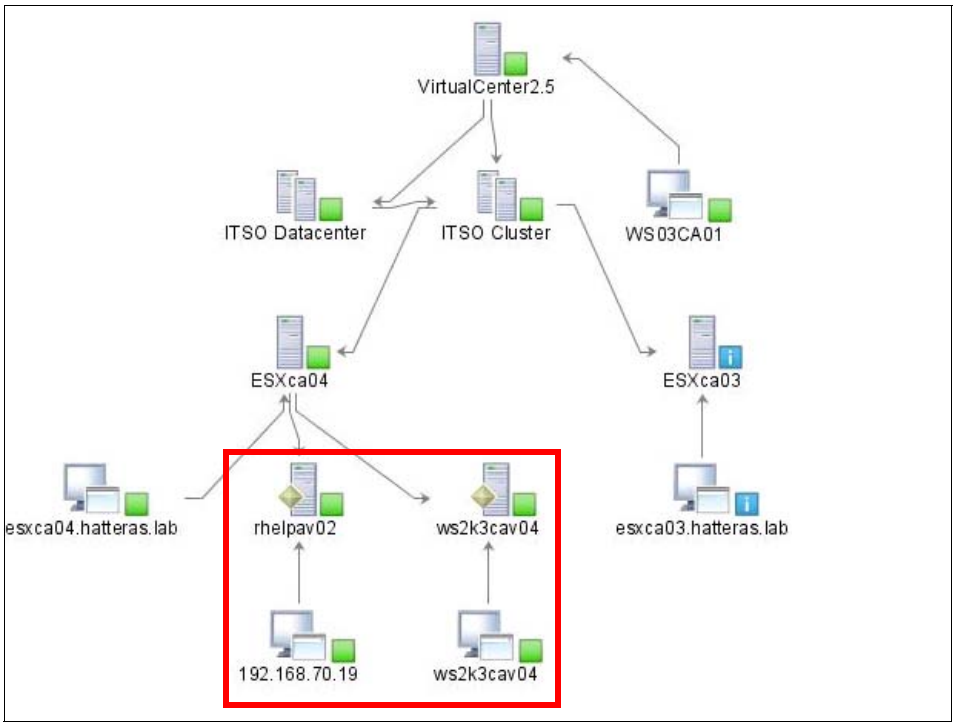


Figure 17-84 Virtualization load migrated to safer host: ESXca03 in maintenance mode

17.6.3 Extending this scenario

This scenario could be extended to any number of host machines. (Each one must have its own Event Automation Plan properly set and pointing the relocation targets to another host_.

Abbreviations and acronyms

AEM	Active Energy Manager
AES	Advanced Encryption Standard
AMM	Advanced Management Module
ANSI	American National Standards Institute
API	Application programming interface
ASCII	American Standard Code for Information Interchange™
ASF	Alert Standard Format
ASIC	Application-specific integrated circuit
ASMA	Advanced System Management Adapter
BC	BladeCenter
BIOS	Basic input output system
BMC	Baseboard Management Controller
BOFM	BladeCenter Open Fabric Manager
BOS	Base Operating System
BPC	Bulk Power Control
CA	Certification Authority
CAS	Column address strobe
CD	Compact disk
CHAP	Challenge-Handshake Authentication Protocol
CIM	Common Information Model
CIMOM	Common Information Model Object Manager
CLI	Command-line interface
CLP	Command Line Protocol
CPC	Central processor complex
CPU	Central processing unit
CSR	Certificate Signing Request
CTS	Clear to send
DB	Database
DBMS	Data base management system
DCOM	Distributed Component Object Model
DEA	Data Encryption Algorithm
DES	Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol
DIP	Development-Integration-Production
DMI	Desktop Management Interface
DMTF	Distributed Management Task Force
DOS	Disk operating system
DRS	Distributed Resource Scheduler
DSA	Digital Signature Algorithm
EAP	Event Action Plan
EFI	Extensible Firmware Interface
ESA	Electronic Service Agent
ESS	Enterprise Storage Server
EST	Eastern standard time
FC	Fibre Channel
FIPS	Federal Information Processing Standard
FRU	Field replaceable unit
FTP	File Transfer Protocol
GA	General availability
GB	Gigabyte

GUI	Graphical user interface
HA	High availability
HD	High definition
HMC	Hardware Management Console
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
I/O	Input/output
IBM	International Business Machines
ID	Identifier
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IMAPI	Image Mastering Application Programming Interface
IP	Internet Protocol
IPC	Interprocess communication
IPMI	Intelligent Platform Management Interface
IRC	Integrated RAID Controllers
ISD	IBM Systems Director
ISO	International Organization for Standards
IT	Information technology
ITESO	Instituto Tecnológico y de Estudios Superiores de Occidente
ITSO	International Technical Support Organization
IVM	Integrated Virtualization Manager
JAAS	Java Authentication and Authorization Service
JCE	Java Cryptography Extension
JDBC	Java Database Connectivity
JRE	Java Runtime Environment
JWS	Java Web start
KVM	Keyboard video mouse
LAN	Local area network
LDAP	Lightweight Directory Access Protocol
LED	Light emitting diode
LPAR	Logical partitions
MAC	Media access control
MB	Megabyte
MEP	M
MIB	Management information base
MPCLI	Management processor command line interface
MS	Microsoft
MSI	Microsoft Installer
MSN	Microsoft Network
MSVS	Microsoft Virtual Server
NIC	Network interface card
NIM	Network Installation Management
NIST	National Institute of Standards and Technology
NNTP	NetNews transfer protocol
NSA	National Security Agency
OS	Operating system
OSD	On window display
PAM	Pluggable authentication module
PC	Personal computer
PCL	Platform Component Library
PDF	Portable Document Format
PE	Preinstallation Environment
PET	Platform Event Trap
PFA	Predictive Failure Analysis
PIN	Personal identification number
PTF	Program temporary fix

PXE	Preboot eXecution Environment
RAID	Redundant array of independent disks
RBAC	Role Based Access Control
RDC	Remote Desktop Connection
RDM	Remote Deployment Manager
RDP	Remote Desktop Protocol
RHEL	Red Hat Enterprise Linux
RPC	Remote procedure call
RPM	Red Hat Package Manager
RSA	Remote Supervisor Adapter
RSS	Receive-side scaling
SAN	Storage area network
SAP	Service access point
SAS	Serial-attached SCSI
SCM	Supply Chain Management
SDK	Software Developers' Kit
SIM	Systems Insight Manager
SLES	SUSE Linux Enterprise Server
SLP	Service Location Protocol
SM	Subnet Manager
SMASH	Systems Management Architecture for Server Hardware
SMBIOS	System management BIOS
SMI	Structure of Management Information
SMI-S	Storage Management Initiative - Specification
SMIT	System Management Interface Tool
SMS	System Management Services
SMTP	Simple mail transfer protocol
SNIA	Storage Networking Industry Association
SNMP	Simple Network Management Protocol
SP	Service processor
SQL	Structured Query Language
SSH	Secure Shell
SSL	Secure Sockets Layer
SSO	Single sign-on
TAP	Telocator Alphanumeric Protocol
TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TFTP	Trivial File Transfer Protocol
TME	Tivoli Management Environment
TPC	Transaction Processing Performance Council
TPM	Trusted Platform Module
TTL	Time to live
UDP	User datagram protocol
UEFI	Unified Extensible Firmware Interface
UI	User interface
UIM	Upward integration module
URL	Uniform Resource Locator
VC	VirtualCenter
VIOS	Virtual I/O Server
VM	Virtual machine
VNC	Virtual Network Computing
VPN	Virtual private network
VSM	Virtual Systems Management
WBEM	Web-Based Enterprise Management
WMI	Windows Management Instrumentation
WWN	World Wide Name
XML	Extensible Markup Language

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this book.

IBM Redbooks publications

For information about ordering these publications, see “How to get Redbooks” on page 816. Note that some of the documents referenced here may be available in softcopy only.

- *Tuning IBM System x Servers for Performance*, SG24-5287
- *Integrating IBM Director with Enterprise Management Solutions*, SG24-5388
- *IBM eServer xSeries and BladeCenter Server Management*, SG24-6495
- *Virtualization on the IBM System x3950 Server*, SG24-7190

Product publications

Documentation on the use of IBM Systems Director is available through the IBM Systems Director Information Center:

`http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html`

The following product publications are also available for IBM Systems Director:

- *Release Notes*
- *Hardware and Software Support Guide*
- *Planning, Installation, and Configuration Guide for AIX*
- *Planning, Installation, and Configuration Guide for IBM i*
- *Planning, Installation, and Configuration Guide for Linux on Power Systems*
- *Planning, Installation, and Configuration Guide for Linux on x86*
- *Planning, Installation, and Configuration Guide for Linux on System z*
- *Planning, Installation, and Configuration Guide for Windows*
- *Systems Management Guide*

- *Troubleshooting Guide*
- *Events Reference*
- *Commands Reference*
- *Hardware Command Line User's Guide*

These are available online from the IBM Systems Director Information Center:

http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_r_pubs_and_related_info.html

Online resources

These Web sites are also relevant as further information sources:

- IBM Systems Director home page

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- IBM Systems Director downloads

  http://www.ibm.com/systems/management/director/downloads/

- IBM Systems Director Information Center

  http://publib.boulder.ibm.com/infocenter/systems/topic/director_6.1/fqm0_main.html

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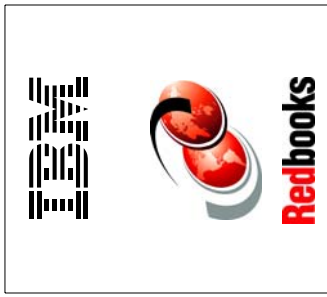

Implementing IBM Systems Director 6.1

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Detailed rationale for the use of each management operation

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