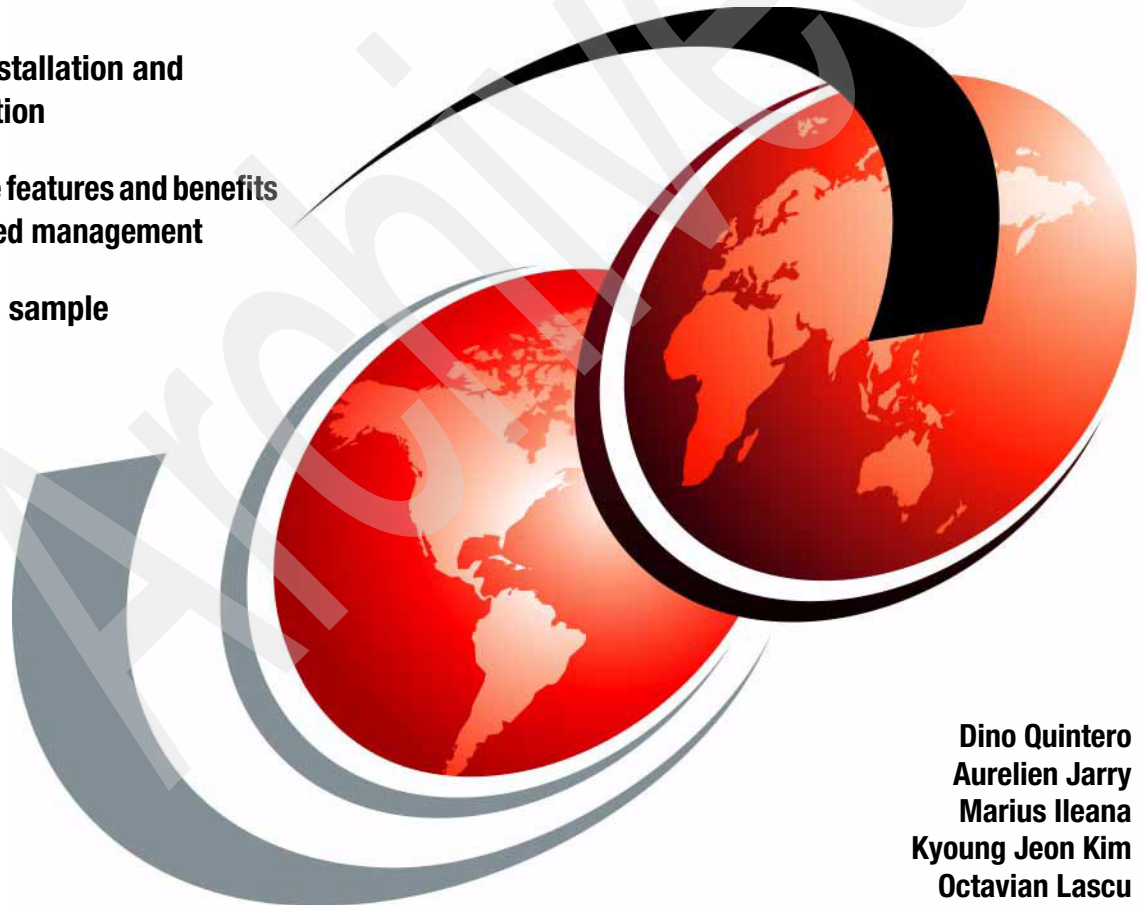# IBM Director on System p5

- **Includes installation and administration**

- **Explains the features and benefits of centralized management**

- **Documents sample scenarios**

Dino Quintero
Aurelien Jarry
Marius Ileana
Kyoung Jeon Kim
Octavian Lascu

Red**paper**

ibm.com/redbooks

IBM

International Technical Support Organization

IBM Director on System p5

March 2007

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

First Edition (March 2007)

This edition applies to IBM Director Version 5.20.

Note: This book is based on a pre-GA version of a product and may not apply when the product becomes generally available. We recommend that you consult the product documentation or follow-on versions of this IBM Redpaper for more current information.

Contents

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:
IBM Director of Licensing, IBM Corporation, North Castle Drive, Armonk, NY 10504-1785 U.S.A.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Trademarks

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

1350™	i5/OS®	ServeRAID™
AIX 5L™	IBM®	System p5™
AIX®	POWER4™	System p™
Asset ID™	POWER5™	System x™
BladeCenter®	POWER™	Tivoli®
Blue Gene®	pSeries®	WebSphere®
DB2®	Redbooks (logo) ™	xSeries®
HACMP™	Redbooks™	z/VM®

The following terms are trademarks of other companies:

Oracle, JD Edwards, PeopleSoft, Siebel, and TopLink are registered trademarks of Oracle Corporation and/or its affiliates.

Java, J2EE, and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Intel, Intel logo, Intel Inside logo, and Intel Centrino logo are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

Preface

This IBM Redpaper positions the new IBM® Director V5.20 among the IBM systems management products. Although IBM systems management software products include several choices such as Cluster Systems Management and IBM Tivoli® Management suite, and some features might seem to overlap, each product targets a specific environment.

This paper will help you to install, tailor, and configure the IBM Director software on IBM System p™ servers running AIX® 5L™ V5.3 and various Linux® enterprise distributions.

This paper provides practical examples of how to use various functions of IBM Director and helps you to understand the choices that you have to manage IBM System p servers.

The team that wrote this IBM Redpaper

This IBM Redpaper was produced by a team of specialists from around the world working at the International Technical Support Organization (ITSO), Poughkeepsie Center.

Dino Quintero is a Senior Certified Consulting IT Specialist working as System Blue Gene® Solution Technical Marketing Manager in Poughkeepsie, New York. Before joining the Blue Gene team, he has been working for the ITSO for seven years. He also worked as a Performance Analyst for the Systems and Technology Group and as a Disaster Recovery Architect for IBM Global Services. His areas of expertise include disaster recovery and IBM eServer pSeries® clustering solutions. He is certified on pSeries system administration and pSeries clustering technologies. He is also an IBM Senior Certified Professional on pSeries technologies. Currently, he leads teams delivering IBM Redbook solutions on pSeries clustering technologies and delivering technical workshops worldwide.

Aurelien Jarry is an IT Specialist in the Products and Solutions Support Center in Montpellier, France. He has over two years of experience in the Information Technology field. He holds a degree in Business Engineering from ESIEA, a top French engineering school in France. His areas of expertise include distance learning technologies, systems management, virtualization, and VMWare. This is his first IBM Redpaper.

Become a published author

Join us for a two- to six-week residency program! Help write an IBM Redbook dealing with specific products or solutions, while getting hands-on experience with leading-edge technologies. You'll have the opportunity to team with IBM technical professionals, Business Partners, and Clients.

Your efforts will help increase product acceptance and customer satisfaction. As a bonus, you'll develop a network of contacts in IBM development labs, and increase your productivity and marketability.

Find out more about the residency program, browse the residency index, and apply online at:

ibm.com/redbooks/residencies.html

Comments welcome

Your comments are important to us!

We want our papers to be as helpful as possible. Send us your comments about this IBM Redpaper or other Redbooks™ in one of the following ways:

► Use the online **Contact us** review redbook form found at:

ibm.com/redbooks

► Send your comments in an e-mail to:

redbooks@us.ibm.com

► Mail your comments to:

IBM Corporation, International Technical Support Organization
Dept. HYTD Mail Station P099
2455 South Road
Poughkeepsie, NY 12601-5400

1

Introducing IBM Director on System p5

This chapter provides an overview of the IBM Director for managing IBM System p5™ servers. It helps you to understand the specifics of IBM Director on System p5 platform, and to decide if IBM Director is the best way to manage your environment.

We start by reviewing some general concepts about IBM Director. Then we provide a list of features available for IBM Director on System p5 platform, including extensions. Finally, IBM Director is compared to other system management products, providing you with the necessary knowledge to make the right choice for managing your environment.

1

1.1 Overview

IBM Director is an integrated suite of tools that provides you with comprehensive system management solution for heterogeneous environments, including IBM System p5 environment.

This paper focuses on System p5 management using IBM Director 5.20 on System p5 platform.

IBM Director automates numerous processes that are required to manage your infrastructure proactively, including software distribution, system inventory, monitoring, remote hardware control, task execution, and more.

The IBM Director core infrastructure is designed to provide a single point of control for managing up to 5,000 agents. It has a graphical user interface that provides easy access to both local and remote systems.

For more information about IBM Director, details on managing other platforms, and for licensing information, visit the following Web pages:

► IBM Director home page

   http://www-03.ibm.com/servers/eserver/xseries/systems_management/ibm_director/

► *Implementing IBM Director 5.20*, SG24-6188

1.2 IBM Director environment

IBM Director is designed to manage complex environments that contain a large number of servers. Focusing on System p5 management, an IBM Director environment contains the following groups of hardware:

► Management servers: One or more servers on which IBM Director is installed. See 2.1, "Planning" on page 20, for supported operating systems and System p servers.

► Managed systems: Logical partitions (LPARs) and servers that are managed by IBM Director. It includes System p and System p5 servers and IBM BladeCenter® JS20.

► SNMP devices: Devices that have Simple Network Management Protocol (SNMP) installed.

> **Note:** Note that AIX has an SNMP server installed and running by default. See Appendix A, "Configuring SNMPv3 for AIX and Linux for POWER" on page 87.

► Managed objects: Any additional managed object, such as platforms, chassis, and Hardware Management Console (HMC).

Figure 1-1 shows a sample environment (hardware) that can be managed using IBM Director.
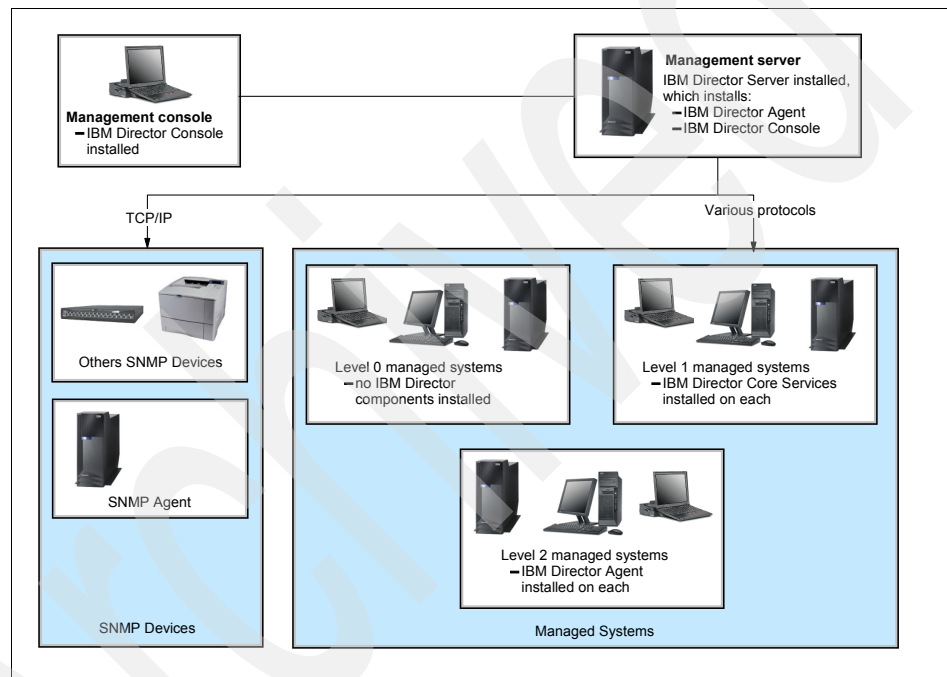
Figure 1-1   IBM Director environment

1.3 IBM Director components

The IBM Director product consists of four components:

► IBM Director Core Services: Systems that have IBM Director Core Services (but not IBM Director Agent) installed on them are referred to as *Level-1*. Level-1 control provides hardware-specific functionality for IBM Director to communicate with and administer the managed system.

► IBM Director Agent: Systems that have IBM Director Agent installed on them are referred to as *Level-2* managed systems. Level-2 provides enhanced functionality with which IBM Director can communicate with and administer the managed system.

► IBM Director Console: This is the graphical user interface (GUI) for IBM Director Server from which the system administrator can perform tasks in IBM Director. This is automatically installed with the Director Server on System p, running AIX or Linux. The IBM Director console provides the same GUI, independently of the machine type and operating system (OS).

► IBM Director Server: This is the main component of IBM Director. It contains the management repository and data, the server engine and the application logic. It provides all the management functions of IBM Director.

IBM Director can also manage systems on which no component of IBM Director is installed. Such managed systems are referred to as *Level-0* managed systems. These systems must at a minimum support either the Secure Shell (SSH) or Distributed Component Object Model (DCOM) protocol.

IBM Director capabilities relative to the different levels are detailed in 1.4, "IBM Director capabilities on System p5". The management features vary according to the operating system on which the agent is installed.

> **Important:** IBM Director Core Services (known as agent Level-1) are not supported on AIX.

1.4 IBM Director capabilities on System p5

IBM Director provides a comprehensive suite of system management capabilities. Management capabilities can vary depending on the operating system hosting the management server, the operating system of the managed system, and the agent level installed on it.

This section provides a list of the tasks available for a System p5 management server and the features available from a managed System p5 server.

1.4.1 IBM Director Server tasks

When running in a System p5 server, almost all of the IBM Director Server tasks are available. The following list includes both core features and extensions:

> **Note:** IBM Director management server tasks that are available are the same whether they are running on AIX or Linux on POWER.

- ▶ **Base Director tasks** available on System p5 server: Discovery, Associations, Group Management, System Status, Inventory, Event Log Viewer, Event Action Plan, Resource Monitor, Process Management, Remote Control, Remote Session, File Transfer, CIM Browser, SNMP Browser, Scheduler, Update Assistant, Microsoft® Cluster Browser, Discovery preferences, Console preferences, Server preferences, User administration, Encryption administration, Message Browser, Command Line Interface

- ▶ **Platform tasks** available on System p5 server: Hardware/System status, Hardware Control, Asset ID™, Configure SNMP Agent, Network Configuration, System Accounts

- ▶ **BladeCenter tasks** available on System p5 server: BladeCenter Configuration Wizard, BladeCenter Management Module Launch, Switch Management Launch

- ▶ **IBM System x™ specific functions**
    - Available on System p platform: Management Processor Assistant Launch, Configure Alert Standard Format
    - Not Available on System p platform: ServeRaid Manager

- ▶ **Other platform-specific tasks** available on System p platform: HMC Support, z/VM® Center Management

- ▶ **Advanced Server tasks**
    - Available on System p platform: Rack Manager, Software Distribution
    - Not available on System p platform: Capacity Manager, System Availability, Remote Deployment Manager, Virtual Machine Manager

> **Attention:** Some tasks are available on a Windows® management server used as System p5 management, but are not available in a System p5 management server, regardless of the managed operating system.

1.4.2 IBM Director Agent features

Depending on the agent level, a System p managed system provides different features for management.

See 2.1, "Planning" on page 20, for details about the OS supported by the IBM Director Agent.

Agentless managed systems

A managed System p5 server on which no IBM Director component is installed is named as an *agentless system*, or Level-0.

An agentless managed system provides the following basic features:

▶ Discovery
▶ Remote session (requires ssh)
▶ Power control
▶ Promotion to Level-1 or Level-2 through Update Assistant

> **Restriction:** These systems must at a minimum support either the Secure Shell (SSH) or Distributed Component Object Model (DCOM) protocol.

For more details on enhancing Level-0 features with SNMP, see 3.3, "Working with agentless (including SNMP) systems" on page 63.

For more details on the software distribution task, see 3.4, "Using Software Distribution" on page 72.

Agent Level-1 managed system

Managed systems that have IBM Director Core Services (but not IBM Director Agent) installed on them are referred to as Level-1. It provides hardware-specific functionality for IBM Director to communicate with and administer the managed system.

The IBM Director Core Services package installs on Linux:

▶ A Service Location Protocol (SLP) service agent
▶ An Secure Sockets Layer (SSL) enabled CIMOM
▶ An optional ssh server
▶ Platform-specific instrumentation

IBM Director Core Services provide a subset of IBM Director Agent functionality. Level-1 Agent provides management entirely through standard protocols. You can perform the following tasks on a Level-1 managed system:

► All Level-0 functions

► Collecting inventory

► Promotion to Level-2 management by distributing the IBM Director Agent package

► Managing events using event action plans, event subscription, and the event log

► Monitoring hardware status

► Running command-line programs

► Distributing system update packages through Software Distribution

Agent Level-2 managed system

A managed system on which the IBM Director Agent is installed is referred to as Agent Level-2 managed system. It provides enhanced management functionalities, which vary depending on the operating system on which it is installed.

Table 1-1 describes the IBM Director Agent functions supported on AIX 5L and Linux on POWER systems.

Table 1-1   IBM Director capabilities on System p5 platform

	AIX	Linux
Base IBM Director function		
Inventory hardware	Yes	Yes
Inventory operating system/software	Yes	Yes
Resource Monitor	Yes	Yes
Process Management	Yes	Yes
Remote control	No	No
Remote session	Yes	Yes
File Transfer	Yes	Yes
CIM Browser	Yes	Yes
Update Assistant	Yes	Yes
Microsoft Cluster Browser	No	No

Platform-specific tasks		
Hardware/System status	No	Yes
Asset ID	No	Yes
Configure SNMP Agent	Yes	Yes
Network Configuration	No	No
System Account	No	No
Capacity Manager	No	No
System Availability	No	No
Software Distribution	Yes	Yes

"Yes" indicates that at least limited functionality of the feature is available.

> **Note:** IBM Director 5.20 for System p brings the following improvements:
>
> ► Supports the micropartition resource monitoring, dedicated or shared processor, capped or uncapped mode
>
> ► Common Information Model (CIM) currency
>
> ► Hardware status improvements on AIX

From this list, we have selected some of the useful features for System p5 management. See Chapter 3, "Scenarios" on page 41, for more details about objectives and implementation.

Figure 1-2 shows the proposed actions when you right-click a System p5 managed system running the IBM Director Agent.
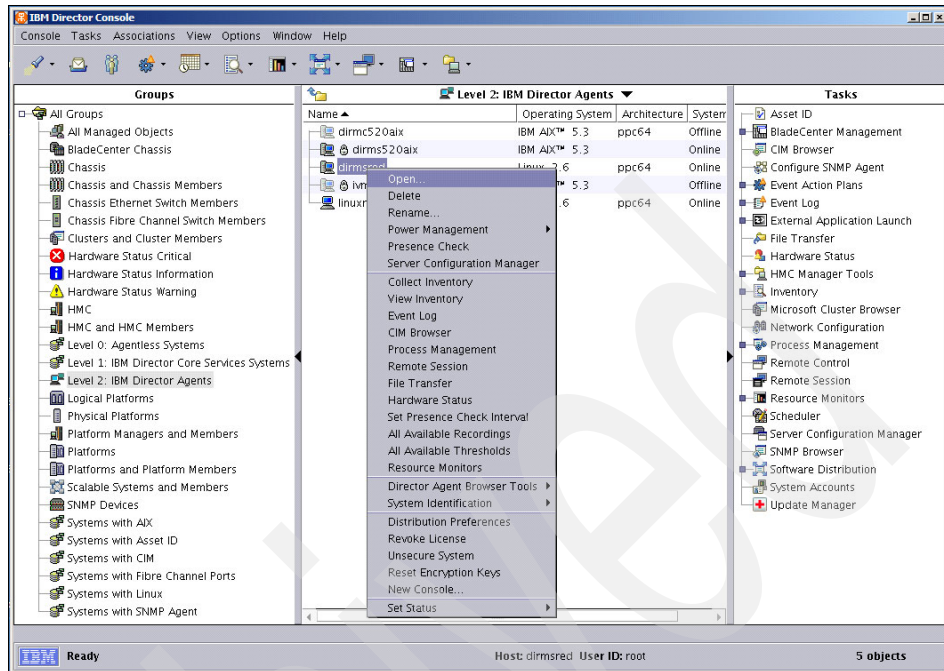
Figure 1-2   Right-clicking a Level-2 System p5 managed system

1.4.3 IBM Director extensions for System p5

In this section, we present the IBM Director extensions, free or fee-based, and, for each of them, we focus on the System p5 management.

IBM Director extensions are plug-in modules, which extend the capabilities of IBM Director:

▶ Install-time extensions: Provided on the base IBM Director CD, installed along with IBM Director Server

▶ Free extensions: Available for download at no charge

▶ Fee-based extensions: Products that require a license

Install-time extensions

Depending on the platform on which you install IBM Director Server, the installation package comes with different install-time extensions, which are automatically installed with the server software.

When installing IBM Director Server on System p (AIX 5L or Linux), the installation package contains:

► Cluster Systems Management (CSM) hardware control utils
► Flexible Service Provider
► Collection Services extensions
► IBM Director Agent
► ASMLIB
► System x extension
► BladeCenter extension
► IBM Director HMC common code extension
► IBM Director HMC console extension

See section 3.1, "Hardware Management Console managed environment" on page 42, for details on how to work with HMC managed systems.

Additional extensions

In addition to the basic IBM Director server installation, some extensions can extend its capabilities.

For more information about how to download or buy IBM Director extensions, visit the IBM Web site at:

http://www-03.ibm.com/servers/eserver/xseries/systems_management/ibm_director/extensions/sysa.html

This section list the extensions available on a System p management server. See Table 1-2 for the complete list.

> **Note:** Certain IBM Director extensions are not supported on a System p management server. However, they can be installed on a Windows management server that is used to manage a System p5 server.

Table 1-2   IBM Director on System p extensions

	Extension type	**Availability on System p**
HMC	Install-time	Yes
BladeCenter	Install-time	Yes
System x	Install-time	Yes
ServeRAID™	Free	No
System Availability	Free	No
Virtual Machine Manager	Free	No

	Extension type	Availability on System p
Capacity	Fee-based	No
Software Distribution Premium Edition	Fee-based	Yes
Remote Deployment Manager (RDM)	Fee-based	No
z/VM	Fee-based	Yes

Note: Install-time extensions are free, as they come with the IBM Director code.

For more information about these IBM Director extensions, refer to the manual *IBM Director Systems Management Guide* (Appendix I):

http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/diricinfo_5 .20/fqr0_bk_systm_mgmt.pdf

Note: Virtual Machine Manager Extension cannot be installed along with IBM Director management server on System p. However, when this feature is installed on another platform, this extension provides useful features for LPARs running on System p.

1.5 IBM Director positioning

IBM has several robust system-management offerings available that give the customer the choice regarding the way they want to manage their System p5 infrastructure. IBM Director is one of the choices, along with IBM Cluster Systems Management and Tivoli systems management suite of tools.

Figure 1-3 shows IBM systems management products.
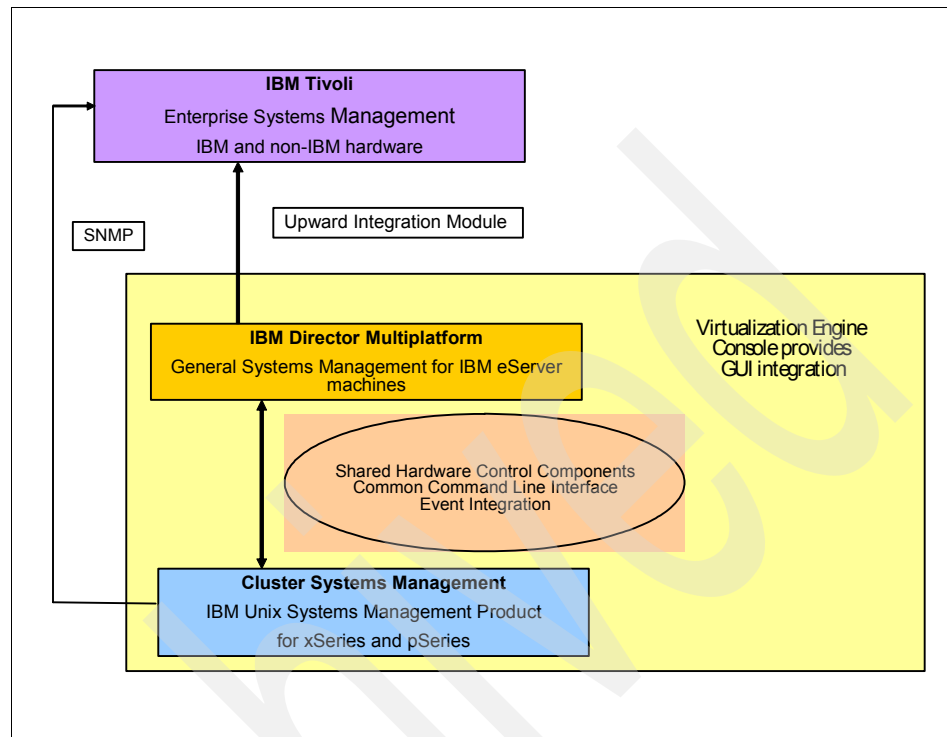
Figure 1-3   IBM systems management products

1.5.1 IBM Director versus Cluster Systems Management

IBM Cluster Systems Management (CSM) offers a way to manage a collection of AIX 5L, Linux, or a combination of servers (nodes) from a single point of control.

CSM functions include automated setup, hardware control, monitoring, and configuration file management. Administrators can manage individual nodes, run commands across nodes or groups of nodes, monitor system resources, and run automated responses to events.

> **Note:** IBM CSM is based on IBM Reliable Scalable Clustering Technology (RSCT) infrastructure, which is supported and works the same way on both AIX and Linux (on IBM platform).

For more information about CSM, visit the CSM documentation Web page:

http://publib.boulder.ibm.com/infocenter/clresctr/vxrx/index.jsp?topic=
/com.ibm.cluster.csm.doc/clusterbooks.html

So far, it looks like IBM Director and CSM have a lot of common features. However, they also have distinct value points. The objective of this section is to clarify the differences between the two IBM system management offerings, and help you to choose the most efficient way to manage your System p5 environment.

Simply stated, IBM Director provides general purpose GUI management, while CSM is more specialized for IBM systems running AIX5L and Linux.

Table 1-3 provides a high-level comparison between the two products.

Table 1-3   High-level comparison between IBM Director and CSM

IBM Director	IBM Cluster Systems Management
General purpose management in distributed environments	Specifically designed for parallel scalability and execution in high-performance cluster environments
Management primarily by drag-and-drop GUI; command-line interface (CLI) limited.	Comprehensive, fully scriptable CLI. Some management via WebSM GUI.
Higher-level management functions such as HW/SW inventory	Limited higher-level functions; no specific inventory functionality
Supports AIX 5L, Linux, i5/OS®, and Windows on IBM and non-IBM systems	Supports AIX 5L and Linux on System p, System x and System i LPARs running AIX or Linux (limited HW control).
Virtualization and Image Manager extensions (fee based) allow NIM mksysb AIX deployment for System p; Software Distribution now available on System p	Full deployment of AIX 5L or Linux.

Functional comparison

IBM Director and CSM have overlapping features. This section intends to provide you a recommendation for each of them.

Hardware configuration

IBM Director provides Management Processor Assistant (MPA)/Configuration Wizard to help set up management modules, and monitor state changes and security settings.

CSM involves more manual steps for setting up hardware configuration and management.

> **Recommendation:** *Director* has more automatic functions and requires less manual intervention.

Installing and updating software

IBM Director provides:

- ► Software Distribution Premium Edition, or SDPE, (fee-based extension) now supports package deployment on System p
- ► Remote Deployment Manager, or RDM, (fee-based extension) does not support AIX or Linux on POWER
- ► Initiation NIM installs via Event Action Plans, to be set up manually

CSM supports the installation and updating of software on AIX and Linux on POWER.

> **Recommendation:** *Both* products can be used for updating of software. However, *CSM* should be used for network installations.

Inventory

IBM Director provides Hardware and Software Inventory and Asset Management functionality.

CSM's dsh, SMS, and remote firmware commands can be used for some hardware and software inventory.

> **Recommendation:** *Director* has more robust and convenient functions.

Troubleshooting and diagnostics

IBM Director has hardware status that indicates when a component goes bad.

CSM provides power status, hardware status and information, and diagnostic probes (extensible).

> **Recommendation:** *Both* products have good capabilities, with the specification that CSM allows easier development of new probes.

Event monitoring

IBM Director provides OS and hardware monitoring, and actions can be run in response to events.

CSM provides OS and hardware monitoring, and actions can be run in response to events.

> **Recommendation:** *Both* products provide this function. A wider range of hardware platforms and devices is available in IBM Director. CSM provides more details when monitoring System p and certain System x hardware.

When to recommend one solution versus the other

This section presents a comparison of the general characteristics of the two products, IBM Director and CSM. It is intended to help you to make your choice not only based on the features, but also on the characters of the products.

Table 1-4   When to choose IBM Director or CSM

Choose IBM Director if you want:	Choose CSM if you want:
► A Windows style GUI for systems management tasks ► To manage multiple IBM HW and OS platforms with the same management tool ► To manage a wide variety and mixture of types of machines in your management domain ► Higher level management functions such as complete hardware/software inventory ► More complete IBM eServer xSeries® (PCI, ServeRAID, and so on), and BladeCenter configuration support ► Support for non-IBM hardware and also IBM hardware	► A full command line and scripting ability for system administration tasks ► To use just parts of the system management tool and fit them into your existing management processes ► Scalable, parallel operations across a fairly homogeneous set of machines ► High Performance Computing (HPC) environments, (especially Cluster 1350™, Cluster 1600, or HPS switch customers) ► Integrated deployment for AIX and Linux

Licensing

Your choice between these two powerful products can be determined based upon the implementation cost. Here, IBM Director and CSM are totally different.

Like almost all the IBM systems, when you buy a System p, it includes a license for IBM Director Agent. However, support is not included. In addition, you can also purchase additional licenses for non-IBM systems.

CSM is priced for value. Even though a trial version can be used for 60 days, you have to purchase a license for the server and every node managed by CSM thereafter.

IBM Director integration with CSM

In some cases, your System p5 management requires both IBM Director and CSM's distinct features. The two products can coexist.

Today, CSM and IBM Director can coexist with the following limitation: Remote Deployment Manager (RDM) and CSM (NIM) cannot coexist on the same subnet, because there will be Dynamic Host Configuration Protocol (DHCP) and Preboot eXecution Environment (PXE) conflicts. If both RDM and CSM are set up to perform system software installations, then each server has to be on a local subnet to the respective nodes.

Conclusion

The two products have distinct value points and overlapping capabilities.

CSM should be considered when the target managed systems are UNIX and High Performance Computing (HPC) environments. CSM is the distributed systems management tool of choice for System p and System p clusters.

IBM Director should be viewed as a general system management tool that supports a variety of platforms.

1.5.2 IBM Director and Tivoli positioning

The systems management arena can be defined based on three IT organizational levels:

► Element management

  Element managers provide a level of information detail and management functionality specific to the platforms they manage (for example, Intel®-based PCs), which is unavailable with higher level management platforms.

► LAN suites or workgroup management

  Workgroup managers provide most of the functionality of element managers, but they usually add more software management features, such as software distribution.

► Enterprise management

  Enterprise managers provide the integration and centralized management that is required in large IT infrastructures.

IBM Director provides a high level of integration with many key workgroup and enterprise managers, providing a robust solution.

Compatibility is achieved by exploiting the implementation in the IBM Director Agent of the latest systems management standards, including Common Information Model (CIM), Web-Based Enterprise Management (WEBM) and Extensible Markup Language (XML).

Features

IBM Director is required for low-level functions; as the functional requirements grow and managing applications becomes a priority, Tivoli is the answer. Therefore, there is a good cooperation between Tivoli management software and IBM Director.

Figure 1-4 shows the cooperation between IBM Director and IBM Tivoli from the resources point of view.
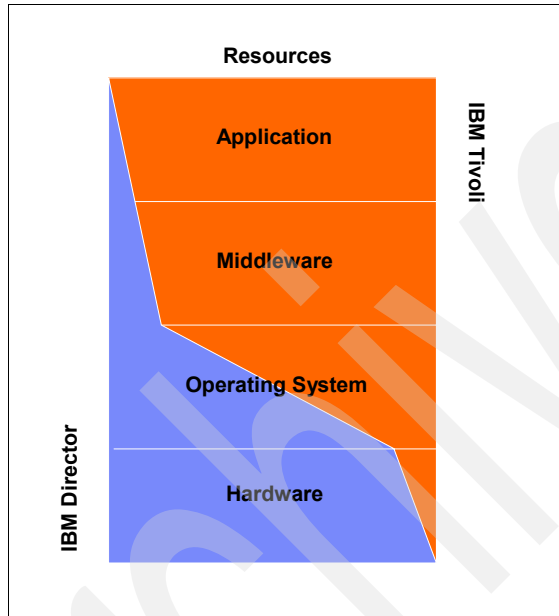
Figure 1-4   IBM Director and Tivoli

IBM Director

IBM Director covers:

► "Care and feeding" of the hardware
► Detailed hardware inventory, alerts and tools for IBM systems
► Basic software distribution
► Upward integration into the Tivoli environment
► Advanced, predictive server hardware management

IBM Tivoli

IBM Tivoli covers:

► Highly scalable cross-platform enterprise level systems management solutions
► Sophisticated systems management and monitoring capability
► Advanced software distribution

- ► Applications management
- ► Network management
- ► Business systems management

Integration

IBM Director has the ability to integrate with enterprise management solutions from a number of vendors. Unlike other hardware vendors, whose systems management software can only integrate with the same brand of enterprise software, IBM Director enables you to get the most out of your enterprise management structure. It upwardly integrates with:

- ► IBM Tivoli Management Framework
- ► IBM Tivoli NetView
- ► HP OpenView
- ► Microsoft Systems Management Server (SMS)
- ► Microsoft Operations Manager (MOM)
- ► CA Unicenter
- ► BMC Patrol

Note: Tivoli and IBM Director together deliver the most comprehensive end-to-end systems management in the industry.

With the upward integration modules (UIMs), you can use your systems management software to manage systems installed with IBM Director Core Services or IBM Director Agent software. You can use IBM Director Agent software to:

- ► Gather detailed inventory information about your systems, including operating system, memory, network adapters, and hardware

- ► Track your systems with features such as power management, event log, and system monitor capabilities

For detailed information about IBM Director UIMs for Tivoli, refer to the manual *IBM Director 5.20 Planning, Installation, and Configuration Guide*:

http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/diricinfo_5
.20/fqp0_bk_install_gde.pdf

2

Installation examples

This chapter contains information that helps you with the planning and installing of your management environment using the IBM Director suite (Server, Agents, Console).

In this chapter, the following topics are discussed:

- ► Planning
- ► Installation on AIX 5L
- ► Installation on Linux on POWER

2.1 Planning

Before installing IBM Director 5.20, we recommend that you review the installation requirements and plan your installation. See the manual *IBM Director 5.20 Planning, Installation, and Configuration Guide* at:

http://publib.boulder.ibm.com/infocenter/eserver/v1r2/topic/diricinfo_5.20/fqp0_bk_install_gde.pdf

2.1.1 Minimum requirements

This section presents the minimum requirements for installing and running IBM Director Server, Agent, or both.

Minimum hardware requirements

We recommend that you consider the following information when you review the hardware requirements for both AIX 5L and Linux on POWER.

► The disk space specified in Table 2-1 on page 21 is the minimum requirement for installing the default components.

► This does not include the database software and hardware requirements or the additional persistent storage for the managed objects.

► You cannot install IBM Director Console separately on the same management server as IBM Director Server because IBM Director Server provides all the functionalities of IBM Director Console and IBM Director Agent. In case you intend to install IBM Director Console on the other server, refer to the hardware requirements of IBM Director Console as shown in Table 2-1 on page 21 for AIX 5L or Table 2-2 on page 21 for Linux on POWER.

Servers running AIX 5L

> **Note:** The information presented in this section might not be up to date, as new hardware is continuously tested and added to the support list. Always check the latest requirements at:
>
> http://www-306.ibm.com/software/tivoli/products/directory-server/requirements.htm

You have to check if your servers running AIX 5L (including System p servers, and JS20 and JS21 blade servers) have the minimum hardware requirements, as shown in Table 2-1 on page 21.

Table 2-1 Minimum hardware requirements for servers running AIX 5L

Requirements	IBM Director Server	IBM Director Console	IBM Director Agent
Microprocessor	POWER4™ or POWER5™ 1.5 GHz	POWER4 or POWER5 1.5 GHz	POWER4 or POWER5 1.5 GHz
Memory (RAM)	512 MB (minimum) 1024 MB (recommended)	512 MB (minimum)	512 MB (minimum)
Disk space	325 MB (/opt) 8 MB (usr)	185 MB (/opt)[a] 6 MB (/usr)	90 MB (/opt) 3 MB (/usr)
Display	At least 256 colors	At least 256 colors	N/A

a. Includes the disk space required for IBM Director Agent

Servers running Linux on POWER

We recommend that you ensure minimum hardware requirements before installing IBM Director 5.20 on Linux on POWER running on System p servers, and JS20 and JS21 blade servers. See Table 2-2.

Table 2-2 Minimum hardware requirements for servers running Linux on POWER

Requirements	IBM Director Server	IBM Director Console	IBM Director Agent (Level 2)	IBM Director Core Services (Level 1)
Microprocessor	POWER4 or POWER5 1.5 GHz	POWER4 or POWER5 1.5 GHz	POWER4 or POWER5 1.5 GHz	POWER4 or POWER5 1.5 GHz
Memory (RAM)	512 MB (minimum) 1024 MB (recommended)	512 MB (minimum)	512 MB (minimum)	128 MB (minimum)
Disk space	425 MB	225 MB	170 MB	100 MB
Display	At least 256 colors	At least 256 colors	N/A	N/A

Minimum software requirements

IBM Director 5.20 supports several operating systems such as AIX 5L, Red Hat Linux and SUSE Linux running on System p servers, and JS20 and JS21 blade servers. Refer to Table 2-3 on page 22. We recommend that you consider the following information while preparing the installation of IBM Director 5.20.

▶ IBM Director provides Level-0 (agentless) support for all operating systems, which provides Discovery, Remote Session, and a limited subset of the Software Distribution task.

► IBM Director Server and IBM Director Console cannot be installed on the same system as IBM Director Server on System p servers, and JS20 and JS21 blade servers running AIX 5L or Linux on POWER.

Table 2-3   Operating systems supported by IBM Director on System p, JS20 and JS21 servers

Operating system	IBM Director Server	IBM Director Console	IBM Director Agent (Level-2)	IBM Director Core Services (Level-1)
AIX 5L 5.3 (TL3 or later)[a]	Yes	Yes	Yes	
AIX 5L 5.2 (TL5 or later)[b]			Yes	
Red Hat Enterprise Linux AS 4.3 and 4.4 for IBM POWER	Yes	Yes	Yes	Yes
SUSE Linux Enterprise Server 10 for IBM POWER	Yes	Yes	Yes	Yes
SUSE Linux Enterprise Server 9 for IBM POWER[c]	Yes	Yes	Yes	Yes

a. IY78923 and IY76140 is required for AIX 5L 5.3 running a 64-bit kernel
b. IY78923 and IY76141 is required for AIX 5L 5.2 running a 64-bit kernel
c. Service Pack 3 is required for SUSE Linux Enterprise Server 9

In addition to the operating system requirements, you should verify that the prerequisite filesets for AIX 5L or Linux on POWER are installed. Some components of IBM Director 5.20 might not be installed if the prerequisites are missing. See the prerequisites for IBM Director 5.20 for AIX 5L in 2.2, "Installation on AIX 5L" on page 27, and for Linux on POWER in 2.3, "Installation on Linux on POWER" on page 33.

2.1.2 IBM Director 5.20 implementation phases on AIX 5L

In this section, we describe the overall implementation steps of IBM Director 5.20 on AIX 5L. Generally, we can state that it is simpler to install IBM Director 5.20 on AIX 5L than Linux on POWER, because most of the filesets related to IBM Director 5.20 are packaged to be easily implemented. Before starting the installation of IBM Director 5.20, you should verify whether the System p server meets the hardware requirements and has the prerequisite filesets.

Make sure that the System p server has the following prerequisite filesets:

► Open SSL fileset

  – openssl-0.9.6k-2.aix5.1.ppc.rpm (or later)

- ► Pegasus CIM server filesets
  - – sysmgt.pegasus.cimserver 2.5.1.0 (or later)
  - – sysmgt.pegasus.osbaseproviders 1.2.6.0 (or later)
  - – sysmgt.pegasus.smisproviders 1.1.0.0 (or later)
- ► APAR fixes of AIX 5L
  - – IY78923 is required for all supported versions of AIX
  - – IY76140 is required for AIX 5.3 running a 64-bit kernel
  - – IY76141 is required for AIX 5.2 running a 64-bit kernel
- ► Required fileset for IBM Director Console-Hardware Management Console (HMC) integration extension
  - – sysmgt.websm
  - – sysmgt.sguide

When the hardware and software environment is ready, you can start the installation of IBM Director Server 5.20 after verifying the following check points:

☐ Uninstall the existing IBM Director components when you have IBM Director on the same system.

☐ Install and configure DB2 or Oracle® as IBM Director database in case you do not use the default database (Apache Derby).

☐ Modify the installation settings in the dirserv.rsp file to customize installation.

Next, start the installation of IBM Director Server 5.20 by using one of the following commands, depending on how you want to supply the installation data:

- ► Install all the components of IBM Director Server (recommended for interactive installation):

  ```
  ./dirinstall 2>&1 | tee /tmp/dirinstall.log
  ```

- ► Or, install IBM Director Server using a response file:

  ```
  ./dirinstall -r /directory/response.rsp
  ```

If you complete the IBM Director Sever 5.20 installation, you can manage it by using the following commands:

- ► To start:

  ```
  # /opt/ibm/director/bin/twgstart
  ```

- ► To stop:

  ```
  # /opt/ibm/director/bin/twgstop
  ```

- ► To start the Console:

  ```
  # /opt/ibm/director/bin/twgcon
  ```

IBM Director Agent 5.20 requires the following prerequisite filesets:

► Open SSL fileset

– openssl-0.9.6k-2.aix5.1.ppc.rpm (or later)

► Pegasus CIM server filesets

– sysmgt.pegasus.cimserver 2.5.1.0 (or later)
– sysmgt.pegasus.osbaseproviders 1.2.6.0 (or later)
– sysmgt.pegasus.smisproviders 1.1.0.0 (or later)

To start the installation of IBM Director Agent 5.20, make sure that you are in directory where the installation filesets reside, and then use the following script:

```
# ./dir5.20_agent_aix.sh
```

The script automatically extracts several install-time extensions and installs the IBM Director Agent code as well.

To start the IBM Director Agent, use the same command as for the IBM Director Server:

```
# /opt/ibm/director/bin/twgstart
```

2.1.3 Implementation of IBM Director 5.20 for Linux for POWER

This section covers the steps that you should follow to implement a management solution infrastructure based on IBM Director running on Linux on POWER systems. Before we start the actual installation process, we have to collect and install (if necessary) the prerequisite software components. We also present a high-level overview of the installation process and how to start and stop the product.

Before you install the IBM Director Server or Agent components, the Linux system should meet the applicable requirements for a System p platform, meaning that the operating system should be aware of features such as dynamic LPAR (DLPAR) or serviceable and informational hardware events that the POWER platform can provide.

For Linux on POWER, a set of packages has to be installed first. These packages can be downloaded from the IBM Web site, the "Service and productivity tools" section for the Linux on POWER platforms that can be found at:

http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html

The packages are available for the following Linux distributions:

- ► Red Hat Enterprise Linux 3 (RHEL3) and Red Hat Enterprise Linux 4 (RHEL4)
- ► SUSE Linux Enterprise Server 10 (SLES 10), SUSE Linux Enterprise Server 9 (SLES 9) and SUSE Linux Enterprise Server 8 (SLES 8)
- ► Turbolinux Enterprise Server 8 (TLES8)

The POWER-based platforms covered by the packages include the HMC-managed or Integrated Virtualization Manager (IVM)-managed servers, BladeCenter servers, and other (non-Blade, non-HMC-managed) systems.

For example, at the time of the writing this paper, the packages shown in Table 2-4 were available for RHEL4 systems.

Table 2-4   Packages for RHEL4 on POWER for HMC- or IVM-managed environments

Tool name	Package name and version
Platform Enablement Library	librtas-1.3.0-0.ppc64.rpm
SRC	src-1.2.2.1-05054.ppc.rpm
RSCT core & utilities	rsct.core.utils-2.4.1.2-05070.ppc.rpm rsct.core-2.4.1.2-05070.ppc.rpm
CSM core & client	csm.core-1.4.0.12-98.ppc.rpm csm.client-1.4.0.12-98.ppc.rpm
ServiceRM	devices.chrp.base.ServiceRM-2.2.0.0-2.ppc.rpm
DynamicRM	DynamicRM-1.2-0.ppc.rpm
Service Aids	powerpc-utils-1.0.0-1.ppc64.rpm powerpc-utils-papr-1.0.3-1.ppc64.rpm
Hardware Inventory	lsvpd-0.15.1-1.ppc.rpm
Service Log	servicelog-0.2.2-0.ppc64.rpm
Error Log Analysis	diagela-2.1.5-0.ppc64.rpm
PCI Hotplug Tools	rpa-pci-hotplug-1.0-18.ppc64.rpm
Dynamic Reconfiguration Tools	rpa-dlpar-1.0-25.ppc64.rpm
Inventory Scout	IBMinvscout-2.2-5.ppc.rpm

Note: In the case of Red Hat Linux distribution, some of the above packages such as csm.client and DynamicRM require the libstdc++ compatibility package version 2.96 to be installed on the system. The RPM package name is compat-libstdc++-296-2.96-132.7.2.ppc.rpm and for RHEL4 Update 4, it can be found on *CD#3*.

Based on the RPM dependencies, we recommend that you install the packages included in Table 2-4 on page 25 in the order listed in the table, in order to have the Linux system ready for any DLPAR operations. More information about the tools and functionality that these packages provide can be found at:

http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/info/resources.html

The minimum set of packages that have to be installed on RHEL4, SLES 9, and SLES 10 systems before any IBM Director 5.20 Server or Agent installation on a POWER platform is included in the following list:

► librtas-1.2-1.ppc64.rpm
► lsvpd-0.12.7-1.ppc.rpm
► diagela-2.1.5-0.ppc64.rpm
► servicelog-0.2.1-2.ppc64.rpm
► powerpc-utils-1.0.0-1.ppc64.rpm
► powerpc-utils-papr-1.0.3-1.ppc64.rpm

After the prerequisite packages are installed, you can start the installation process by running the utility corresponding to the product component image:

► To install the IBM Director Server:

   # ./dirinstall

► To install the IBM Director Agent Level 2:

   # ./dir5.20_agent_linppc.sh

► To install the IBM Director Agent Level 1:

   # ./cs5.20_agent_linppc.sh

► To install the IBM Director Console:

   # ./dirinstall

The installer performs the basic verifications and deploys the RPM packages on the system. When the installation has finished, for both server and agent you can use the following commands:

► To start:

   # /opt/ibm/director/bin/twgstart

► To stop:

   # /opt/ibm/director/bin/twgstop

► To start the Console:

   # /opt/ibm/director/bin/twgcon

The same command can be used for the server and the agent because the server installation comes by default with the agent (and the console), therefore at the server side, running `twgstart` starts the server components processes, which also include the agent functionality. The IBM Director Server system can also be discovered and managed as a Level-2 Agent system.

The IBM Director Console can be started using:

```
# /opt/ibm/director/bin/twgcon
```

Because the console is a graphical user interface (GUI) based application, it requires a DISPLAY, which can be provided by a local X server, or by an external (remote) X server. You can also use the VNC server on your system, which is seen as a local X server, and you connect to it remotely using a VNC console session.

Detailed information about installing the prerequisite packages and the IBM Director Server, Agent, and Console components can be found in 2.3, "Installation on Linux on POWER" on page 33.

2.2 Installation on AIX 5L

This section covers the installation of IBM Director Server on AIX 5L.

2.2.1 IBM Director 5.20 and prerequisite software

To install IBM Director Server 5.20 on AIX 5L, you require IBM Director 5.20 software and also the prerequisite filesets.

1. You can obtain the IBM Director 5.20 software for AIX 5L from the following sources.

   a. Download the IBM Director 5.20 file from the IBM Director Web site:

      http://www-03.ibm.com/servers/eserver/xseries/systems_management/xseries_sm/dwnl.html

   b. Select **IBM Director for pSeries** at Step 1: Choose software. Type your name and e-mail address at Step 2: Download software, and click **Submit** button.

   > **Note:** You require an IBM ID and password. If you do not have one, you can register on the Web. Allow 24 hours for the registration process to complete.

c. Select **IBM Director Server, Agent and Console for AIX**, and download it.

2. You require Pegasus CIM Server for IBM Director 5.20 installation.

Visit the following Web site:

http://www-03.ibm.com/servers/eserver/xseries/systems_management/xseries_sm/dwnl.html

a. In this page, select **IBM Director for pSeries** at Step 1: Choose software.

b. Download **IBM Pegasus CIM Server and Providers for AIX** 2.5.1 files.

c. Unzip and extract its contents by typing the following commands:

```
# gzip -cd Pegasus2.5.1.0_AIX.tar.gz | tar -xvf -
# gzip -cd OSProviders1.2.6.0_SMISProviders1.1.0.0_AIX.tar.gz | tar -xvf -
```

2.2.2 Preparing to install IBM Director 5.20 on AIX 5L

Before installing IBM Director Server on a System p platform, make sure that your platform meets the requirements. Consider the following information:

1. Ensure that the following AIX Pegasus CIM Server and providers are installed and functional:

   – openssl-0.9.6k-2.aix5.1.ppc.rpm (or later)

   Check to see if openssl packages are installed. If not, install it as shown in Example 2-1.

Example 2-1   Installing openssl package

```
dirms520aix:> rpm -qa | grep -i openssl
dirms520aix:> rpm -ivh openssl-0.9.7g-1.aix5.1.ppc.rpm
openssl #####################################
dirms520aix:> rpm -qa | grep -i openssl
openssl-0.9.7g-1
```

   – sysmgt.pegasus.cimserver 2.5.1.0 (or later)
   – sysmgt.pegasus.osbaseproviders 1.2.6.0 (or later)
   – sysmgt.pegasus.smisproviders 1.1.0.0 (or later)

   Make sure that all three filesets are installed. If not, you install them by SMIT (or the `installp` command).

   For more information about requirements and how to install OpenSSL and Pegasus, see the System p and AIX information center at:

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

To view these documents, type `cim server` as search key into the Search box on the left and then click **Install the Pegasus CIM Server and base providers** in the Search Results. The information center contains instructions about how to use the `lslpp -l` command to verify that the installed Pegasus filesets are at the required version. It also describes how to verify which version of OpenSSL is installed and how to obtain the correct version of this RPM.

2. Verify that the required APAR fixes are installed on your system.

   – IY78923 is required for all supported versions of AIX
   – IY76140 is required for AIX 5.3 running a 64-bit kernel
   – IY76141 is required for AIX 5.2 running a 64-bit kernel

   Complete the following steps to verify that you have the required fixes installed.

   a. Type the following command and press Enter:

      ```
      # instfix -i -k " IY76140 IY78923"
      ```

   b. Check to see if the filesets incorporating these APAR fixes are installed.

      IY78923 is included in the following filesets:

      • xlC.aix50.rte (version 8.0.0.5 or later)
      • xlC.rte (version 8.0.0.5 or later)
      • xlsmp.aix50.rte (version 1.6.0.0 or later)
      • xlsmp.rte (version 1.6.0.0 or later)

      IY76140 is included in the following fileset:

      • bos.mp and bos.mp64 (version 5.3.0.40 or later)

         These filesets are included in AIX 5L 5.3 TL4 or later.

   c. If any filesets are not installed, download and install the required APARs from the Fix Central Web site at:

      http://www.ibm.com/eserver/support/fixes/fixcentral

3. Make sure that these prerequisites are installed for IBM Director Console-HMC integration extension:

   – sysmgt.websm
   – sysmgt.sguide

4. We also recommend that you back up the CIM repository. Use the commands shown in Example 2-2.

Example 2-2   Backing up the CIM repository

```
dirms520aix:> /opt/freeware/cimom/pegasus/bin/cimserver -s
PGS10019: CIM server is stopped.
dirms520aix:> cp -pRh /opt/freeware/cimom/pegasus/etc/repository
/opt/freeware/cimom/pegasus/etc/repository.backup.20061012
```

```
dirms520aix:/opt/freeware/cimom/pegasus/etc> ls -l repository.back*
total 0
drwxr-xr-x 5 root system 256 Sep 29 01:03 root
drwxr-xr-x 5 root system 256 Sep 29 01:03 root#PG_InterOp
drwxr-xr-x 5 root system 256 Sep 29 01:03 root#PG_Internal
drwxr-xr-x 5 root system 256 Sep 29 01:03 root#cimv2
dr-xr-xr-x 5 root system 256 Sep 29 01:03 root#ibmsd
drwxr-xr-x 5 root system 256 Oct 10 13:11 root#ibmsd_remote
```

Additional configuration and troubleshooting information about the AIX Pegasus CIM Server is available in the following two documents:

– The *Common Information Model Guide for AIX*, which is available at:

http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.doc/aixbman/cim/cim.pdf

– The README file that is installed with the sysmgt.pegasus.cimserver fileset in /opt/freeware/cimom/pegasus/

Refer to these documents if you encounter problems running the AIX Pegasus CIM Server. The guide and the README file contain instructions on repository recovery (if needed).

2.2.3 Installing IBM Director Server 5.20 on AIX 5L

After preparing your system, you can install IBM Director Server on AIX by downloading the AIX installation file, or by using the IBM Director for AIX 5L V5.20 CD. You can perform a standard installation or you can use a response file to customize the features that are installed.

Notes:

► IBM Director Server and IBM Director Console must be at the same release level.

► If you are planning to install and use a database for IBM Director other than the default database, make sure that you have installed and configured the database application before installing IBM Director Server.

► IBM Director Server includes all the functionalities of IBM Director Agent and IBM Director Console. It is not possible (nor necessary) to separately install either IBM Director Agent or IBM Director Console on the management server after installing IBM Director Server.

► Before installing IBM Director Server on a system that has IBM Director Console or IBM Director Agent installed, you must first uninstall the existing IBM Director components.

1. Prepare the IBM Director 5.20 installation image.

2. Start to install IBM Director Server as shown in Example 2-3.

   The *dirinstall* script automatically installs IBM Director Server, Director Agent, and install-time extensions (unless you use a response file to customize the features to be installed).

Example 2-3   Installing IBM Director Server 5.20 using dirinstall script

```
dirms520aix:/kits/dir520/server/aix> chmod +x dirinstall
dirms520aix:/kits/dir520/server/aix> ./dirinstall 2>&1 | tee
/tmp/dirinstall.log


*********************************************************************
This Program is licensed under the terms of the agreement located in
the license file in the Program's installation license folder or in the
license folder on the source media.
By installing, copying, accessing, or using the Program, you agree to
the terms of this agreement. If you do not agree to the terms, do not
install, copy, access, or use the Program.
*********************************************************************

.....................
```

3. To start IBM Director Server, type the `twgstart` command. Then check to see if IBM Director Server is running by typing `twgstat` command. See Example 2-4.

Example 2-4   Starting IBM Director Server 5.20 on AIX 5L

```
dirms520aix:/opt/ibm/director/bin> ./twgstart
Service started.
dirms520aix:/opt/ibm/director/bin> ./twgstat
Active
```

4. To start IBM Director Console, type this command and press Enter.

   `/opt/ibm/director/bin/twgcon`

   If you want to access IBM Director Console on systems that do not have local display such as JS20 and JS21, you have to export Director Console using either the `xhost` command or Secure Shell (SSH) tunneling.

> **Note:** To uninstall IBM Director Server, you should use the `/opt/ibm/director/bin/diruninstall` command instead of using SMIT.

2.2.4 Installing IBM Director Agent 5.20 on AIX 5L

IBM Director 5.20 provides System p servers, and JS20 and JS21 servers that run AIX 5L 5.3 or AIX 5L 5.2 with Level-0 (Agentless) or Level-2 IBM Director Agent. IBM Director Server can discover the managed servers without any IBM Director Agent (Level-0), but it provides a limited amount of information to the system administrator. If you do not intend to install IBM Director Agent on AIX 5L, but still want to manage the server using IBM Director, we recommend to discover the server as a Simple Network Management Protocol (SNMP) device.

Level-2 Agent installation

In this section, we describe how to install Level-2 IBM Director Agent on AIX 5L.

1. Ensure that the following prerequisite filesets are installed (see Example 2-5):

   – openssl-0.9.6k-2.aix5.1.ppc.rpm (or later)
   – sysmgt.pegasus.cimserver 2.5.1.0 (or later)
   – sysmgt.pegasus.osbaseproviders 1.2.6.0 (or later)
   – sysmgt.pegasus.smisproviders 1.1.0.0 (or later)

Example 2-5   Prerequisites checking that IBM Director Agent 5.20 is installed on AIX 5L

```
aixmp10:> rpm -qa | grep -i openssl
openssl-0.9.7g-1
aixmp10:> /opt/freeware/cimom/pegasus/bin/cimserver -v
2.5.1
```

2. Verify that the IBM Director Agent code to be installed is at the same level as IBM Director Server.

3. Start to install IBM Director Agent 5.20 on AIX 5L. The installation file (dir5.20_agent_aix.sh) is located in the FILES directory of your IBM Director Agent 5.20 installation image file system. See Example 2-6.

Example 2-6   Installing IBM Director Agent 5.20 on AIX 5L

```
aixdoumi:> /mnt/kits/aix/FILES> chmod +x dir5.20_agent_aix.sh
aixdoumi:> /mnt/kits/aix/FILES> ./dir5.20_agent_aix.sh

./dir5.20_agent_aix.sh self-extracting installation program... Please
wait...

....... (Omitted lines) ......

Installation of selected components is successful.
To start IBM Director Agent manually, run
/opt/ibm/director/bin/twgstart
```

4. To start IBM Director Agent, type the **twgstart** command and then check to see if IBM Director Agent is running by typing **twgstat** command, as shown in Example 2-7.

Example 2-7   Starting IBM Director Agent 5.20 on AIX 5L

```
aixdoumi:/opt/ibm/director/bin> ./twgstart
Service started.
aixdoumi:/opt/ibm/director/bin> ./twgstat
Active
```

2.3 Installation on Linux on POWER

This section covers the installation of IBM Director Server and Level-1 and Level-2 Agents on IBM System p running Linux (Linux on POWER).

2.3.1 Obtaining the installation files

To prepare the system before installing the IBM Director Server or Agent components, you should first install the prerequisites packages listed in Table 2-2 on page 21 in "Servers running Linux on POWER" on page 21.

The IBM Director for Linux on POWER product can be downloaded from the IBM Director Web site:

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

In case you have the *IBM Director for Linux on POWER, V5.20* CD, mount it and start the installation process for the IBM Director Server component. The same installation sources are available for IBM Director Agent, IBM Director Core Services (formerly known as Level-1 Agent), and IBM Director Console images for the POWER platforms.

The following sections cover the installation of the server and Level-2 Agent components. The information presented applies also for the Level-1 Agent because the installation process does not differ from the Level-2 Agent installation process.

2.3.2 Installing the prerequisites

When the prerequisite files have been downloaded to a local directory, we can start installing them one by one in the order shown in the following list. You can also install them all together. To install a package, use the following command:

```
rpm -ivh <package>.rpm
```

Where <package>.rpm is the name of the package.

Starting with the requirements specified in the *IBM Director Planning, Installation, and Configuration Guide* for installing the IBM Director Server or Agent components, and the files available online at the time of writing this paper, the minimum set of packages required is:

► librtas-1.3.0-0.ppc64.rpm
► lsvpd-0.15.1-1.ppc.rpm
► servicelog-0.2.2-0.ppc64.rpm
► diagela-2.1.5-0.ppc64.rpm
► powerpc-utils-1.0.0-1.ppc64.rpm
► powerpc-utils-papr-1.0.3-1.ppc64.rpm

The RPM files (or later versions) in the previous list have to be installed for RHEL4, SLES 9, and SLES 10 systems.

Distribution-specific considerations

For RHEL4 systems, before installing IBM Director, ensure that the compat-libstdc++-33-3.2.3-47.3.ppc.rpm file (or later version) is installed.

If you intend to install the rest of the packages listed in Table 2-4 on page 25, packages such as csm.client and DynamicRM might require the compat-libstdc++-296-2.96-132.7.2.ppc.rpm file also to be installed.

Packages conflicts

Depending on the POWER platform (System p or BladeCenter), there might be cases when one or more of the new packages that you have to install are in conflict with an existing vendor-provided package installed by default with the Linux operating system. In Example 2-8 on page 35 and Example 2-9 on page 35, we present the installation options for RHEL4 and SUSE 10 systems that we have used in our testing environment.

Tip: In case of a file conflict reported when installing an RPM package, use the `--Uvh --force` option to install the package. This might apply to the librtas-1.3.0-0.ppc64.rpm, powerpc-utils-1.0.0-1.ppc64.rpm, and powerpc-utils-papr-1.0.3-1.ppc64.rpm files on SLES 10 and RHEL4.

In the outputs in Example 2-8 and Example 2-9, we include the installation output of the minimum set of packages required.

Example 2-8   Installing the prerequisites for IBM Director Server/Agent

```
# rpm -ivh librtas-1.3.0-0.ppc64.rpm
Preparing...          ######################################## [100%]
   1:librtas           ######################################## [100%]
# rpm -ivh lsvpd-0.15.1-1.ppc.rpm
Preparing...          ######################################## [100%]
   1:lsvpd             ######################################## [100%]
# rpm -ivh servicelog-0.2.2-0.ppc64.rpm
Preparing...          ######################################## [100%]
   1:servicelog        ######################################## [100%]
# rpm -ivh diagela-2.1.5-0.ppc64.rpm
Preparing...          ######################################## [100%]
   1:diagela           ######################################## [100%]
Starting rtas_errd (platform error handling) daemon: [  OK  ]
#
```

The servicelog, diagela, and powerpc-utils packages are required by IBM Director Core Services (formerly known as Level-1 Agent) and IBM Director Level-2 Agent too, because the Level-1 Agent is also a base for Level-2 Agent.

The RHEL4 installation comes with the ppc64-utils package and SLES 10 supplies the powerpc-utils package (installed by default). These packages conflict with the powerpc-utils packages provided by IBM. To install the powerpc-utils RPMs, the `rpm --Uvh --force` installer flags must be used as shown in Example 2-9.

Example 2-9   Installing the prerequisites for IBM Director Server/Agent (continued)

```
# rpm -Uvh --force powerpc-utils-1.0.0-1.ppc64.rpm
Preparing...          ######################################## [100%]
   1:powerpc-utils     ######################################## [100%]
# rpm -Uvh --force powerpc-utils-papr-1.0.3-1.ppc64.rpm
Preparing...          ######################################## [100%]
   1:powerpc-utils-papr   ################################### [100%]
#
```

After these steps, the system is ready for the IBM Director Server and agents installation.

2.3.3 Installing IBM Director Server 5.20 on Linux on POWER

The installation of IBM Director components can be performed in an interactive (standard) way or you can use a response file to customize the features to be installed.

The standard installation is a straightforward process. You have to run the `dirinstall` utility from the directory where the installation image files have been extracted (or from the CD mount point), and the filesets are installed on the system. In case the system has the IBM Director Console or IBM Director Agent components already installed, you must first uninstall these components because the IBM Director Server includes the functionality for both the agent and the console.

You can download the IBM Director for Linux on POWER, Version 5.20 image (DIr5.20_LinuxonPower.tar.gz) from the IBM Director Web site at:

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

Then extract the archive using:

```
gzip -cd Dir5.20_LinuxonPower.tar.gz | tar -xvf -
```

Start the installation from the same directory by running (see Example 2-10):

```
./dirinstall
```

In case you have the *IBM Director for Linux on POWER, V5.20* CD, mount it and run the installer from the right location, using the following commands:

```
# mount /dev/cdrom /mnt/cdrom
# cd /mnt/cdrom/director/server/linux/ppc
# ./dirinstall
```

In the previous example *cdrom* is the CD drive device and */mnt/cdrom* is the mount point for the ISO file system.

Example 2-10   Installation of IBM Director Server and basic verification steps

```
# ./dirinstall

***********************************************************************
This Program is licensed under the terms of the agreement located in
the license file in the Program's installation license folder or in the
license folder on the source media.
By installing, copying, accessing, or using the Program, you agree to
the terms of this agreement. If you do not agree to the terms, do not
install, copy, access, or use the Program.
***********************************************************************
```

```
Attempting to install ITDServer-5.20-1.ppc.rpm
Preparing...
################################################
ITDServer
################################################
```

... (content omitted) ...

```
Attempting to install HMCConsoleExt-5.20-1.noarch.rpm
Preparing...
#################################################
HMCConsoleExt
#################################################

Installation of selected components is successful.
To start IBM Director Server manually, run
/opt/ibm/director/bin/twgstart
#
# /opt/ibm/director/bin/twgstat
Inactive
# /opt/ibm/director/bin/twgstart
Service started.
# /opt/ibm/director/bin/twgstat
Active
```

This concludes the installation of IBM Director Server, and the basic checks performed.

2.3.4 Installing IBM Director Agent 5.20 on Linux on POWER

The installation of the Level-2 Agent component is slightly different from the installation process of the Server component. To make sure that the system is ready for the installation, you should follow the instructions in 2.3.2, "Installing the prerequisites" on page 34.

When the system has all the prerequisites installed, we can start installing the Level-1 Agent: IBM Director Agent for Linux on POWER or Level-2 Agent: IBM Director Agent for Linux on POWER.

There are two methods:

► Downloading the installation image from Internet:

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

► Using the CD

Example 2-11 presents the installation of Level-2 Agent on IBM System p running Linux.

Example 2-11   Installation of Level 2: IBM Director Agent on Linux on POWER

```
]# ./dir5.20_agent_linppc.sh

./dir5.20_agent_linppc.sh self-extracting installation program...
Please wait...


*************************************************************************
This Program is licensed under the terms of the agreement located in
the license file in the Program's installation license folder or in the
license folder on the source media.
By installing, copying, accessing, or using the Program, you agree to
the terms of this agreement. If you do not agree to the terms, do not
install, copy, access, or use the Program.
*************************************************************************


Attempting to install ITDAgent-5.20-1.ppc.rpm
Preparing...
################################################
ITDAgent
################################################

... (content omitted) ...


compiling IndicationSchema.mof

Setup filters using batch file ->
/opt/ibm/director/cimom/bin/pSeriesLinuxIndicationSettingsFilters.dat
Number of filters now active   ===>
21
Setup subscriptions using batch file ->
/opt/ibm/director/cimom/bin/pSeriesLinuxIndicationSettingsSubscriptions
.dat
Number of subscriptions now active   ===>
42
Attempting to install ColSrvDirExt-5.20-1_RHEL4.ppc.rpm
Preparing...
################################################
ColSrvDirExt
################################################
```

If the IBM Director agent is running, restart the agent to activate the
extension.

```
Installation of selected components is successful.
To start IBM Director Agent manually, run
/opt/ibm/director/bin/twgstart
#
# /opt/ibm/director/bin/twgstat
Inactive
# /opt/ibm/director/bin/twgstart
Service started.
# /opt/ibm/director/bin/twgstat
Active
#
```

Scenarios

In this chapter, we present practical examples of how to use IBM Director for System p specific tasks. In the ITSO lab, we have tested various configurations and implemented IBM Director to monitor using different agent levels to monitor System p hardware, including Hardware Management Console (HMC) and Integrated Virtualization Manager (IVM).

This chapter describes the following scenarios:

► Hardware Management Console managed environment

► Integrated Virtualization Manager managed environment

► Working with agentless (including SNMP) systems

► Using Software Distribution

3.1 Hardware Management Console managed environment

In this scenario, we cover the integration of IBM Director with an HMC system used for managing one or more IBM System p5 servers. As a hardware control point, HMC provides access to features such as logical partition (LPAR) management, Micro-Partitioning, and dynamic LPAR (DLPAR) operations.

> **Note:** IBM Director Server's HMC support is provided by an extension installed automatically with the Director software, therefore you do not have to install additional extensions.

The HMC extension is automatically installed with IBM Director Server and IBM Director Console on the following management servers and management consoles: AIX 5L, i5/OS, and Linux on IBM System p5 servers.

You can check the installed HMC extension of IBM Director Server on AIX 5L by typing the `lslpp -l HMC*` command, as shown in Example 3-1.

Example 3-1   Verifying HMC extension installed on AIX 5L

```
dirms520aix:/> lslpp -l HMC*
  Fileset                      Level  State       Description
----------------------------------------------------------------------
Path: /usr/lib/objrepos
  HMCCommonExt            5.20.0.0  COMMITTED  Director HMC Common Code Extension for AIX
  HMCConsoleExt           5.20.0.0  COMMITTED  Director HMC Console Extension for AIX
```

The `rpm -qa | grep -i hmc` command reveals whether the HMC extensions of IBM Director Server are installed on Linux on POWER, as shown Example 3-2.

Example 3-2   Verifying whether HMC extension is installed on Linux on System p5 server

```
[root@dirmsred /]# rpm -qa | grep -i hmc
HMCServerExt-5.20-1
HMCCommonExt-5.20-1
HMCConsoleExt-5.20-1
```

The diagram in Figure 3-1 presents the environment that we used for testing the examples described in this section.
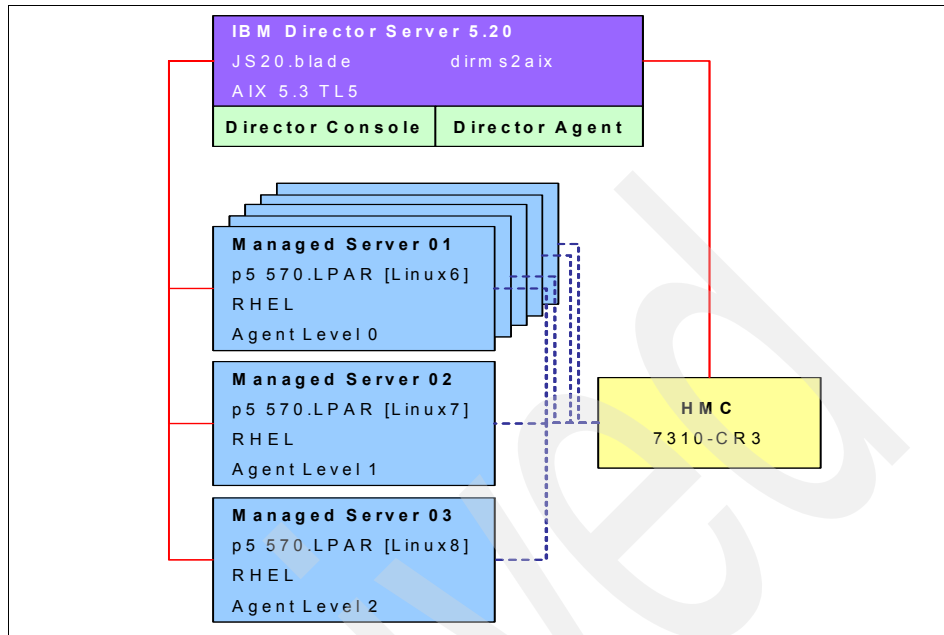
Figure 3-1   Scenario 2: Hardware Management Console managed environment

Discovering the Hardware Management Console

In order to manage and monitor HMC through IBM Director Server, you have to add the HMC definition to the IBM Director Server database. We recommend that you use the automatic discovery process for the HMC, rather than manually adding it to the system. Before running automatic discovery, you can change certain HMC discovery options in Discovery Preferences under the Options menu.

To run Discover:

1. From the central panel of the IBM Director Console, use your mouse and right-click to select **Discover** → **HMC**. Wait for the IBM Director Server to find the new HMC machine, as shown in Figure 3-2.
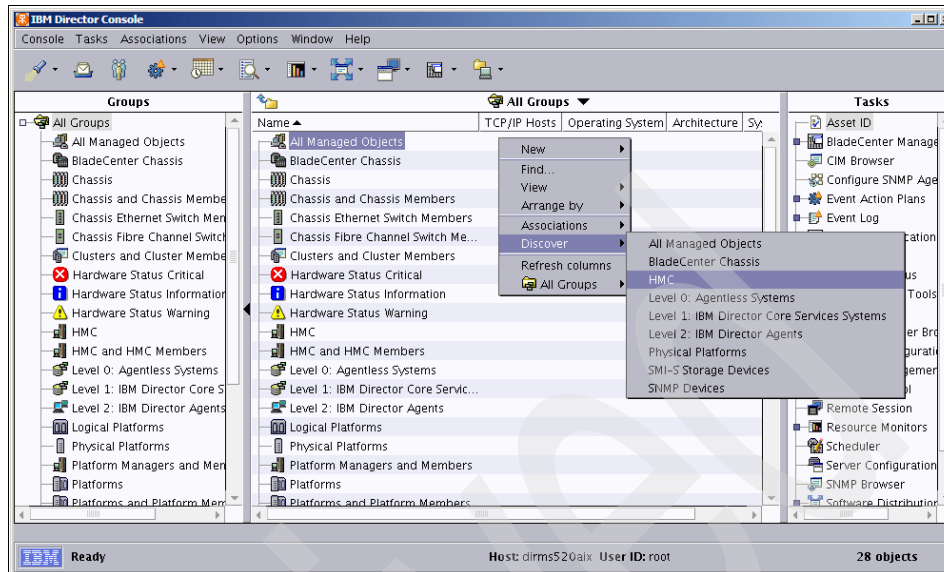
Figure 3-2   Activating the HMC discovery process in IBM Director Console

2. Click the **HMC and HMC Members** icon in the left panel to check if the new HMC machine has been discovered. You can see an HMC for System p5 570 shown in Figure 3-3 on page 45.

   Even if the System State is displayed as `Unknown`, you can ignore this for the moment, as this will be soon changed to `Online` after performing the following steps.

   Another way to check the current state of the HMC is by right-clicking the HMC machine name and then selecting **Presence Check**. You can also right-click the HMC and select **Open** to view the general attributes of a managed server, in this case the HMC.
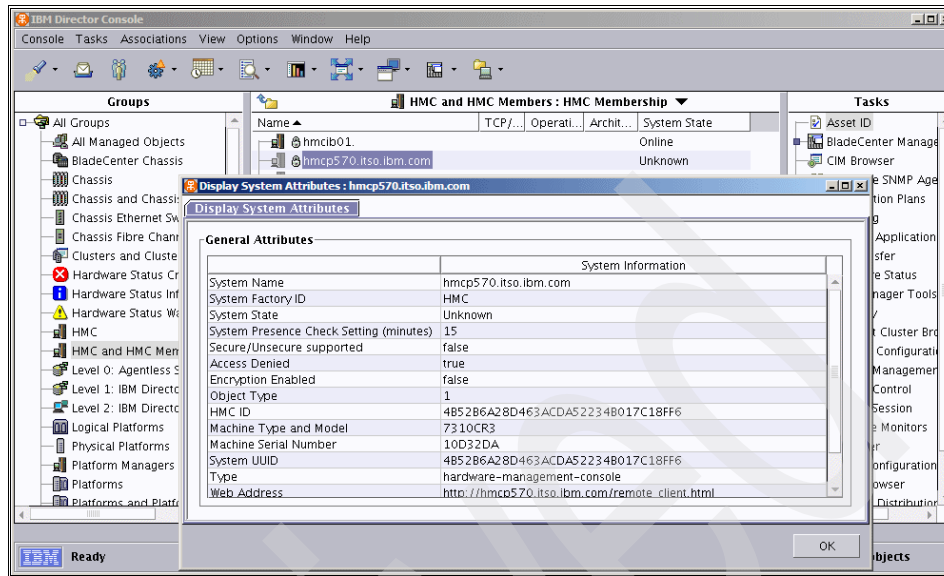
Figure 3-3   Viewing the general attributes of HMC as a managed server

3. To activate the integrated HMC support menu on IBM Director Console, you have to grant access to the HMC. To do this, right-click the HMC and then select **Request Access**. In the dialog box, type the HMC user ID (usually "hscroot"), and the password for this ID, as shown in Figure 3-4.
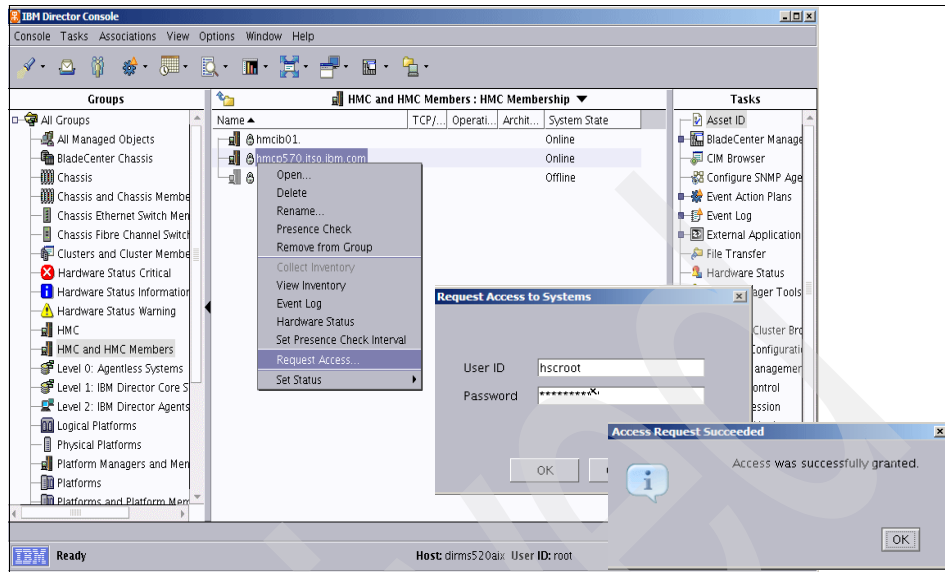
Figure 3-4   Requesting access to an HMC

4. In this step, we list the newly integrated HMC-related menus on the IBM Director Console (see Figure 3-5). The HMC Manager Tools that are integrated with IBM Director Consoles are:

   – Server and Partition Management

      • Frame Management
      • Server Management

   – Licensed Internal Code Maintenance

      • HMC Code Update
      • Licensed Internal Code Updates

   – HMC Management

      • HMC Users
      • HMC Configuration

   – Information Center and Setup Wizard

   – Service Focal Point

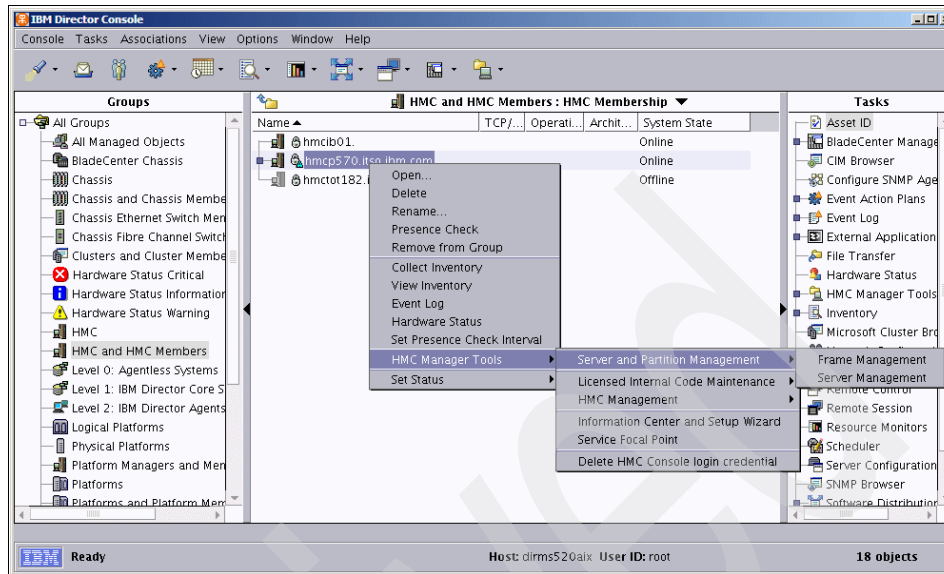   – Delete HMC Console login credential

Figure 3-5   Figuring out the HMC Manager Tools menu on IBM Director Console

When you run one of these tools, an HMC Web-based System Manager (WSM) window is launched and you can go to the selected tool (screen). You can also manage Central Electronics Complex (CEC) and HMC-managed LPARs. We discuss the detailed CEC support functionality later in this scenario.

5. You can see all the HMC-managed LPARs that are discovered by IBM Director Server regardless of the IBM Director Agent level. Click the **HMC and HMC Members** icon in the left panel, and observer the HMC, CEC, and HMC-managed LPARs, as shown in Figure 3-6.
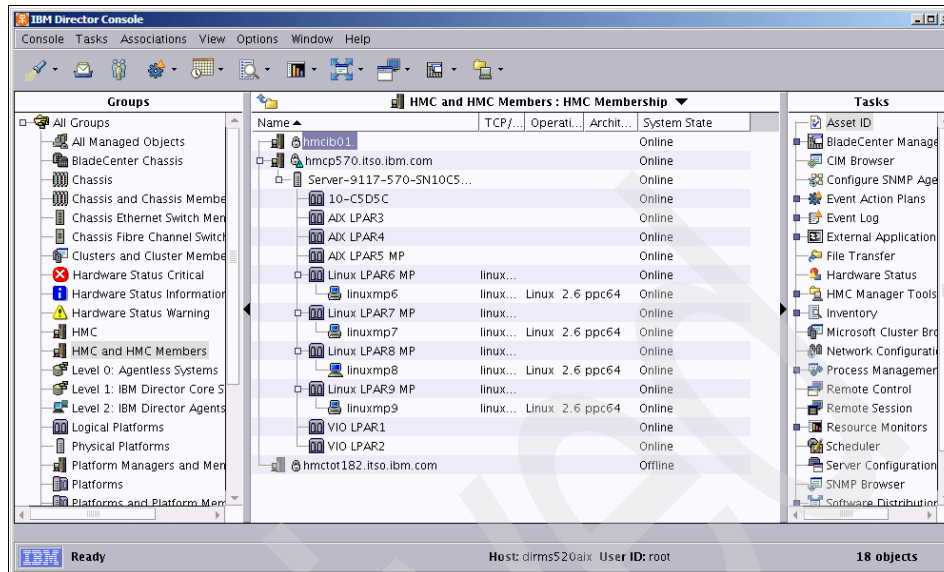
Figure 3-6 HMC, CEC, and HMC-managed logical partitions

Working with HMC Manager Tools

When you select HMC functions provided by IBM Director Console, an HMC WSM window is started.

1. Click the **HMC and HMC Members** icon in the left panel. Go to the central panel of IBM Director Console and right-click the managed object representing the HMC, and go to **HMC Manager Tools**. Select the task that you want to run.

2. Provide HMC credentials (user ID and password) to launch the HMC WSM console. Usually, this is the *hscroot* user. See Figure 3-7.
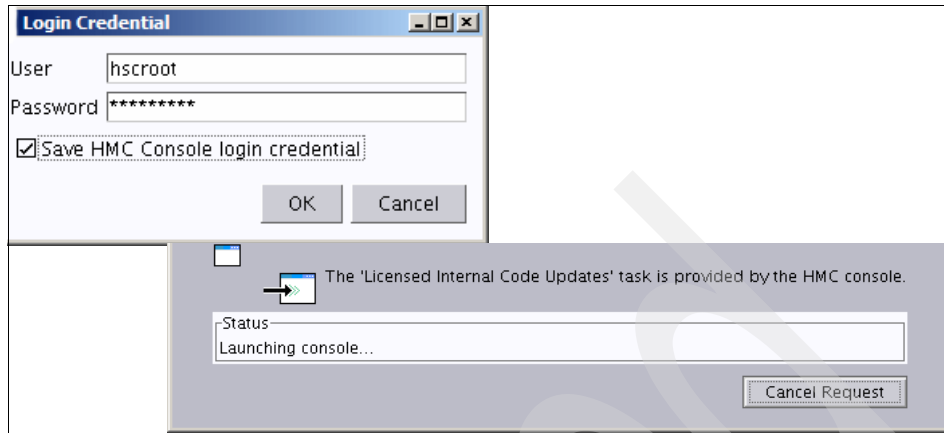
Figure 3-7   Running HMC Manager Tools of IBM Director Console

Managing Central Electronics Complex and LPARs

In addition to the HMC Manager Tools, IBM Director Server provides support for managing CECs. For example, you can power-on or power-off an IBM System p server hardware managed by HMC through IBM Director Console.

1. Start by clicking the **HMC and HMC Members** icon in the Groups panel on the left. Go to the central panel and right-click the physical platform that represents the System p server hardware. Select **Power Management** from the menu in order to turn System p server on or off. See Figure 3-8.
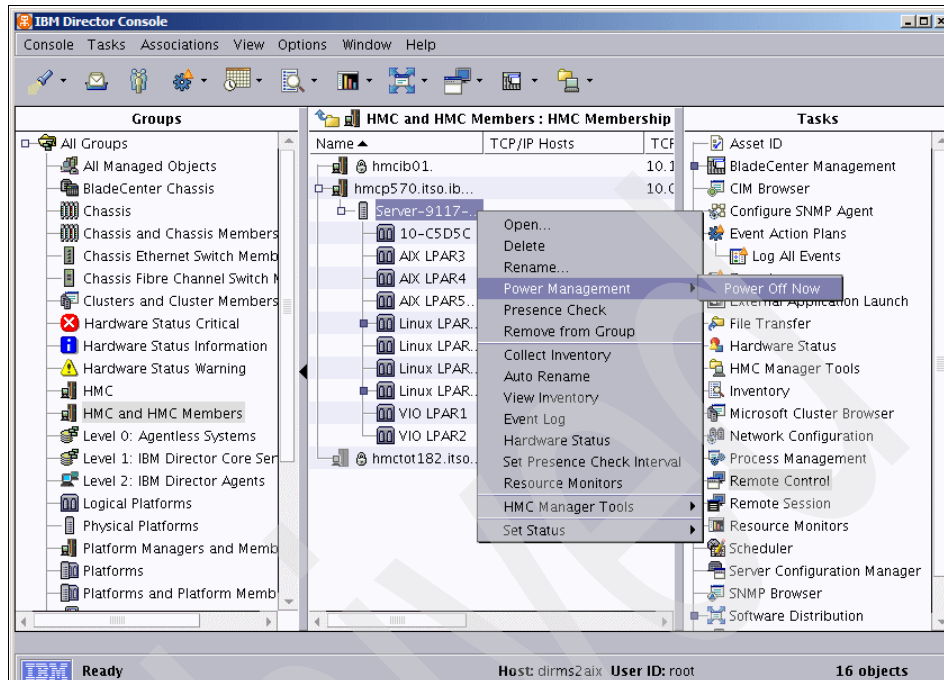
Figure 3-8   Managing Central Electronics Complex using IBM Director Console

2. You can schedule another time to turn System p server on or off by selecting the **Schedule** button. To turn it on or off immediately, click the **Execute Now** button. See Figure 3-9.
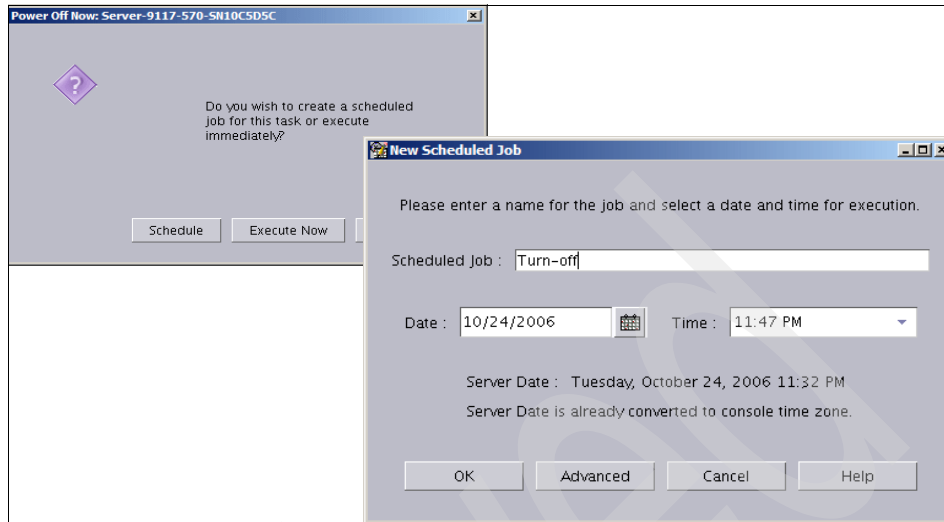
Figure 3-9   Selecting power-on or power-off time

You can also manage LPARs managed by an HMC. If the LPAR is activated, you can restart or power it off. Otherwise, you can activate LPARs through the IBM Director Console.

Click the **HMC and HMC Members** icon in the Groups panel on the left. Go to the central panel and right-click the logical platform representing an LPAR managed by the HMC. Select **Power Management** menu in order to activate or deactivate the LPAR.

You can also select **Schedule** for planning the action at a later time, or you can click **Execute Now** to take action immediately. See Figure 3-10. If the Power Management menu still presents the old menu (even though you turned on/turned off LPAR), you can re-check the current LPAR status by clicking **HMC Manager Tools** → **Server and Partition Management** → **Server Management**.
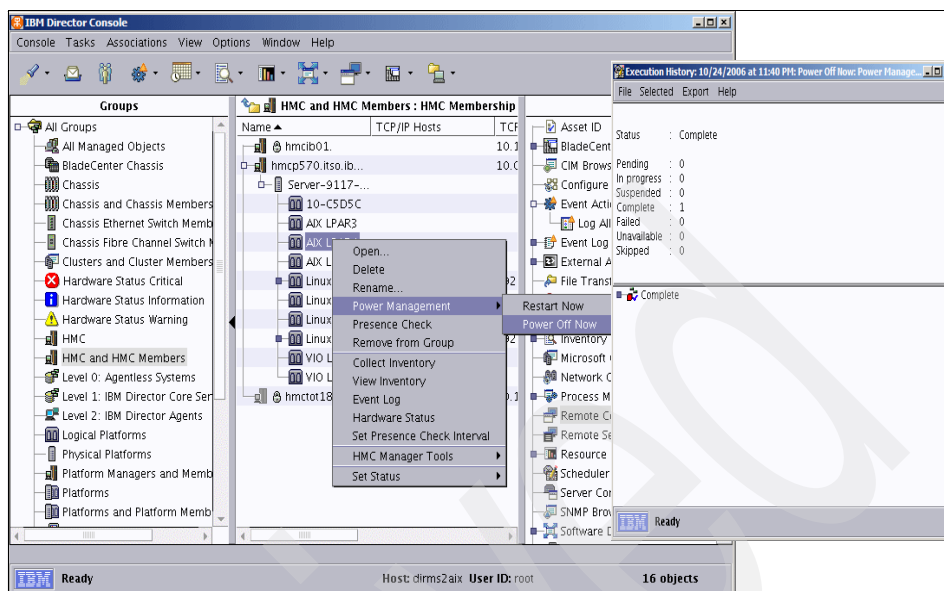
Figure 3-10   Managing LPAR by IBM Director Console

Configuring HMC to send serviceable events to IBM Director

One HMC can manage several IBM System p5 servers. Each server can send informational or warning messages to the HMC and these messages are collected by the HMC as serviceable events.

The serviceable events collected by the HMC can also be forwarded as Simple Network Management Protocol (SNMP) traps to the IBM Director Server. HMC software has the capability to notify an SNMP manager about any new (SNMP) event. This is the Customer Notification feature of the Service Agent component.

To configure the HMC to send events to an IBM Director server, we have to connect to HMC using the WSM client or from the IBM Director Console (the HMC Extension must be installed). The WSM navigation path is *<HMC-hostname>* → **Service Applications** → **Service Agent** → **Customer Notification**.

1. From the IBM Director Console, you have to right-click the HMC system and select **HMC Manager Tools** → **Service Focal Point**.

2. Provide the credentials and log in to the graphical user interface (GUI).

3. Select the **Service Agent** icon from the Navigation Area pane and click the **Customer Notification** in the Service Agent Configuration pane.

4. Customer Notification feature can send messages to the IBM Director when a service events occurs on the HMC or on the connected systems. From the

Customer Notification dialog, you select the **SNMP Trap Configuration** tab
and add the IP address of the IBM Director Server system and the *public*
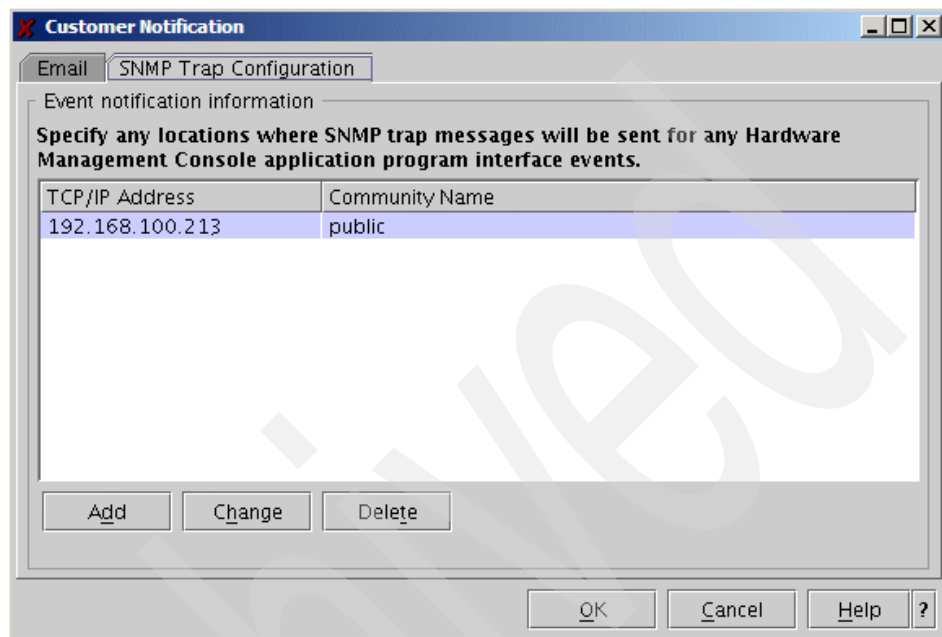community name, as shown in Figure 3-11.

Figure 3-11   Customer Notification feature on HMC to send SNMP messages

Generating serviceable events

In order to test that the HMC can send serviceable events (as SNMP messages)
to the IBM Director Server, we have to generate a serviceable event. For this
example, we choose one AIX LPAR from an IBM System p5 server managed by
the HMC previously configured.

To generate a serviceable event from in AIX system, we use the `diag` utility.

1. To generate such an event, we run `diag` in a shell prompt.

2. In the FUNCTION SELECTION menu, we go to Advanced Diagnostics
   Routines and select **Problem Determination**.

3. From the list of the resources, we select the Operator panel (oppanel)
   resource by moving the cursor to it and pressing Enter.

4. We press F7 to continue, and finish by selecting **YES** to create a test
   Serviceable Event.

Later we can observer the event in the HMC Service Focal Point using the HMC Manager Tools provided in the IBM Director Console, or just running the following command from a Secure Shell (SSH) session on the HMC console:

```
lssvcevents -t hardware
```

We can see the serviceable event generated from the AIX logical partition in the list of the events, as shown in Example 3-3.

Example 3-3   Description of the serviceable event generated from an LPAR

```
hscroot@hmc:~> lssvcevents -t hardware
problem_num=14,pmh_num=,refcode=651-199,status=Open,first_time=10/25/20
06 01:37:19,last_time=10/25/2006
01:37:19,sys_name=Server-9117-570-SN10C5D5C,sys_mtms=9117-570/10C5D5C,e
nclosure_mtms=9117-570/10C5D5C,firmware_fix=,text=This is a test of the
flow of a Serviceable Event from this system to the Service Focal Point
on the HMC. This is not a real problem.,created_time=10/25/2006
01:37:19,reporting_name=Server-9117-570-SN10C5D5C,reporting_mtms=9117-5
70/10C5D5C,failing_mtms=9117-570/10C5D5C,analyzing_hmc=hmcp570,event_ti
me=10/25/2006 02:39:45
... (content omitted) ...
```

The same event can be seen in the IBM Director Console as a warning message associated with the HMC system. Clicking the yellow exclamation symbol displayed in the bottom-right corner (see Figure 3-12), we can see the content of the message that represents the serviceable event.
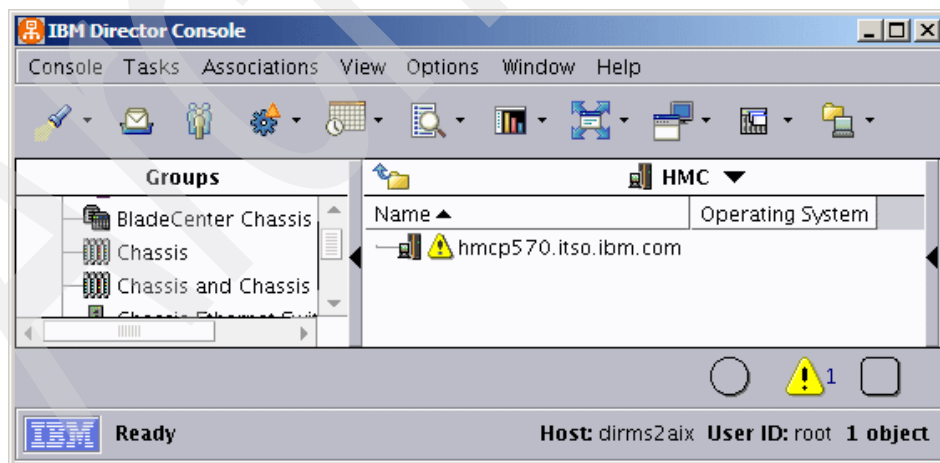

Figure 3-12   The warning message associated with the HMC system

In Figure 3-13, you can see the same service event previously displayed in Example 3-3 on page 54.
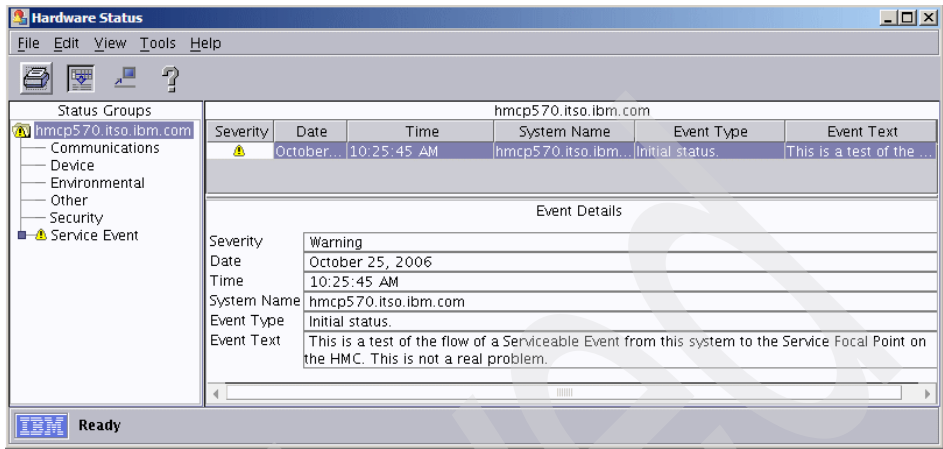

Figure 3-13   The generated serviceable event displayed as a warning message

3.2 Integrated Virtualization Manager managed environment

IVM support has been introduced in IBM Director version 5.20. This scenario discusses how IBM Director 5.20 works with an IVM managed IBM System p5 server. Throughout this section, we present this new functionality and how we applied it in our environment.

If you have an entry level System p server, such as IBM System p5 510, IBM System p5 520, and IBM System p5 550, you can create and manage LPARs through IVM, even though HMC is not used. However, IVM does not offer all the functionalities that can be achieved through HMC. For example, dynamic LPAR (DLPAR) is not available with IVM.

IBM Director 5.20 support for IVM functionality even works with a Level-0 IBM Director Agent (also known as agentless system), therefore this chapter covers a Level-0 Agent environment using an IVM server. The chart shown in Figure 3-14 on page 56 helps you to understand the infrastructure that we have used for this scenario.

This scenario presents how to manage an IVM server managed using SNMP in IBM Director 5.20, and the tasks for making an IVM server a managed device in IBM Director V5.20.

The environment for this scenario consists of:

► Management Server

– AIX 5L 5.3 TL5 or Red Hat Linux
– IBM Director Server 5.20 (including all the install-time extensions)
– VNC server to enable GUI-based Director Console

► IVM server (managed server)

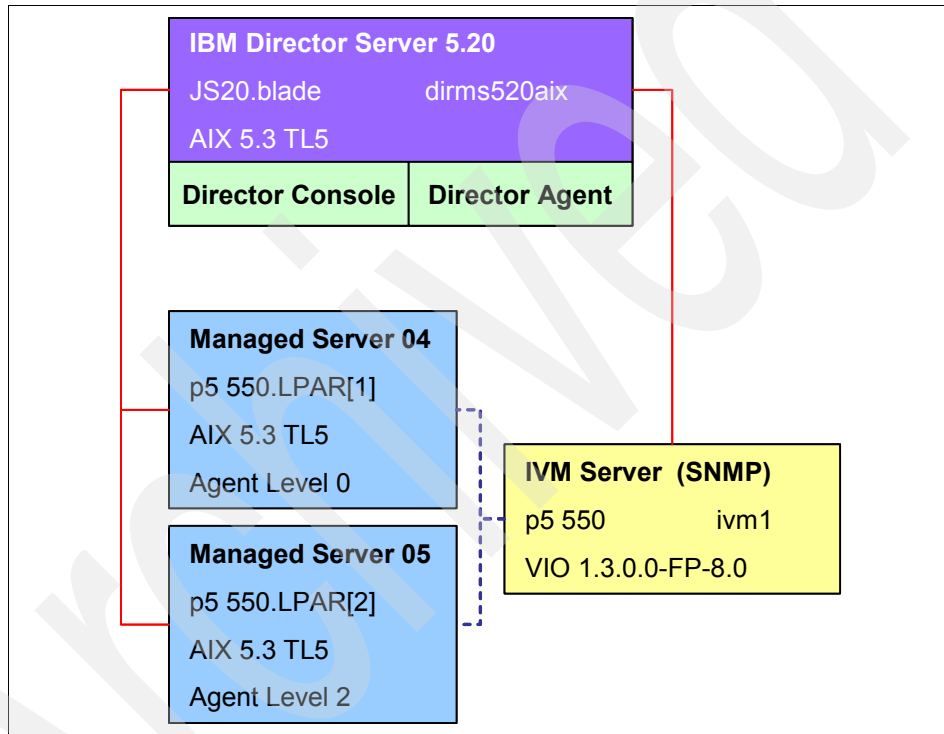– Virtual I/O 1.3 Fix Pack 8
– SSH-1.99-OpenSSH_4.3

Figure 3-14   IBM Director 5.20 Scenario: IVM managed environment

Configuring IVM server for IBM Director V5.20

We recommend that you add the IVM server as a Level-0 IBM Director Agent (agentless) device using SNMP. As IVM runs in a virtual I/O server (VIOS), you perform all tasks through the VIO server.

Currently, VIOS does not provide any command to start the SNMP daemon with *padmin* user, therefore you should access the AIX 5L V5.3 environment mode using the `oem_setup_env` command. When in AIX environment, (as root) use the

System Resource Controller `startsrc -s snmpd` command to start the snmpd daemon. See Example 3-4.

Example 3-4   Starting snmpd daemon on the VIO server

```
$ oem_setup_env
# lssrc -s snmpd
Subsystem          Group          PID          Status
snmpd              tcpip                        inoperative
# startsrc -s snmpd
0513-059 The snmpd Subsystem has been started. Subsystem PID is 188598.
# lssrc -s snmpd
Subsystem          Group          PID          Status
snmpd              tcpip          188598       active
# exit
$
```

The CIM server (cimserver) is subsequently started when IVM server is rebooted. VIO server provides the `lsnetsvc cimserver` command to check whether the cimserver is running. You can also manually start the CIM server by typing the `ioscli startnetsvc cimserver` command, as shown in Example 3-5.

> **Note:** Make sure that the cimserver is not active before you manually try to start it. If active, stop it before trying to restart it manually.

Example 3-5   Checking, stopping, and starting the cimserver on VIO server

```
$ lsnetsvc cimserver
Network service "cimserver" is not active.
$ ioscli startnetsvc cimserver
$ lsnetsvc cimserver
root   368716 1056974   0 17:31:54      -  0:00
/opt/freeware/cimom/pegasus/bin/cimservera
$
```

You can force cimserver to stop by using the `ioscli stopnetsvc cimserver` command as well.

> **Note:** In IVM server, the CIM server is integrated with one of the IVM components (ios.lparmgr.cim.rte), therefore you should be careful if you re-install or de-install the CIM server.

Discovering IVM server as a managed object

To establish the communication between IVM server and IBM Director Server, you should register IVM server into the managed objects group in IBM Director Server. There are two ways to add a managed object:

- ▶ Automatic discovery of IVM server
- ▶ Manually adding the IVM server

When the IVM server is discovered as a managed object, its IP address is stored into the IBM Director database. We recommend that you manually add the IVM server to the IBM Director's managed objects repository.

Before the manual procedure, you should start IBM Director Console using the `/opt/ibm/director/bin/twgcon` command and log in to the IBM Director Server.

If you have more than one IBM Director Server in your network environment, you can access another management server by typing the IP address (or host name) in the IBM Director Server login window. See Figure 3-15.

Figure 3-15   Logging in to IBM Director Server

Note: As we discuss only the manual procedure here, if you want your IVM server to be automatically discovered by the IBM Director Server, refer to the section "Discovering managed objects" of Chapter 4, "Managing systems" in *IBM Director Systems Management Guide Version 5.20*.

The steps to add the IVM server to managed objects in IBM Director are:

1. In the IBM Director Console menu, click **Console** → **New** → **Managed Objects** → **Systems**. See Figure 3-16.
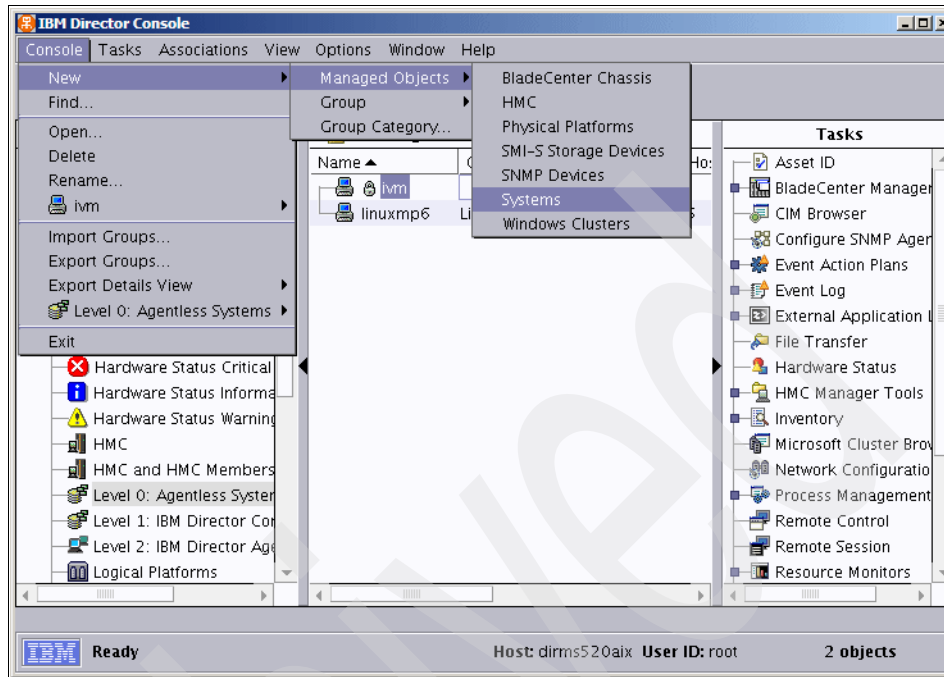
Figure 3-16   Navigating to Add a new system menu

2. In the Add Systems window, specify values for the System Name, Network
    Protocol, and Network Address fields, and click the **OK** button. When IBM
    Director finds an IVM server, you will see the complete message as shown in
    Figure 3-17. To verify the IVM server information, you have to click **Level 0 :
    Agentless Systems** in the Groups panel of IBM Director Console. If you
    cannot see it in central panel, click **All Managed Objects** in the Groups panel
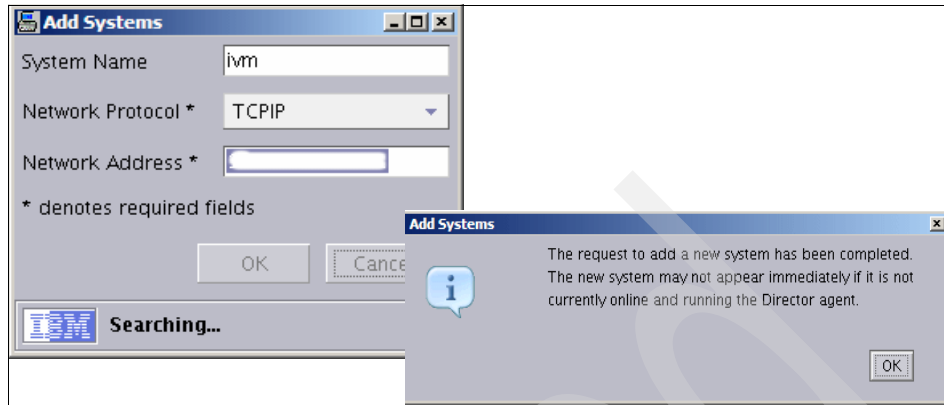   on the left.

Figure 3-17   Typing the IVM server information to add

3. Right-click the IVM server and click **Request Access**. When you provide the correct credentials for the SSH daemon in the IVM server, the managed object is unlocked, as shown in Figure 3-18.
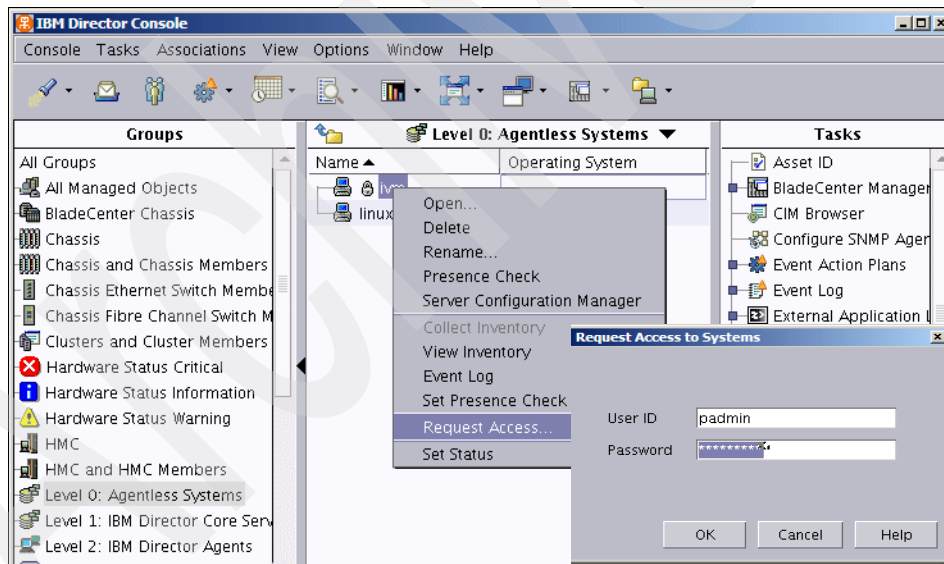

Figure 3-18   Unlocking the IVM server (Request Access)

If you upgrade to VIOS 1.3 or later from a previous VIOS version using a fix pack, and you have already manually installed OpenSSH, then the /etc/ssh/sshd_config file will not be updated. If the file is not updated, the non-interactive SSH sessions will not be allowed. In order to force the update,

run the `ioscli startnetsvc ssh` command. If the OpenSSH was not installed previously, everything should work without any manual intervention.

Adding an IVM-managed LPAR manually

There is no difference between the IVM server itself and the IVM-managed LPARs for the steps to add managed objects to IBM Director Server. You can refer to the previous section, "Discovering IVM server as a managed object" on page 58, for the steps to add a LPAR that is managed by IVM.

Launching IBM Integrated Virtualization Manager

One of the brand-new features of IBM Director 5.20 is to launch the IBM Integrated Virtualization Manager through IBM Director Console.

1. Click **Platform Managers and Members** in the left panel of IBM Director Console to go to the managed object on which IVM is installed. Then you can see that object on the central panel.

2. Right-click the IVM installed object and click **Web Browser** to launch the IVM Web-based GUI. See Figure 3-19.
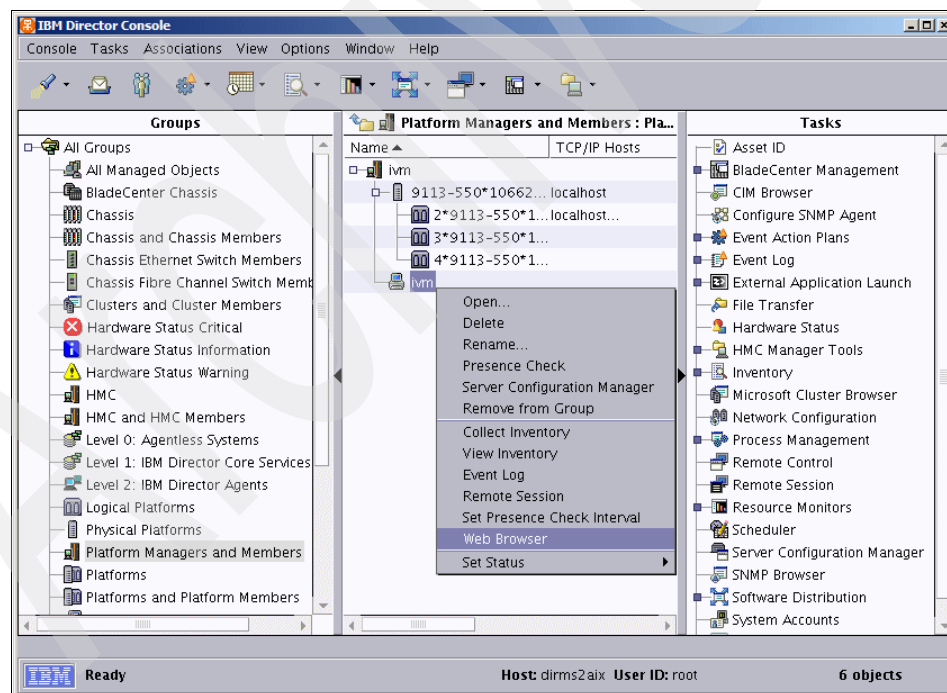

Figure 3-19   Launching IVM using IBM Director Console

> **Note:** If you cannot start the IVM Web-based GUI, we recommend that you check to see if your browser runs. If the browser can be manually started, just type the IP address of the IVM server to get the IVM Web-based GUI.

Power control for managed objects managed by IVM

Power control enablement of IBM Director Server is included as part of the base IBM Director Server installation for System p server. You do not have to install any specific extension for power control of a System p server managed by IVM.

► Power management for LPARs managed by IVM

IVM provides power control for the LPARs it manages, but does not provide power control for the LPAR or the physical system on which it runs itself. After access request from IBM Director Server is granted to the IVM, when you right-click Power Management, the menu provides the applicable tasks: *Power On* when LPAR is off, and *Power Off Now* or *Restart Now* when LPAR is on.

► Power management of a host physical System p server

A Flexible Service Processor (FSP) provides out-of-band power management for the physical system. To enable power control for the physical system managed by IVM, perform the following steps:

a. Click **Platform Managers and Members** in the Groups panel on the left. Go to the central panel and right-click the host physical system on which IVM is running. Click **Power Management** → **Request Access**.

b. Provide the requested information to authenticate your access to the host system FSP, normally which this is the *admin* user of HMC, and the appropriate password. You must authenticate only one time with the host system that IVM manages. See Figure 3-20.

c. After authentication is complete, when you right-click Power Management, the menu provides Power On or Restart Now/Power Off tasks.
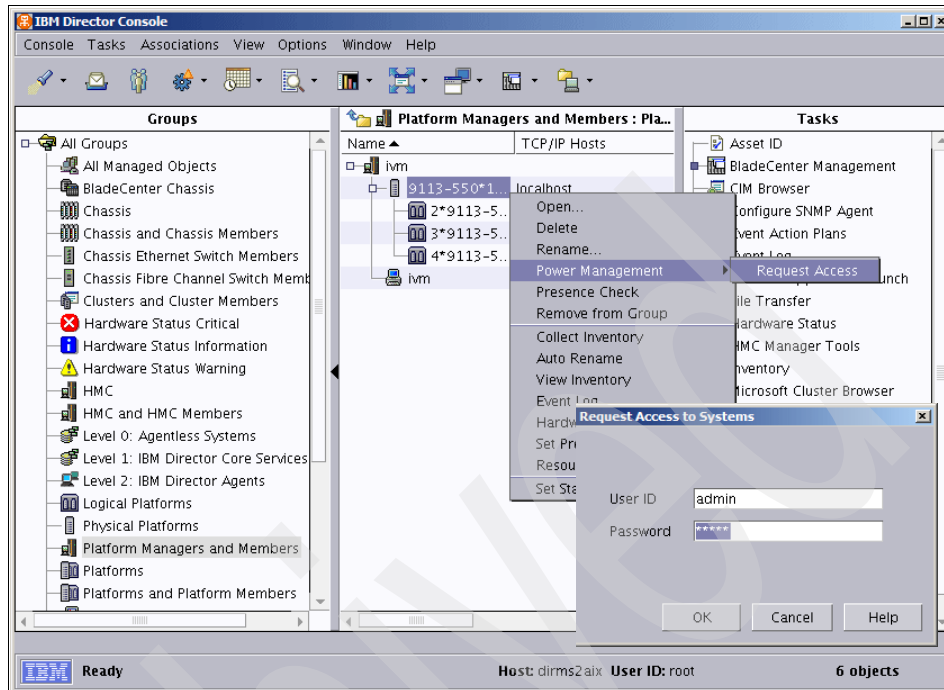
Figure 3-20   Power control for a host physical system managed by IVM

Virtual I/O Server as managed objects

Usually, VIOS is managed as a Level-0 Agent (agentless) object by IBM Director
Server. The steps for discovery and configuration of VIOS are similar to IVM,
therefore you can apply this scenario to a VIOS as well.

If you want to manage VIOS and IVM with SNMP, the SNMP scenario of this
IBM Redpaper helps you understand it. Refer to 3.3.1, "Working with SNMP on
IBM Director" on page 66. The SNMP scenario covers how to add the SNMP
device and configure SNMP features of IBM Director Server. For details on how
to use SNMP and agentless systems, see 3.3, "Working with agentless (including
SNMP) systems".

3.3 Working with agentless (including SNMP) systems

This section covers the management features provided by IBM Director for
systems where no IBM Director software is installed. Because most of the
operating systems installations come with the SNMP software installed (as the
document is related to systems on POWER platforms, we refer here to AIX and

Linux), this section also covers the SNMP installation, configuration, and features provided, and how IBM Director can interact with these systems.

The agentless systems are managed through the network services that are native to the operating system. These services can be SSH or Windows Management Instrumentation (WMI). They are called agentless or Level-0 managed systems because no IBM Director Agent is installed.
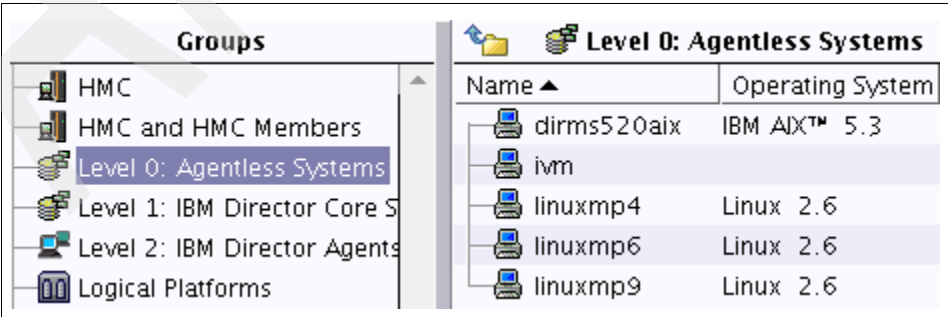
To manage a system using IBM Director, that system, at a minimum, must support the Secure Shell (SSH) or Distributed Component Object Model (DCOM) protocol. Level-0 managed systems can be IBM or non-IBM servers, desktop computers, workstations, and mobile computers.

IBM Director discovers Level-0 managed systems by verifying the IP addresses on your network and scanning the ports of those addresses using the SSH or DCOM protocols. The range of IP addresses that are verified is governed by the IBM Director discovery preferences that you configure in IBM Director Console. By default, IBM Director uses the range of addresses that are in the IP domain of the management server.

When a Level-0 managed system is discovered, it is locked by default. You can unlock the system by requesting access to it through IBM Director Console. After you discover and unlock a Level-0 managed system, you can perform a minimum set of tasks on the system:

► Collect inventory that is available from the operating system.

► Install Level 1: Core Services or Level 2: IBM Director Agent by using Software Distribution.

► Restart the operating system (Linux only).

► Run command-line programs (only if SSH is present).

The list of agentless managed systems can be obtained by selecting **Level 0: Agentless Systems** from the Groups panel, as shown in Figure 3-21.

Figure 3-21   Listing the agentless systems

Right-click one of the systems. This shows the general tasks available for it (see Figure 3-22), which include collecting and viewing the inventory, viewing the event log, and the remote session feature. Some tasks are more general, while others are specific to the operating system. For example, we can use the remote session to have a console access to the system, and that is possible because the system provides the ssh access to it.
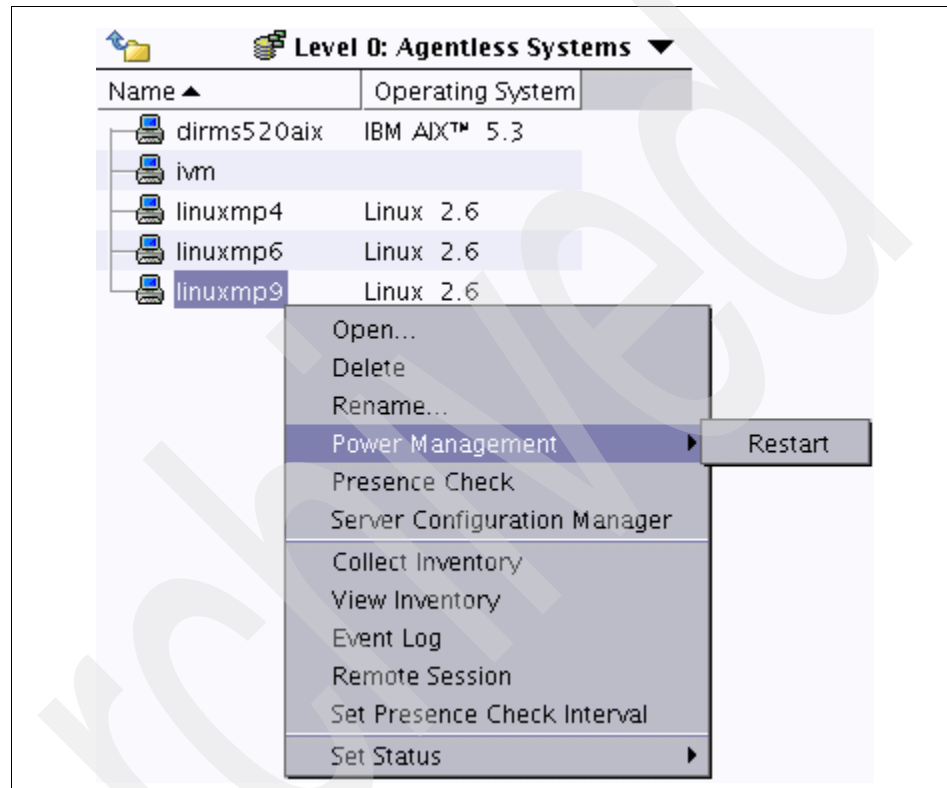
Figure 3-22   General tasks for agentless systems

Besides the regular tasks available for the agentless systems, we are interested in complementary ways to extend the management features for such systems. One solution is to use SNMP features by installing and configuring the SNMP daemon on the agentless managed system.

We cover the SNMP configuration and testing steps for AIX and Linux on POWER systems. For security reasons, we choose to work with an SNMPv3 configuration because of the security features it provides: It is a user-based authentication, the credentials (user name and password, called securityName and authKey in SNMPv3 as specified in RFC 2574) are not sent in clear text as with the community names of the previous SNMP versions.

3.3.1 Working with SNMP on IBM Director

Both AIX and Linux distributions provide SNMP packages that enable management and monitoring the system through the SNMP. AIX comes by default with the installation of the operating system. Starting with AIX 5.2, the SNMPv3 non-encrypted version is installed by default and is started at system boot time. Further details about SNMP for AIX can be found in the *Network and communication management* AIX manual, in section "SNMP for network management".

IBM Director can detect and see a system as both an agentless system and SNMP device. As Figure 3-23 shows, the same linuxmp4, linuxmp6, linuxmp9 systems can be found as SNMP devices too. Besides the basic tasks available for an agentless system, SNMP provides further options that are available, such as the SNMP Browser option.
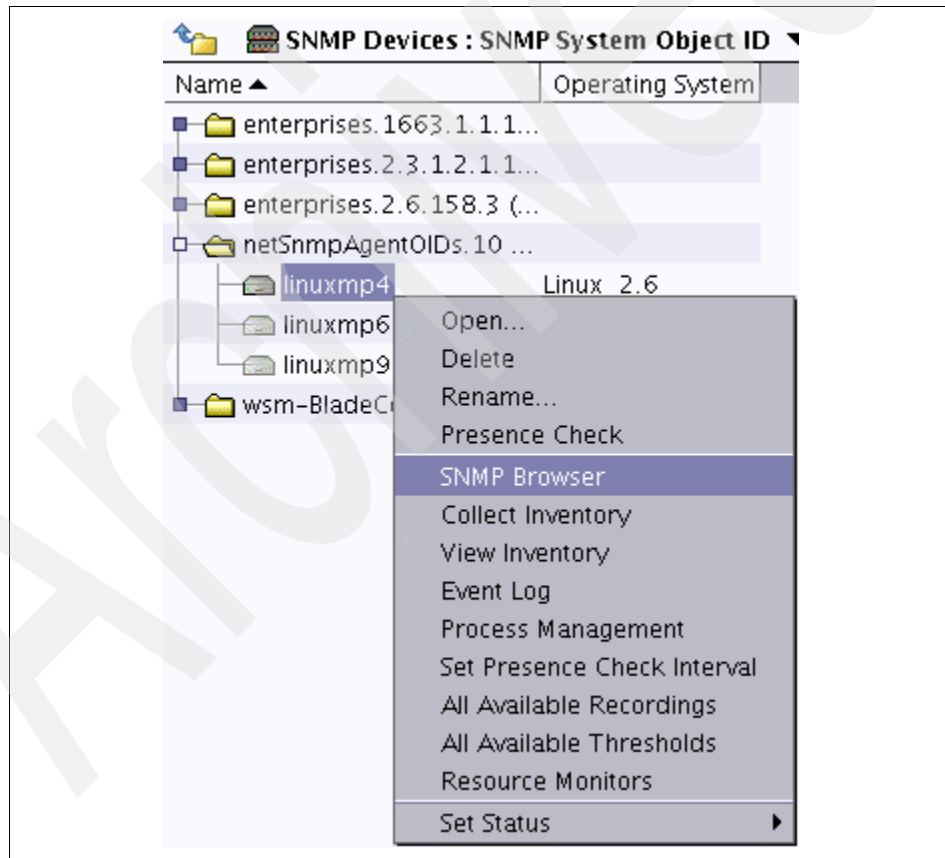
Figure 3-23   IBM Director options for SNMP devices

> **Note:** If the system is not automatically detected as an SNMP device, you can manually add it and associate the corresponding SNMP profile to it so that IBM Director server can collect the available data from the SNMP daemon of the system.

The *IBM Director Systems Management Guide* manual, section "Managing SNMP devices", describes the information required to correctly discover and set up an SNMP device or system that is running an SNMP daemon, and how to work with the SNMP Browser component.

Before adding or working with an SNMP system, a profile must exist and be associated with the system. If the SNMP agent is up and running, and we do not want to wait for IBM Director to detect the system at the next discovery interval, we can manually add the system by selecting the **SNMP Devices** group, right-clicking an empty space in the SNMP Devices: SNMP System Object ID pane, and selecting **New → SNMP Devices** (see Figure 3-24).
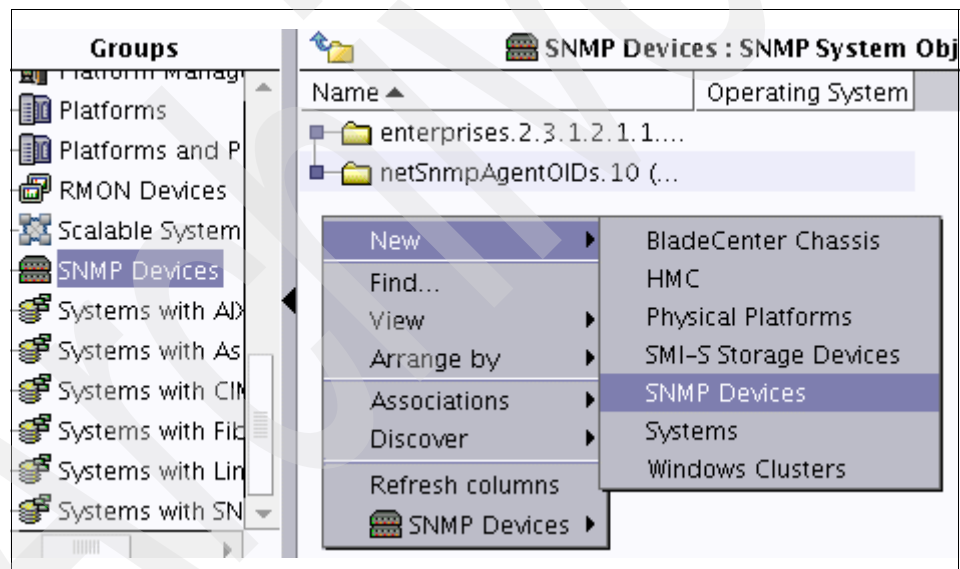
Figure 3-24   Adding an SNMP device manually

The information required is the name (if the server uses IP name resolution) or IP address of the system and a profile if the system runs an SNMPv3 configuration or the community name for SNMP v1 or v2c versions. This is the reason we have to create an SNMP profile before adding the system or device.

To create an SNMPv3 profile, the menu path is **Options** → **Server Preferences** → **SNMP** tab. For our configuration, in the Add Profile window, we have used the values shown in Table 3-1.

Table 3-1   The ibmDir user SNMPv3 profile

Field name	Field value
Profile Name	ibmDir_SNMPv3_authNoPriv_profile
User Name	ibmDir
Authentication Protocol	MD5 - HMAC
Password	dirPassword
Confirm Password	dirPassword

Our SNMPv3 user (securityName) is ibmDir with the password (authKey) dirPassword. We left the encryption fields empty. Now that we have the profile created, we can manually add the system to our list of SNMP devices. Figure 3-25 shows how we add the linuxmp4 system.
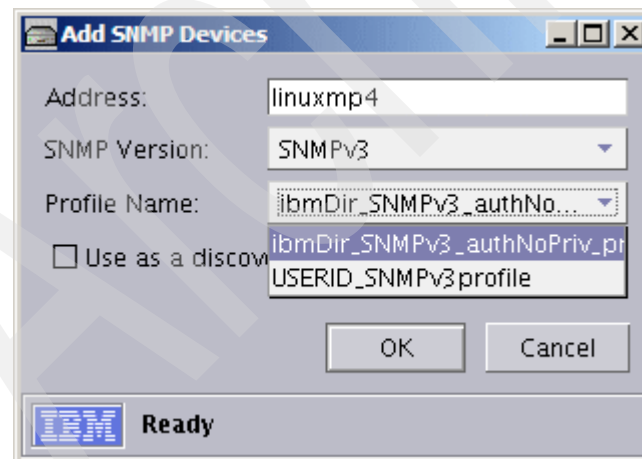
Figure 3-25   Data needed to add an SNMPv3 device

IBM Director can discover the SNMP devices automatically. By default, the IBM Director server assigns the SNMPv1 configuration with the community name *public*. Considering that the linuxmp4 system was already discovered and added, this system runs an SNMP agent configured to work with SNMPv3 configuration, and we only have to assign the right SNMPv3 profile to it. To do this, double-click the system to open the Display System Attributes window, select the SNMP Devices tab, choose the SNMPv3 option as the SNMP Version and ibmDir_SNMPv3_authNoPriv_profile option for the Profile Name field.

We can use the SNMP Browser task to view and configure the attributes of SNMP devices, for example, hubs, routers, or other SNMP-compliant management devices. SNMP Browser can also be useful for SNMP-based management, troubleshooting, or monitoring the performance of SNMP devices.

The managed system is fully configured from the IBM Director point of view and we can start using the SNMP Browser available for it. It can be started by dragging the **SNMP Browser** task onto the system or from the contextual menu of the system to select SNMP Browser menu option (see Figure 3-26).
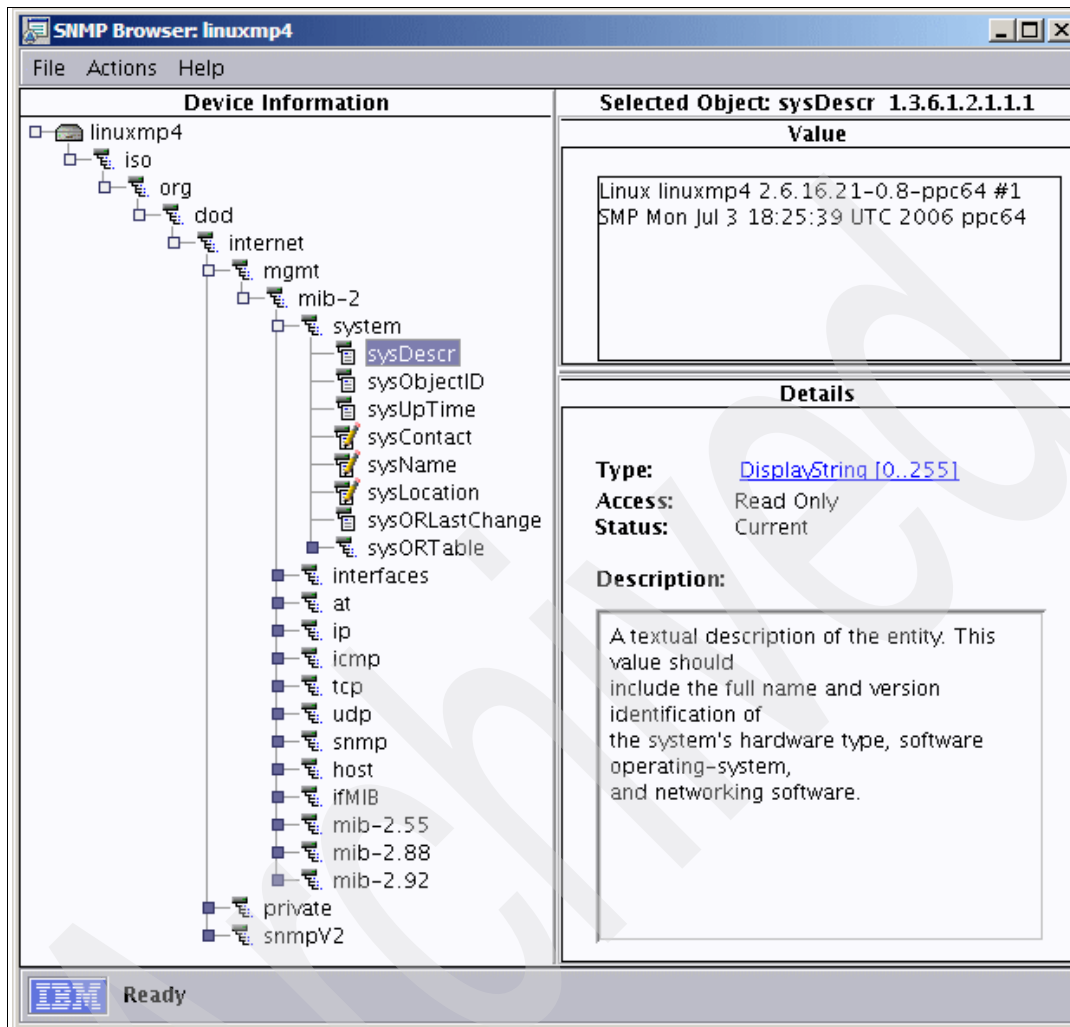
Figure 3-26   SNMP Browser to query data available on linuxmp4 system

Some of the objects in the subtree are read-only, while others can be changed. For example, in Figure 3-26, objects such as sysContact, sysName, and sysLocation have a read-write access and they can be changed to reflect specific information about the system.

Depending on the SNMP agent capabilities, more information can be extracted from the system. On linuxmp4 system, which is our target system to explore, the agent also provides further information related to hardware and software components known by the operating system. The data about the host system that an SNMP agent can provide is defined in the industry standard Host

Resources Management Information Base (MIB) document, proposed standard RFC 1514.

The Host Resources MIB supported by the SNMP agent provides information about the following components:

► Hardware components (in the *hrDevice* group, we can get data related to CPU, memory, disks, and other devices detected by the operating system, disk partitions and file systems attributes).

► Software components (the *hrSWInstalled* group contains detailed information about the software installed).

► Various statistics related to the currently running system resources (most of them are available in the *hrSWRun* and *hrSWRunPerf* groups). Additionally, the *hrSystem* group provides access to data such as the number of user sessions and processes currently running.

This is the kind of information that can be extracted from an SNMP agent. Each SNMP implementation supports multiple MIB files and therefore further data can be provided to the IBM Director Server in the form of classical or informational SNMP traps (see Figure 3-27).
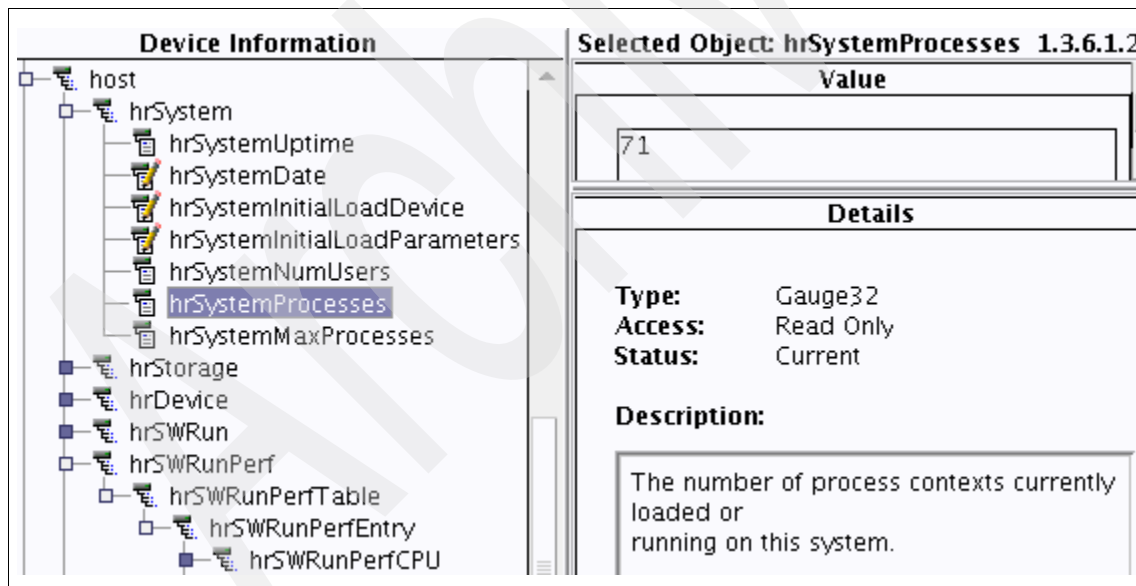

Figure 3-27   Sample statistics extracted using SNMP Browser

3.3.2 SNMP messages to IBM Director

The SNMP agents can send informational or alert messages in the form of traps to IBM Director. Like the managed systems running an IBM Director Agent, the agentless SNMP systems can send messages to IBM Director Server, and depending on the type and information some events can be triggered, the main objective being able to proactively monitor the system and minimize the response time to problems or possible problems that might affect the system.

Both AIX SNMP and Net-SNMP implementations can be further configured to send message with possible problems that might appear such as, for example, when one of the file system has only 5% free space left. The SNMP agents can monitor and send valuable information to IBM Director and the system administrator has time to solve the issue before it becomes a major problem.

For the HMC-managed environments, any LPAR system running on a server managed by an HMC system can report events. These are the serviceable events that we can work with from the Service Focal Point component of HMC.

Refer to 3.1, "Hardware Management Console managed environment" on page 42, for information about configuring the HMC system to send messages to IBM Director.

3.4 Using Software Distribution

One of the major tasks of systems management is to control the state of installed software on the systems. This task includes operations such as collecting information, installing new applications, upgrading old versions, and uninstalling deprecated or unused software.

This task is implemented within IBM Director; it is called Software Distribution.

In this scenario, we detail several practical examples based on Software Distribution. The objective is to make you more familiar with the IBM Director capabilities regarding this task, focusing on System p management.

3.4.1 Architecture

For this scenario, we have used the architecture shown in Figure 3-28.
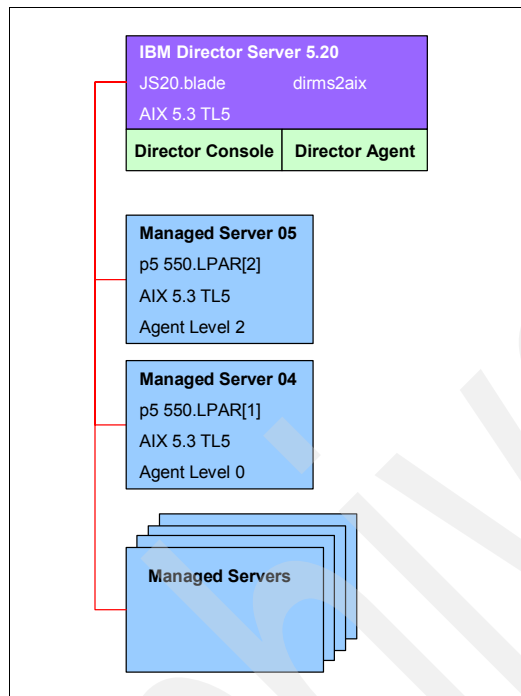
Figure 3-28   Software Distribution environment

It includes:

► IBM Director Server 5.20 on AIX 5.3, where we installed the Software Distribution Premium Edition

► AIX 5.3 managed system agentless, where we deployed the IBM Director Agent

► AIX 5.3 managed system agent Level-2, where we deployed RPMs

► Any others managed systems to create a dynamic group for patch management

Attention: The results of Software Distribution greatly depend on network reliability and bandwidth. Software Distribution can cause high usage of network bandwidth and, thus, reduce the efficiency of the network to other processes. These issues must be carefully considered when defining distribution time and parameters.

3.4.2 Implementation

Software Distribution allows users to import applications and data, build a software package, and distribute the package to IBM Director managed systems. This includes Level-0, Level-1, and Level-2 Agents.

There are two editions of Software Distribution: standard and premium. With the standard edition, customers can only import software distributed by IBM and build a software package using the Director Update Assistant wizard. With the premium edition, they can largely extend the capabilities of the tool up to the creation of fully customized packages.

Three logical steps are required to distribute software to the managed systems through this tool:

1. Obtain the software to be distributed.
2. Import the software into IBM Director Server and build a software package.
3. Distribute the software package to managed systems either by streaming from the management server to selected managed systems or by using redirected distribution.

By default, Software Distribution uses TCP. If you disable TCP-session support on a managed system, Software Distribution uses UDP.

In the following section, we provide detailed examples on both versions of the Software Distribution task in IBM Director:

► Software Distribution Standard Edition
► Software Distribution Premium Edition

3.4.3 Software Distribution (Standard Edition)

You can use the Software Distribution (Standard Edition) task to import applications and data, build a software package, and distribute the package to IBM Director managed systems. With IBM Director Software Distribution (Standard Edition), you can import only software that is distributed by IBM (such as UpdateXpress packages) and build a software package using only the IBM Update Assistant wizard.

Solution Install packages enable software distribution to Level-0, Level-1, and Level-2 managed systems. Solution Install packages contain the following elements:

► Installable unit (IU) of software that is self-extracting, self-installing, and runs in silent, unattended mode.

► Installable unit deployment descriptor (IUDD) Extensible Markup Language (XML) file, the PackagedIU.xml file that describes the dependencies of the package.

► Artifact XML file that describes the installation instructions for the IU.

A Solution Install package can be in the form of a JAR file, a .zip file, or a Solution Install formatted directory structure.

The XML specification file contains information about the software installation package such as version and source file. The cimv20.dtd and IBMupdate.xsl can be found on the ftp.software.ibm.com Web site:

► cimv20.dtd

   ftp://ftp.software.ibm.com/pc/pccbbs/pc_servers/cimv20.dtd

► IBMupdate.xsl

   ftp://ftp.software.ibm.com/pc/pccbbs/pc_servers/IBMupdate.xsl

The packaging format used is the Solution Install (SI) format, and is also supported by the AIX 5.3 `geninstall` command. The SI format is based on the IU concept, which is a software entity that can be deployed to an IT system. The solution installation architecture defines a root IU as the smallest unit of packaging. More information about the SI format can be found in the following Web site:

http://www.ibm.com/developerworks/autonomic/

The IBM Directory XML schema IBMPSG_SystemUpdateProduct inherits from CIM classes, such as the CIM_Configuration and CIM_SoftwareElement. More information about the CIM schemas can be found in the following Web sites:

► Installable Unit Deployment Descriptor Specification Version 1.0

   http://www.w3.org/Submission/InstallableUnit-DD/

► CIM Schema: Version 2.8.2 (Final)

   http://www.dmtf.org/standards/cim/cim_schema_v28

► The Open Group

   http://wiki.opengroup.org/

► OASIS

   http://www.oasis-open.org/

> **Note:** Pay attention to documentation found on the Internet and differentiate between the IBM Director (Monitoring and Management Server) and Tivoli Director (LDAP server).

Software distribution and installation flow

You must perform three steps to distribute software packages to IBM Director managed systems:

1. Obtain the software.
2. Import the software into IBM Director Server and build a software package.
3. Distribute and install the software package to managed systems.

Software specification files for distribution and installation from IBM Director should be in the XML format.

You import the XML files into IBM Director, and the IBM Update Assistant creates software packages. Then, you can use the IBM Director Software Distribution task to distribute the packages to the managed systems.

The IBM Update Assistant is a wizard that imports software that is distributed by IBM into IBM Director and creates the software package or packages for distribution.

The following detailed steps show you how to distribute and install software from the IBM Director Server system to a system with the IBM Director Agent:

1. Store BFF or RPM filesets and software installation packages in a file system directory on the IBM Director Server system. This can be done with the `bffcreate` command.
2. Create the XML software specification files for all BFF or RPM filesets to install.
3. Import the XML software specification files into IBM Director database, using the IBM Update Assistant from the IBM Director Console. To do this, select **Tasks → Software Distribution → Import Software Distribution Packages** from the IBM Director Console menu. Select **Wizards → IBM Update Assistant**. Select the XML file that was created under the previous step 2 above, and select **Next** and then **Finish**. If the XML is correct, the package specification will be updated under the Tasks column and Software Distribution → All Software Distribution Packages.
4. Install the BFF or RPM filesets on the IBM Director Agent system, using the Tasks column in the IBM Director Console. To do this, select **Software Distribution → All Software Distribution Packages → PACKAGE** in the IBM Director Console Tasks column, where PACKAGE is the imported

specification for the BFF or RPM fileset to install. Drag this package from the Tasks column to the target system in the All Managed Objects column (by default or after selecting **All Managed Objects** from the Groups column). Follow the panel instructions to perform the installation or schedule it for later (see Figure 3-29).

Figure 3-29   Confirm installation job created from drag-and-drop operation

By selecting **Schedule**, you can select the installation to be performed at a specific date and time. In our example, we select **Execute Now** and the window shown in Figure 3-30 is displayed, and the progress of the submitted task can be viewed.
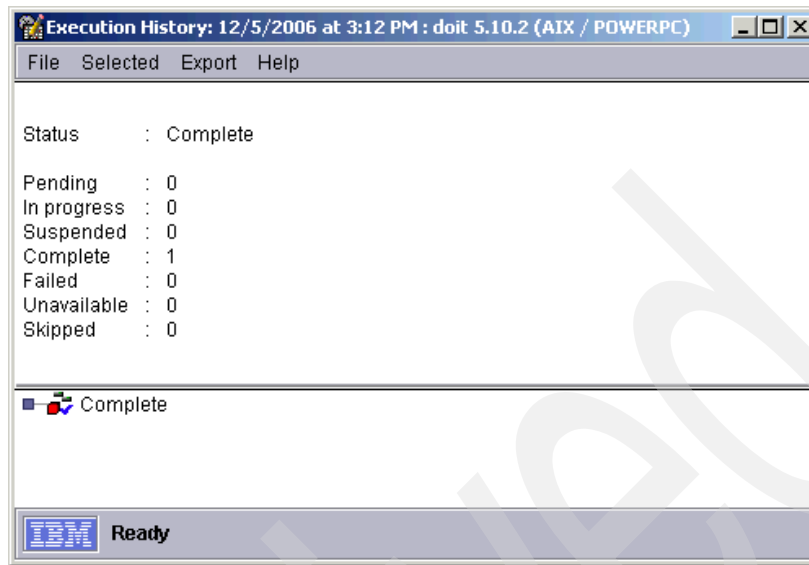
Figure 3-30   Execution history for installation task

By selecting **File** → **View Log**, the following detailed progress report is displayed in a new window. By default, the level of information is less than can be shown when selecting **View** → **Detail** → **High** as can be seen in Figure 3-31.
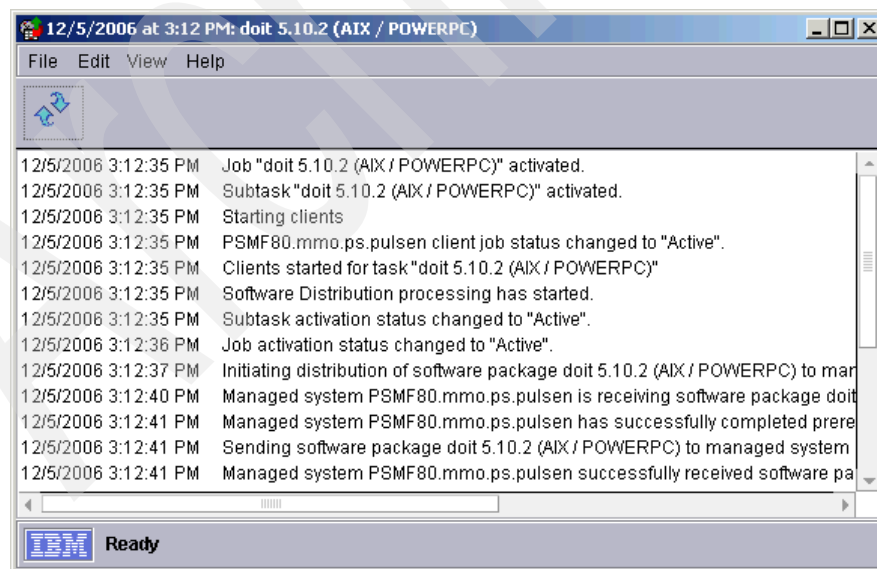

Figure 3-31   Execution log for installation task

Debugging the installation

To debug the IBM Director Agent during the installation process, perform the following steps:

1. Stop the IBM Director Agent.
2. Edit the IBM Director Agent TWGRas.properties configuration file.
3. Start the IBM Director Agent again.
4. View the logfiles in /opt/ibm/director/bin/ using the `ras*` commands.

You can stop the IBM Director Agent with the /opt/ibm/director/bin/`twgstop` command, as shown in Example 3-6.

Example 3-6   Stopping the IBM Director Agent on AIX

```
root@PSMF80:/: /opt/ibm/director/bin/twgstop
Waiting for service to end.
Service ended.
```

Edit and save the IBM Director Agent /opt/ibm/director/data/TWGRas.properties configuration file and remove all number signs (#), and set the value for `twg.ras.comps` to "262144" to debug only the software distribution part, and set it to "-1" to debug everything.

Start the IBM Director Agent again with the opt/ibm/director/bin/`twgstart` command, as shown in Example 3-7.

Example 3-7   Starting the IBM Director Agent on AIX

```
root@PSMF80:/: /opt/ibm/director/bin/twgstart
Service started.
```

The `twgstart` program checks the existence of the /opt/ibm/director/version.srv file and, if it is not readable, the `twgagent` program is started.

Monitor the installation process by viewing the /opt/ibm/director/log/TWGRas.log on the IBM Director Server using the `rasview, raswatch`, or `rasdump` commands.

The `rasdump` command (Example 3-8) formats the specified debug log into a displayable form. The output can either be displayed to standard output or piped to a text file. In Example 3-8, we use plain authentication and not encrypted, hence the error messages at startup.

Example 3-8   Using rasdump

```
root@PSMF80:/: cd /opt/ibm/director/log
root@PSMF80:/opt/ibm/director/log: ../bin/rasdump
18.01.42.441 -- Trace log TWGServer (TWGVersion 5.10 2006-01-20 build id 38) os.name="AIX"
```

```
18.03.26.700 !! TWGServer TWGExtension.LateLaunch()
18.04.33.150 !! TCPIP sender TWGIPCXferSend failed to send DGRAM_SIMPLE_SEND to
172.16.52.19 for xfer 3. key=1405735931 TWGDatagram.SendEncryptedDatagram:  Creating
or encrypting send data packet failed to TCPIP::172.16.52.19
18.04.33.169 !! TCPIP sender TWGIPCXferSend failed to send DGRAM_SIMPLE_SEND to
172.16.52.19 for xfer 4. key=1405735931 TWGDatagram.SendEncryptedDatagram:  Creating
or encrypting send data packet failed to TCPIP::172.16.52.19
18.04.38.839 !! TCPIP sender TWGIPCXferSend failed to send DGRAM_SIMPLE_SEND to
172.16.52.19 for xfer 2. key=1405735931 TWGDatagram.SendEncryptedDatagram:  Creating
or encrypting send data packet failed to TCPIP::172.16.52.19
. . .
```

The `rasview` command (Example 3-9) and the `raswatch` command format the
debug information in real time in the standard output stream of the current shell.
Functionally, these commands are the same; however, `raswatch` contains a
check that it does not start unless the IBM Director service is already active.

Example 3-9   Using rasview

```
root@PSMF80:/: cd /opt/ibm/director/log
root@PSMF80:/opt/ibm/director/log: ../bin/rasview -high -mask=262144
Viewing log for all components
. . .
2006-12-05 18.05.52.306 !! Thread-92 pegcli      at
com.tivoli.twg.engine.TWGNatveManagedObject$SubscriptionThread.run(TWGNativeManagedOb
ject.java:5750)
. . .
2006-12-05 18.08.20.974 !! ServiceNode <TicUnixAgent> pegcli     at
com.tivoli.twg.inventory.agent.unix.TicUnixInventory.GetTables(TicUnixInventory.java:
171)
2006-12-05 18.08.20.974 !! ServiceNode <TicUnixAgent> pegcli     at com.tivoli.tw
g.inventory.agent.unix.TicUnixInventory.CommandReceived(TicUnixInventory.java:118)
. . .
```

Creating the installation package

The installation package should consist of two files, one XML specification file
and one self-installing file.

Creating the self-installing file

The IBM Director usually only transfers one package file to be installed. It is then
up to this package file to perform whatever operations it wants to update or install
software on the IBM Director managed node, in this case, an IBM Director Agent
node.

The self-installing file is first transferred by the IBM Director Server and then it is executed on the IBM Director Agent.

The method used by the default upgrade package for the IBM Director Agent is a form of SHAR-archive (SHell ARchiving utility).

The files in a shell archive are concatenated without compression, and the resultant archive is essentially a shell script, complete with `#!/bin/sh` header (or other "shebang"), and containing all the necessary unarchiving and installation commands.

The file package can be a executable binary or even a normal shell script. The shell script can invoke Network Installation Manager (NIM) to perform installation of the software or can perform Network File System (NFS) mounts and use **installp** or **rpm** install commands to install specific software from a remote server.

> **Attention:** Do *not* edit the script with a Microsoft Windows editor, or something similar, that adds a Carriage Return (CR) character after each line in addition to the Line Feed (LF) character. For UNIX® and AIX, each line should be terminated with only the LF character. If there is a CR character at the end of the script lines, the script will not be executed by the IBM Director Agent after it is transferred and the task will be incomplete.

The following simple script installs the bos.adt fileset on the NIM client LPAR66, from the NIM master named MASTER, using the NIM lpp_source LPP530. The **c_sm_nim_cust** script is a SMIT installation script that uses the **nimclient** command. The script is named Hello and can be executed from the command line with **ksh -xvn Hello** for verification (see Example 3-10).

Example 3-10   Example IBM Director installation package script "Hello" with nimclient commands

```
#!/usr/bin/ksh
niminit -aname=LPAR66 -apif_name=en0 -amaster=MASTER -aplatform=chrp -acable_type1="N/A"
/usr/lpp/bos.sysmgt/nim/methods/c_sm_nim cust  -l LPP530 \
-o 'bos.adt ALL @@I:bos.adt _all_filesets' -f Y -f g -f X
```

The **nimclient** command can be used to install software bundles of BFF or RPM filesets from the NIM master to the NIM client or clients, which are also IBM Director managed systems.

> **Note:** The error message "`0042-041 niminit: /etc/niminfo already exists`" is not important; it only warns that the client system is already a NIM client.

Creating the XML specification file

The following sample XML uses a script (`doinstallp`) to install the AIX 5.3 content list fileset. The `doinstallp` script is just a simple korn shell script using the `installp` command. To view the XML file using the XSL translation, just open the XML file in a Web browser, provided the cimv20.dtd and IBMupdate.xsl files are in the same directory. In the XML in Example 3-11, the script name is Hello and the package is named Hello.

Example 3-11   Sample XML specification file for IBM Director Software Distribution package

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<!DOCTYPE CIM SYSTEM "cimv20.dtd">
<?xml-stylesheet type="text/xsl" href="IBMupdate.xsl" ?>
<CIM CIMVERSION="2.0" DTDVERSION="2.0">
 <MESSAGE ID="1" PROTOCOLVERSION="1.0">
 <MULTIREQ>
  <SIMPLEREQ>
   <IMETHODCALL NAME="CreateInstance">
    <LOCALNAMESPACEPATH>
     <NAMESPACE NAME="root"/>
     <NAMESPACE NAME="cimv2"/>
    </LOCALNAMESPACEPATH>
    <IPARAMVALUE NAME="NewInstance">
     <INSTANCE CLASSNAME="IBMPSG_SystemUpdateProduct">
      <PROPERTY NAME="Name" TYPE="string"><VALUE>Hello</VALUE></PROPERTY>
      <PROPERTY NAME="IdentifyingNumber"
TYPE="string"><VALUE>999999999</VALUE></PROPERTY>
      <PROPERTY NAME="Version" TYPE="string"><VALUE>1.0</VALUE></PROPERTY>
      <PROPERTY NAME="ibmSchemaVersion" TYPE="string"><VALUE>1.0</VALUE></PROPERTY>
     </INSTANCE>
    </IPARAMVALUE>
   </IMETHODCALL>
  </SIMPLEREQ>

  <SIMPLEREQ>
   <IMETHODCALL NAME="CreateInstance">
    <LOCALNAMESPACEPATH>
     <NAMESPACE NAME="root"/>
     <NAMESPACE NAME="cimv2"/>
    </LOCALNAMESPACEPATH>
    <IPARAMVALUE NAME="NewInstance">
     <INSTANCE CLASSNAME="IBMPSG_SystemUpdateElement">
<PROPERTY NAME="Name" TYPE="string"><VALUE>Hello</VALUE></PROPERTY>
<PROPERTY NAME="SoftwareElementID" TYPE="string"><VALUE>ABCDEF</VALUE></PROPERTY>
<PROPERTY NAME="SoftwareElementState" TYPE="uint16"><VALUE>1</VALUE></PROPERTY>
```

```
<PROPERTY NAME="TargetOperatingSystem" TYPE="uint16"><VALUE>9</VALUE></PROPERTY>
<PROPERTY NAME="type" TYPE="uint16"><VALUE>4</VALUE></PROPERTY>
<PROPERTY NAME="Version" TYPE="string"><VALUE>Version 1.0</VALUE></PROPERTY>
<PROPERTY.ARRAY NAME="applicableMachineTypes" TYPE="string"><VALUE.ARRAY>
    <VALUE>IBM Director Agent Install</VALUE>
 </VALUE.ARRAY></PROPERTY.ARRAY>
<PROPERTY.ARRAY NAME="applicableOperatingSystems" TYPE="string"><VALUE.ARRAY>
    <VALUE>AIX 5L Version 5.2</VALUE>
    <VALUE>AIX 5L Version 5.3</VALUE>
</VALUE.ARRAY></PROPERTY.ARRAY>
<PROPERTY.ARRAY NAME="architecture" TYPE="string"><VALUE.ARRAY>
    <VALUE>POWERPC</VALUE>
</VALUE.ARRAY></PROPERTY.ARRAY>
<PROPERTY NAME="buildNumber" TYPE="string"><VALUE>WBYT21AUS</VALUE></PROPERTY>
<PROPERTY NAME="description" TYPE="string"><VALUE>This package installs
Hello.</VALUE></PROPERTY>
<PROPERTY NAME="installCommandLine" TYPE="string"><VALUE></VALUE></PROPERTY>
<PROPERTY NAME="installationNotes" TYPE="string"><VALUE>This is a NIM installation
script.</VALUE></PROPERTY>
<PROPERTY NAME="languageEdition" TYPE="string"><VALUE>All</VALUE></PROPERTY>
<PROPERTY NAME="manufacturer" TYPE="string"><VALUE>IBM</VALUE></PROPERTY>
<PROPERTY NAME="rebootRequired" TYPE="uint8"><VALUE>0</VALUE></PROPERTY>
<PROPERTY NAME="regions" TYPE="string"><VALUE>Worldwide</VALUE></PROPERTY>
<PROPERTY NAME="releaseDate"
TYPE="datetime"><VALUE>2006-04-15T14:36:11Z</VALUE></PROPERTY>
<PROPERTY NAME="revisionHistory" TYPE="string"><VALUE>1.0 Modified
2006-04-15T14:36:11Z.</VALUE></PROPERTY>
<PROPERTY NAME="severity" TYPE="uint8"><VALUE>99</VALUE></PROPERTY>
<PROPERTY NAME="installDirectory" TYPE="string"><VALUE>./FILES</VALUE></PROPERTY>
<PROPERTY NAME="unattendedInstallCommandLine"
TYPE="string"><VALUE>./Hello</VALUE></PROPERTY>
<PROPERTY NAME="unattendedUninstallCommandLine"
TYPE="string"><VALUE></VALUE></PROPERTY>
<PROPERTY NAME="uninstallCommandLine" TYPE="string"><VALUE></VALUE></PROPERTY>
     </INSTANCE>
    </IPARAMVALUE>
   </IMETHODCALL>
  </SIMPLEREQ>
 </MULTIREQ>
 </MESSAGE>
</CIM>
```

Some of the CIM and IBMPGS XML properties are:

Name   The name used to identify this software element

softwareElementState CIM-derived attribute identifies the installation state of software; valid values are: 0=Deployable, 1 = Installable, 2 = Executable, 3 = Running

softwareElementID   CIM-derived attribute used as an identifier for this software element that can be used as a unique identifier when the Name attribute value is insufficient

identifyingNumber   CIM-derived attribute for product identification such as a serial number

manufacturer   CIM-derived attribute identifying the software manufacturer

languageEdition   The language edition of this software element; the language codes defined in ISO 639 should be used

Version   CIM-derived attribute for version and release; version should be in the form <Major>.<Minor>.<Revision> or <Major>.<Minor><letter><revision>

TargetOperatingSystem

       The target operating system environment. Two other pieces of information are required. First, the version of the operating system (OS) has to be specified, using the OS Version Check. The second piece of information is the architecture that the OS runs on. This information is captured with the ArchitectureCheck class. The combination of these constructs allows the provider to clearly identify the level of OS required for a particular software element.

rebootRequired   If rebootRequired is set (1), the installation expects that *the IBM Director Agent will be restarted, not the system*.

installDirectory   The installDirectory property specifies the directory on the IBM Director Server where the package in the unattendedInstallCommandLine can be found.

unattendedInstallCommandLine

       The unattendedInstallCommandLine is the file name and file system path, relative to the value of installDirectory property.

3.4.4 Software Distribution (Premium Edition)

You can use the Software Distribution (Premium Edition) task to import applications and data, build a software package, and distribute the package to IBM Director managed systems.

In addition to the functions provided by IBM Director Software Distribution (Standard Edition), Software Distribution (Premium Edition) has several additional capabilities.

For AIX on System p and Linux, you can import software or build software packages with the following wizards:

► AIX InstallP wizard (AIX)
► RPM Package wizard (AIX and Linux)

The principles for both wizards are the same, therefore we only show the steps with the AIX InstallP wizard.

AIX InstallP wizard

Using the AIX InstallP wizard is much more easy and simpler for installing BFF filesets on AIX systems. This is the preferred way to use for installing BFF filesets with IBM Director to managed AIX systems.

The steps to distribute and install software from the IBM Director Server system to a system with IBM Director Agent installed are:

1. Store BFF or RPM filesets and software installation packages in a file system directory on the IBM Director Server system. This can be done with the `bffcreate` command.

2. Create a Software Distribution package. To do this, select **Tasks** → **Software Distribution** → **Import Software Distribution Packages** from the IBM Director Console menu. Select **Wizards** → **AIX InstallP Package** or **Wizards** → **RPM Package**, depending on the fileset format. Name the package and select **Next**. Add filesets to the package by clicking **Add** and then select the required filesets. Then select **Finish** and the package is created.

3. Install the BFF or RPM filesets on the IBM Director Agent system, using the Tasks column in the IBM Director Console. To do this, select **Software Distribution** → **All Software Distribution Packages** → **PACKAGE** in the IBM Director Console Tasks column, where PACKAGE is the created package to install. Drag this package from the Tasks column to the target system in the All Managed Objects column (by default or after selecting **All Managed Objects** from the Groups column). Follow the panel instructions to perform the installation or schedule it for later.

Figure 3-32 shows the status of the installation, from "In progress" to "Complete".
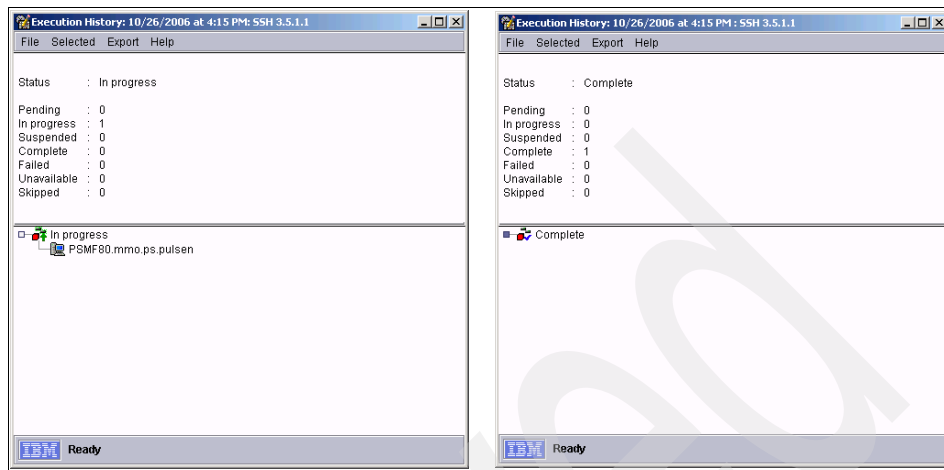
Figure 3-32   Submitted installation task

A

Configuring SNMPv3 for AIX and Linux for POWER

In this appendix, we provide the configuration steps performed in order to have a secure SNMPv3 configuration ready to be used. The targets for our two configuration examples are an AIX v5.3 system and a Linux SUSE Linux Enterprise Server 10 (SLES 10) system.

There are different Simple Network Management Protocol (SNMP) implementations available for AIX and Linux. For the AIX system, we use the native SNMP implementation that comes by default with the operating system, and for the Linux system we use the Net-SNMP agent implementation.

A.1 AIX SNMPv3 configuration

The SNMP agent that is installed by default with the AIX operating system is part of the bos.net.tcp.server fileset. This fileset includes the SNMP agent, the SNMP DPI2 subagents, and the *snmpinfo* program used for getting the setting data in SNMP objects that the agent provides.

In AIX, the SNMP agent (snmpd daemon) and the three *hostmibd*, *snmpmibd*, *aixmibd* DPI2 subagents are started at boot time from the /etc/rc.tcpip file as subsystems. At run time, the status can be obtained using the lssrc utility to query the SRC master, as shown in Example A-1.

Example: A-1   Using the lssrc utility to query the SRC master

```
# lssrc -g tcpip | egrep "snmp|mib"
 snmpd           tcpip           192606          active
 hostmibd        tcpip           196704          active
 snmpmibd        tcpip           90286           active
 aixmibd         tcpip           155732          active
#
```

In terms of security, SNMPv3 provides authentication and privacy services. The authentication is not based on a community name that is sent in clear text in the datagram from the SNMP manager to the agent. The SNMPv1 and SNMPv2c versions are community-based. The SNMPv3 specification adds the security features that the previous versions lacked. The second security feature, called *privacy*, offers the encryption of the messages in the client agent communication.

> **Note:** To use the SNMPv3 privacy features, the SNMP encrypted version has to be installed. This version can be found in the AIX Expansion Pack.

The SNMPv3 architecture introduces the User-based Security Model (USM) for message security and the View-based Access Control Model (VACM) for access control. USM uses the concept of a user for which security parameters (levels of security, authentication and privacy protocols, and keys) are configured at both the agent and the manager. The use of VACM involves defining collections of data (called *views*), groups of users of the data, and access statements that define which views a particular group of users can use for reading, writing, or receipt in a trap.

This configuration covers the USM and VACM part of SNMPv3 configuration. In terms of USM data, this means that we have to provide information about the

user (securityName, authProto, authKey). The VACM part contains the mappings between the user, group, data, and type of access granted.

We do not have to restrict the access of our user to any data. We just create the user, named ibmDir, who will be used by the IBM Director Server to access (read access, write access where possible) the data provided by the SNMP agent.

The snmpd daemon uses the /etc/snmpdv3.conf configuration file. This is the only file that we work with for configuring the agent.

We start by generating the authentication keys for our user using the **pwtokey** command, as shown in Example A-2.

Example: A-2   Generating the authentication keys using pwtokey

```
# pwtokey -p HMAC-MD5 -u auth dirPassword virt_p1
Display of 16 byte HMAC-MD5 authKey:
a58285ed4173335c24bdd9ab47c0d69b

Display of 16 byte HMAC-MD5 localized authKey:
e4c1608c220969eca14ea2333fa76edc

#
```

We update the snmpdv3.conf file to include for the user ibmDir the following entries, as shown in Example A-3.

Example: A-3   SNMPv3 configuration for ibmDir user (USM part)

```
#---------------------------------------------------------------------
# USM_USER entries
#    Defines a user for the User-based Security Model (USM).
# Format is:
# userName engineID authProto authKey privProto privKey keyType storageType
#---------------------------------------------------------------------

USM_USER ibmDir - HMAC-MD5 e4c1608c220969eca14ea2333fa76edc - - L -
```

Note that we chose the localized authKey from the **pwtokey** output to be included as the authKey of the ibmDir user. As specified in RFC 2574, the localized key is a secret key shared between a user and the authoritative SNMP engine. Even though a user might have only one password and therefore one key for the whole network, the actual secrets shared between the user and each authoritative SNMP engine are different.

We want our user to have access to any data available. For this case, to have a common configuration for both AIX and Linux (configuration of it is described later in this document), we choose to provide the ibmDir user access to *system*, *interfaces*, *tcp*, and *host* subtrees. To accomplish this, we update the /etc/snmpdv3.conf file on AIX with the following entries, as shown in Example A-4.

Example: A-4   SNMPv3 configuration for ibmDir user (VACM part)

```
#----------------------------------------------------------------------------
# VACM_GROUP entries
#     Defines a security group (made up of users or communities)
#     for the View-based Access Control Model (VACM).
# Format is:
#   groupName securityModel securityName storageType
#----------------------------------------------------------------------------

VACM_GROUP ibmDirGrp USM ibmDir -

#----------------------------------------------------------------------------
# VACM_VIEW entries
#     Defines a particular set of MIB data, called a view, for the
#     View-based Access Control Model.
# Format is:
#   viewName viewSubtree viewMask viewType storageType
#----------------------------------------------------------------------------

VACM_VIEW ibmDirGrpView system - included -
VACM_VIEW ibmDirGrpView host - included -
VACM_VIEW ibmDirGrpView tcp - included -
VACM_VIEW ibmDirGrpView interfaces - included -

#----------------------------------------------------------------------------
# VACM_ACCESS entries
#     Identifies the access permitted to different security groups
#     for the View-based Access Control Model.
# Format is:
#   groupName contextPrefix contextMatch securityLevel securityModel readView
# writeView notifyView storageType
#----------------------------------------------------------------------------

VACM_ACCESS ibmDirGrp - - AuthNoPriv USM ibmDirGrpView ibmDirGrpView
ibmDirGrpView -
```

We can now restart the snmpd daemon and do some basic tests to check our configuration. The snmpd daemon is a subsystem and can be managed using the SRC utilities. To restart the snmp daemon, you can use the **stopsrc** and **startsrc** commands, as shown in Example A-5.

Example: A-5   Restarting the SNMP agent on AIX

```
# stopsrc -s snmpd
0513-044 The snmpd Subsystem was requested to stop.
# startsrc -s snmpd
0513-059 The snmpd Subsystem has been started. Subsystem PID is 446670.
#
```

A basic verification of the configuration is to request some data to the SNMP agent. The basic test can include some read and write operations on the agent. The steps can be performed on any other SNMP implementation that is not particularly related to AIX environment.

In Example A-6, we do a **snmpwalk** to browse the system subtree, and we change the system location information (available in sysLocation object instance) with **snmpset** and read it again to see the changes using the **snmpget** command.

Example: A-6   Basic verification test on the SNMP agent

```
# snmpwalk -v3 -l authNoPriv -u ibmDir -a MD5 -A dirPassword virt_p1 system
SNMPv2-MIB::sysDescr.0 = STRING: IBM PowerPC CHRP Computer
Machine Type: 0x0800004c Processor id: 00C6627E4C00
Base Operating System Runtime AIX version: 05.03.0000.0050
TCP/IP Client Support version: 05.03.0000.0051
SNMPv2-MIB::sysObjectID.0 = OID: SNMPv2-SMI::enterprises.2.3.1.2.1.1.3
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (712100) 1:58:41.00
SNMPv2-MIB::sysContact.0 = STRING:
SNMPv2-MIB::sysName.0 = STRING: virt_p1
SNMPv2-MIB::sysLocation.0 = STRING:
SNMPv2-MIB::sysServices.0 = INTEGER: 72
SNMPv2-MIB::sysORLastChange.0 = Timeticks: (600) 0:00:06.00
SNMPv2-MIB::sysORID.1 = OID: SNMPv2-SMI::enterprises.2.3.1.2.1.1.3
SNMPv2-MIB::sysORID.2 = OID: SNMPv2-SMI::enterprises.2.3.1.2.3.1.1
SNMPv2-MIB::sysORID.3 = OID: SNMPv2-SMI::enterprises.2.6.191
SNMPv2-MIB::sysORID.4 = OID: SNMPv2-SMI::enterprises.2.3.1.2.1.6
SNMPv2-MIB::sysORID.5 = OID: HOST-RESOURCES-MIB::host
SNMPv2-MIB::sysORDescr.1 = STRING: AIX SNMP Agent
SNMPv2-MIB::sysORDescr.2 = STRING: SMUX ATM daemon
SNMPv2-MIB::sysORDescr.3 = STRING: AIX Enterprise MIB Support subagent
SNMPv2-MIB::sysORDescr.4 = STRING: AIX SNMP MIB SubAgent
SNMPv2-MIB::sysORDescr.5 = STRING: Host Resources DPI sub-agent Version 1

... (content omitted) ...

# snmpget -v3 -l authNoPriv -u ibmDir -a MD5 -A dirPassword virt_p1 sysLocation.0
SNMPv2-MIB::sysLocation.0 = STRING:
```

```
# snmpset -v3 -l authNoPriv -u ibmDir -a MD5 -A dirPassword virt_p1
sysLocation.0 s 'DataRoom2,Floor 1'

# snmpget -v3 -l authNoPriv -u ibmDir -a MD5 -A dirPassword virt_p1 sysLocation.0
SNMPv2-MIB::sysLocation.0 = STRING: DataRoom2,Floor 1
```

The read and write operations work, therefore we consider our configuration and test for the SNMPv3 agent on AIX completed.

After the managed system is added to the IBM Director Server, using the SNMP Browser on the same system (named virt_p1), we have access to the components that we defined in the VACM configuration part (see Example A-4 on page 90). See Figure A-1.
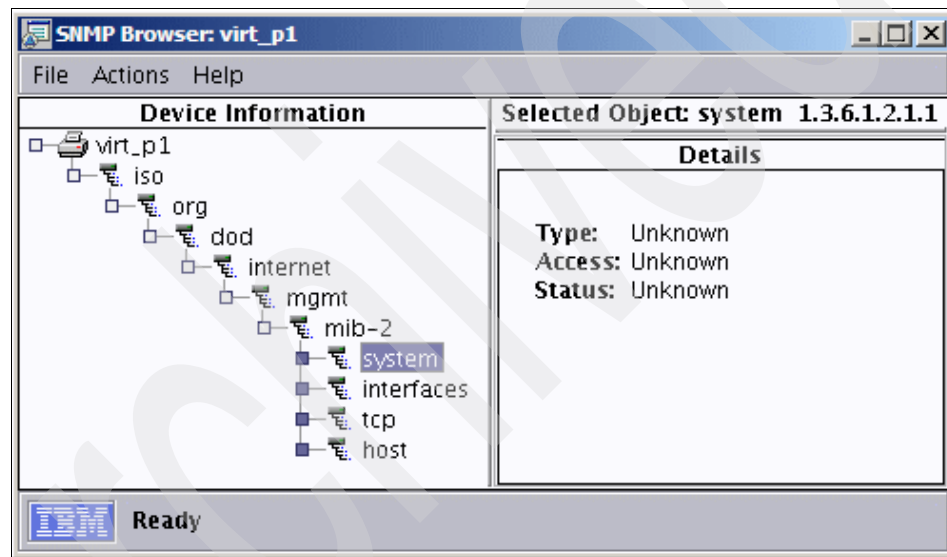

Figure A-1   Checking the data provided by the agent using SNMP Browser

The aixmibd SNMP DPI2 subagent collects data from the system for variables defined in the AIX enterprise specific Management Information Base (MIB). The subagent receives SNMP requests and sends data via the SNMP-DPI API for communication with the main AIX snmpd daemon. An Enterprise Management application or other simple application (for example, `snmpinfo` command) uses SNMP protocol to get or set AIX MIB objects.

One focus of the aixmibd subagent is on the data related to the file systems, volume groups, logical volumes, physical volumes, paging space, processes, print queues, print jobs, system users, system groups, users currently logged in, subsystems, subservers, system environment, and various devices.

Another focus of the aixmibd subagent is on important system traps. Traps, which are also called *indications*, or *notifications*, are event reports and are used to decrease the length of time between when the event happens and when it is noticed by a manager so that the event can be handled in a timely manner. Traps are generated periodically to report the status change and operating status of the system.

The aixmibd daemon can be configured for sending informations or alerts to the IBM Director Server with valuable information about the status of the different components.

More information about configuring the aixmibd subagent can be found in the aixmibd manual pages.

A.2 Linux SNMPv3 configuration

This section describes the steps for configuring the SNMPv3 on a Linux system. Although we refer in this document to Red Hat and SUSE distributions available on POWER platforms and supported by the IBM Director, the actual configuration applies to any other Linux system that we might want to have configured to send messages to our IBM Director Server.

The information presented covers the Net-SNMP agent that is included in most of the Linux distribution, including the Red Hat Enterprise Linux (RHEL) and SUSE distributions. We can either install the packages available on the distribution kit or to go to:

http://net-snmp.sourceforge.net

Then download the source code of the latest version, compile it, and install it.

The system we choose for this configuration is the linuxmp4 system, running SLES 10. The Net-SNMP implementation for SLES 10 comes with the distribution as net-snmp-5.3.0.1-25.2.ppc.rpm package. This package includes all the utilities and daemons that we need to start our SNMPv3 configuration from scratch.

The Net-SNMP agent has a snmpd.conf configuration file associated. Usually, by running a `rpm -ql net-snmp` on the system to list the files installed by the package, we can see that the full path of it is /etc/snmp/snmpd.conf. But there is another more useful way to find the places where the agent is looking for the configuration files at startup.

For starting and stopping the agent, the following commands are available:

- For starting the agent, either **service snmpd start** or **/etc/init.d/snmpd start** commands can be used.

- For stopping the agent, either **service snmpd stop** or **/etc/init.d/snmpd stop** commands can be used.

Considering that for our distribution and package installed, we do not know the location of the persistent data file, the snmpd program can help us by providing the path it searches for the snmpd.conf configuration file, by running the following command:

```
snmpd -Dread_config -H 2>&1 | grep "config path" | sort -u
```

This can have an output similar to the one shown in Example A-7.

Example: A-7   Paths that Net-SNMP agent searches for snmpd.conf file

```
# snmpd -Dread_config -H 2>&1 | grep "config path" | sort -u
read_config:  config path used for
agentx:/etc/snmp:/usr/share/snmp:/usr/lib/snmp:/root/.snmp (persistent
path:/var/lib/net-snmp)
read_config:  config path used for agentx:/var/lib/net-snmp (persistent
path:/var/lib/net-snmp)
read_config:  config path used for
snmp:/etc/snmp:/usr/share/snmp:/usr/lib/snmp:/root/.snmp (persistent
path:/var/lib/net-snmp)
read_config:  config path used for snmp:/var/lib/net-snmp (persistent
path:/var/lib/net-snmp)
read_config:  config path used for
snmpd:/etc/snmp:/usr/share/snmp:/usr/lib/snmp:/root/.snmp (persistent
path:/var/lib/net-snmp)
read_config:  config path used for snmpd:/var/lib/net-snmp (persistent
path:/var/lib/net-snmp)
#
```

The snmpd.conf configuration file is /etc/snmp/snmpd.conf. There is also a /var/lib/net-snmp/snmpd.conf persistent data file. The persistent data file is the place where the agent keeps all the SNMP objects data that can be changed at run time (and not defined in /etc/snmp/snmpd.conf file). Usually, we do not have to use the persistent data file, because the agent is doing the management of it.

For a simple test to make sure that the SNMP agent works properly, we can create a basic configuration by having only the lines shown in Example A-8 in the /etc/snmp/snmpd.conf file.

Example: A-8   Basic configuration file for the agent

```
syslocation Somewhere
rocommunity public
rwcommunity private
```

We start or restart the agent and do some read and write operations as shown in Example A-9.

Example: A-9   Read and write operations for testing a basic SNMP configuration

```
# snmpwalk -v1 -c public linuxmp4 system
SNMPv2-MIB::sysDescr.0 = STRING: Linux linuxmp4 2.6.16.21-0.8-ppc64 #1
SMP Mon Jul 3 18:25:39 UTC 2006 ppc64
SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmpAgentOIDs.10
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (1101) 0:00:11.01
SNMPv2-MIB::sysContact.0 = STRING: root@localhost
SNMPv2-MIB::sysName.0 = STRING: linuxmp4
SNMPv2-MIB::sysLocation.0 = STRING: Somewhere
... (content omitted) ...

# snmpget -v2c -c public linuxmp4 sysContact.0
SNMPv2-MIB::sysContact.0 = STRING: root@localhost
#
# snmpset -v2c -c private linuxmp4 sysContact.0 s 'SysAdmin
admin@system.com'
SNMPv2-MIB::sysContact.0 = STRING: SysAdmin admin@system.com
#
# snmpget -v2c -c public linuxmp4 sysContact.0
SNMPv2-MIB::sysContact.0 = STRING: SysAdmin admin@system.com
#
```

An example file for snmpd.conf configuration can be found at /usr/share/doc/packages/net-snmp/EXAMPLE.conf.

We can now start to create a SNMPv3 configuration. Our target is to have a secure SNMPv3 configuration, therefore first of all we delete the two lines (starting with the *rocommunity* and *rwcommunity* keywords) that specify the community names for read-only and read-write operations, as they are related to SNMPv1 and SNMPv2 specifications.

We start with the following basic configuration file /etc/snmp/snmpd.conf that contains only the following lines:

```
syslocation  "DataRoom #1"
syscontact   "SysAdmin admin@system.com"
```

Before continuing our configuration, we stop the snmp agent using:

```
service snmp stop
```

We do this because we have to add some information in the snmpd.conf persistent data file and if the agent is running, any change to that file will be overwritten at the next stop of the agent.

We create a user named ibmDir with read-write access to everything on the SNMP data, by adding the following line to /var/lib/net-snmp/snmpd.conf persistent data file:

```
createUser ibmDir MD5 dirPassword
```

We specify the read-write granted user by adding the following line in /etc/snmp/snmpd.conf configuration file:

```
rwuser ibmDir auth
```

The configuration file /etc/snmp/snmpd.conf should contain the following lines:

```
syslocation "DataRoom #1"
syscontact "SysAdmin admin@system.com"
rwuser ibmDir auth
```

Note: There are no security issues related to specifying the authentication key in clear text as presented above. We included the authKey in the persistent data file, but the agent is responsible for managing the content of this file. For this reason, after starting the agent again, we can see that our "`createUser ibmDir ...`" line has been changed into another line that starts with "`usmUser 1 3 0x80001f8...`". This is because the agent creates during startup the SNMPv3 secret keys used for securing the communication.

We start the agent again using:

```
service snmpd start
```

We check the agent log file for errors or warnings (if any), as shown in Example A-10.

Example: A-10   Checking the SNMP agent log file

```
# tail -n10 /var/log/net-snmpd.log
NET-SNMP version 5.3.0.1
#
```

From the output shown in Example A-10, we can see that there is no configuration problems. Therefore, we can do the tests again on the

configuration. Using the same **snmpget** test as we started, we can see that now the agent does not respond anymore because the request is not authorized. That is normal behavior: As specified in RFC 2574, the SNMP agent must not respond to a request that is not authorized. See the output in Example A-11 for an example of this.

Example: A-11   SNMP agent does not respond to an unauthorized request

```
# snmpwalk -v1 -c public linuxmp4 system
Timeout: No Response from linuxmp4
#
```

But the agent responds to a right SNMPv3 request, as shown in Example A-12.

Example: A-12   Authorized SNMP requests get the response from the agent

```
# snmpget -v3 -l authNoPriv -u ibmDir -a MD5 -A dirPassword linuxmp4
sysLocation.0
SNMPv2-MIB::sysLocation.0 = STRING: "DataRoom #1"
#
```

At this point, we have finished configuring the USM component of the SNMPv3 security. The Net-SNMP agent is not sensitive if the VACM configuration is not included (as the AIX implementation is). If we have to put some restrictions on the data that ibmDir has to access, then the VACM information must be included in the configuration file. We can manage the users using the **snmpusm** program that comes with the Net-SNMP package. **snmpusm** is meant to ease the administration of SNMPv3 users.

The system is ready to be managed as an SNMP device from the IBM Director point of view.

Abbreviations and acronyms

AIX	Advanced Interactive Executive		**MIB**	Management Information Base
APAR	Authorized Program Analysis Report		**NFS**	Network File System
API	Application Programming Interface		**NIM**	Network Installation manager
			OID	Object ID
ATM	Asynchronous Transfer Mode		**PID**	Process ID
BFF	Backup File Format		**POWER**	Performance Oprimization With Enhanced RISC
CEC	Central Electronic Complex		**PXE**	Preboot Execution Environment
CHRP	Common Hardware Reference Platform		**RDM**	Remote Deployment manager
CIM	Common Information Model		**RFC**	Request For Comment
CIMOM	CIM Object manager		**RISC**	Reduced Instruction Set Computer
CPU	Central Processing Unit			
CSM	Cluster Systems Management		**RSA**	Rivest Shamir and Adelman
DCOM	Distributed Component Object Model		**SDPE**	Software Distribution Premium Edition
DHCP	Dynamic Host Configuration Program		**SLP**	Service Location Protocol
			SMIT	System management Interface Tool
DLPAR	Dynamic LPAR		**SMP**	Symmetric Multi-Processing
FSP	Frame Service Processor		**SMS**	System Management Services
GUI	Graphical User Interface			
HACMP	High-Availability Cluster Multi-Processing		**SNMP**	Simple Network Management Protocol
HMC	Hardware management Console		**SRC**	System Resource Controller
			SSH	Secure Shell
HPC	High Performance Computing		**SSL**	Secure Socket Layer
IBM	International Business Machines Corporation		**UDB**	Universal Database
			UDP	Universal Datgram Protocol
ITSO	International Technical Support Organization		**UIM**	User Interface manager
			USM	Unified Service Management
IVM	Integrated Virtualization Manager		**VIO**	Virtrual I/O
LPAR	Logical Partition		**VIOS**	Virtual I/O Server

XML   Extended 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 Redpaper.

IBM Redbooks

For information about ordering these publications, see "How to get IBM Redbooks" on page 103. Note that some of the documents referenced here may be available in softcopy only.

► *Integrating IBM Director with Enterprise Management Solutions*, SG24-5388

► *Implementing IBM Director 5.20*, SG24-6188

► *Integrated Virtualization Manager on IBM System p5*, REDP-4061

► *Using the IBM Director cimsubscribe Utility,* REDP-4123

Other publications

These publications are also relevant as further information sources:

► IBM Director product publications

– *IBM Director Planning, Installation and Configuration Guide*

– *IBM Director Systems Management Guide*

– *IBM Director Troubleshooting and Support Reference*

– *IBM Director Hardware and Software Support Guide*

– *IBM Director Commands Reference*

– *IBM Director Events Reference*

– *IBM Director Express Planning, Installation and Configuration Guide*

– *IBM Management Processor Command-line Interface Utility User's Guide*

Online resources

These Web sites are also relevant as further information sources:

► IBM Director home page

http://www-03.ibm.com/systems/management/director/index.html

► IBM Director documentation and resources

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

► IBM Director product publications

http://www-307.ibm.com/pc/support/site.wss/pageRedirect.do?page=MIGR -61788

► IBM Director: Extensions - System Availability

http://www-03.ibm.com/servers/eserver/xseries/systems_management/ibm _director/extensions/sysa.html

► IBM eServer xSeries: Downloads

http://www-03.ibm.com/servers/eserver/xseries/systems_management/xse ries_sm/dwnl.html

► IBM System p and AIX Information Center

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

► IBM Director user forum

http://www-128.ibm.com/developerworks/forums/dw_forum.jsp?forum=759& cat=53

► IBM Cluster information center

http://publib.boulder.ibm.com/infocenter/clresctr/vxrx/index.jsp?top ic=/com.ibm.cluster.csm.doc/clusterbooks.html

► IBM Service and productivity tools for Linux on POWER

https://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html

► IBM AIX Toolbox for Linux Applications

http://www.ibm.com/servers/aix/products/aixos/linux/download.html

► IBM Support site

http://www.ibm.com/support

► IBM Tivoli Directory Server

http://www-306.ibm.com/software/tivoli/products/directory-server/req uirements.htm

► Fix Central Web site

  http://www.ibm.com/eserver/support/fixes/fixcentral

► cimv20.dtd

  ftp://ftp.software.ibm.com/pc/pccbbs/pc_servers/cimv20.dtd

► IBMupdate.xsl

  ftp://ftp.software.ibm.com/pc/pccbbs/pc_servers/IBMupdate.xsl

► Autonomic computing

  http://www.ibm.com/developerworks/autonomic/

► Installable Unit Deployment Descriptor Specification Version 1.0

  http://www.w3.org/Submission/InstallableUnit-DD/

► CIM Schema: Version 2.8.2 (Final)

  http://www.dmtf.org/standards/cim/cim_schema_v28

► The Open Group

  http://wiki.opengroup.org/

► OASIS

  http://www.oasis-open.org/

How to get IBM Redbooks

You can search for, view, or download Redbooks, Redpapers, Hints and Tips, draft publications and Additional materials, as well as order hardcopy Redbooks or CD-ROMs, at this Web site:

ibm.com/redbooks

Help from IBM

IBM Support and downloads

ibm.com/support

IBM Global Services

ibm.com/services

IBM Director on System p5

IBM®

Redpaper

Includes installation and administration

Explains the features and benefits of centralized management

Documents sample scenarios

This IBM Redpaper positions the new IBM® Director V5.20 against the other IBM systems management products. Although IBM systems management software products include several choices as Cluster Systems Management and IBM Tivoli Management suite, and some features might seem to overlap, each product targets a specific environment.

This paper will help you to install, tailor, and configure the IBM Director software on IBM System p servers running AIX 5L V5.3 and various Linux enterprise distributions.

This paper provides practical examples of how to use various functions of IBM Director and helps you to understand the choices that you have to manage IBM System p servers.