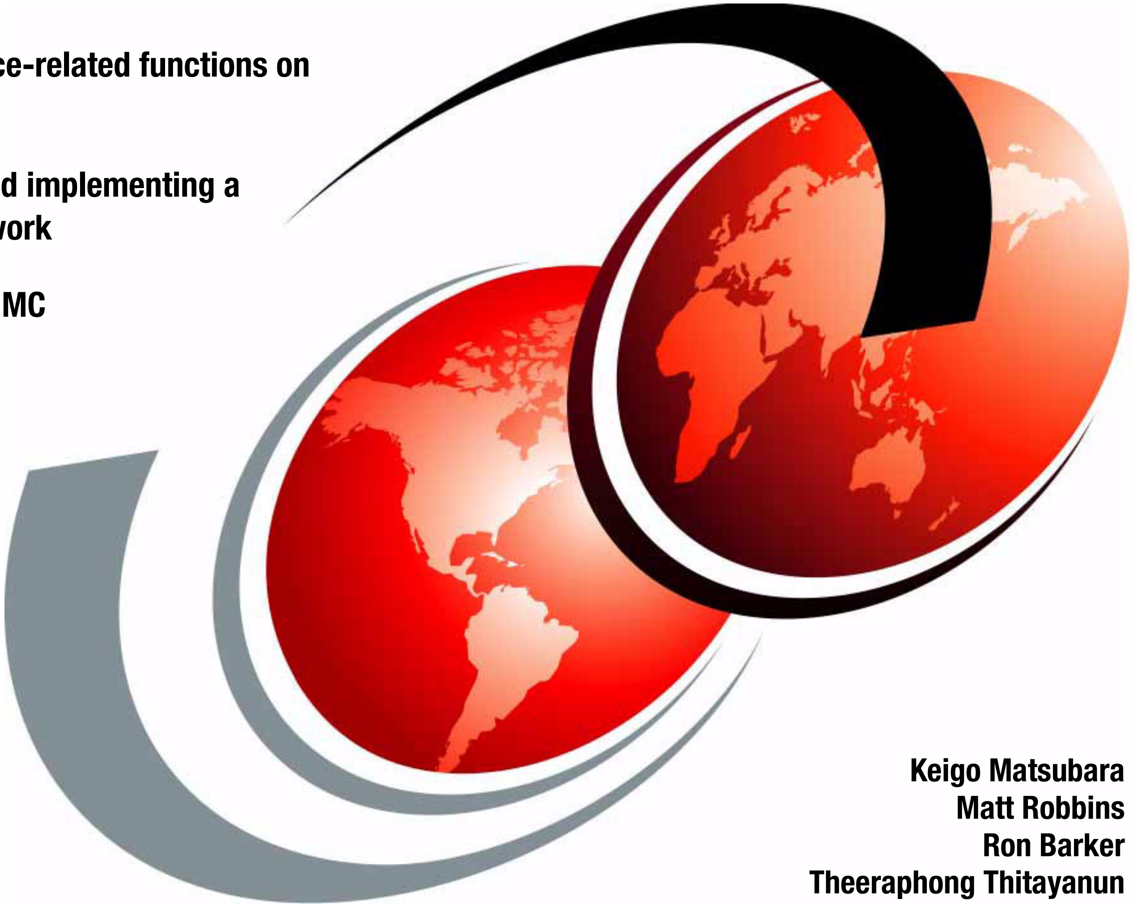
IBM eserver

Effective System Management Using the IBM Hardware Management Console for pSeries

Using service-related functions on the HMC

Planning and implementing a secure network

Exploiting HMC commands



Keigo Matsubara
Matt Robbins
Ron Barker
Theeraphong Thitayanun

Redbooks

ibm.com/redbooks

International Technical Support Organization

Effective System Management Using the IBM Hardware Management Console for pSeries

August 2003

SG24-7038-00

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

First Edition (August 2003)

This edition applies to Release 3, Version 2 of the software (program number 5639-N47) installed on the IBM Hardware Management Console for pSeries.

Contents

Figures

Tables

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 illustrates 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. 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 IBM's application programming interfaces.

Trademarks

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

- AIX®
- AIX 5L™
- DB2 Universal Database™
- DB2®
- eserver™
- eserver ™
- Electronic Service Agent™
- ibm.com®
- IBM®
- POWER4+™
- POWER4™
- pSeries™
- Redbooks (logo) ™
- Redbooks™
- RS/6000®
- SP™

The following terms are trademarks of other companies:

ActionMedia, LANDesk, MMX, Pentium and ProShare are trademarks of Intel Corporation in the United States, other countries, or both.

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

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

C-bus is a trademark of Corollary, Inc. in the United States, other countries, or both.

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

SET, SET Secure Electronic Transaction, and the SET Logo are trademarks owned by SET Secure Electronic Transaction LLC.

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

Preface

The IBM Hardware Management Console for pSeries (hereafter referred to as HMC) is a tool used for administering and managing IBM @server pSeries™ servers. It was first announced in late 2001 with the IBM @server pSeries 690 Model 681, the first partitioning-capable pSeries server model, then has been supporting the other partitioning-capable pSeries server models in conjunction with several software release level updates.

The major function provided by the HMC is partitioning management, which is well covered by several publications, including the sibling redbook *The Complete Partitioning Guide for IBM @server pSeries Servers*, SG24-7039. This IBM Redbook, designed to be used as a deskside reference for systems administrators who manage partitioning-capable pSeries servers using the HMC, is meant to complement other publications by covering the following topics:

- Configuring the HMC
- Managing software levels on the HMC
- Secure remote GUI access to the HMC
- Secure networking in a partitioned environment
- Service functions on the HMC

In addition, this book covers the basic usage of the HMC graphical user interface. New HMC commands, available with the HMC software Release 3, Version 2, are fully exploited in Chapter 9, “HMC command line interface” and Chapter 10, “Advanced HMC command examples”.

The team that wrote this redbook

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

Keigo Matsubara is an advisory IT specialist at the International Technical Support Organization (ITSO), Austin Center. Before joining the ITSO, he worked in the System and Web Solution Center in Japan as a Field Technical Support Specialist (FTSS) for pSeries. He has worked for IBM for 11 years.

Matt Robbins is a pSeries Technical Sales Specialist in Dallas, Texas. He has more than eight years of experience working with pSeries systems and AIX®. His areas of expertise include UNIX, TCP/IP, and designing e-business solutions for

Internet security and Web traffic. He attended the University of North Texas as a student of computer science.

Ron Barker is a Consulting IT Specialist for pSeries Advanced Technical Support in the Americas. He has 16 years of experience in AIX and RISC-based systems. He has worked at IBM for 20 years. His areas of expertise include mid-range and high-end pSeries hardware, logical partitioning, AIX systems management, and AIX Workload Manager.

Theeraphong Thitayanun is a Certified Consulting IT Specialist for IBM Thailand. His main responsibility is to provide billable services and support in all areas of high-end pSeries products. His areas of expertise include PSSP, HACMP, and DB2® Universal Database™. He holds a Bachelors degree in Computer Engineering from Chulalongkorn University and, as a Monbusho student, a Masters degree in Information Technology from Nagoya Institute of Technology, Japan.

Thanks to the following people for their contributions to this project:

International Technical Support Organization, Austin Center
Scott Vetter and Betsy Thaggard

IBM Austin
Bob Minns, Andy McLaughlin, Bob Foster, Christine Trinh, Christine Wang, Christopher Chan, Dave Willoughby, Eric Marshall, Stephanie Jensen, Minh Nguyen, Quan Wang, Richard Cutler, Trish Pierce, Truc Nguyen, and Walter Lipp

IBM Endicott
Scott Nettleship and Lenny Nichols

IBM Japan
Tomoyuki Niijima and Yuan Zong

IBM Poughkeepsie
Michael Schmidt and Anthony Pioli

IBM U.K.
Dave Williams

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 will team with IBM technical professionals, Business Partners and/or customers.

Your efforts will help increase product acceptance and customer satisfaction. As a bonus, you will 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 Redbooks™ to be as helpful as possible. Send us your comments about this 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:

  redbook@us.ibm.com

- Mail your comments to:

  IBM® Corporation, International Technical Support Organization
  Dept. JN9B Building 003 Internal Zip 2834
  11400 Burnet Road
  Austin, Texas 78758-3493

1

Introduction to the HMC

This chapter introduce the IBM Hardware Management Console for pSeries by providing the following sections:

- “What is the HMC?” on page 2
- “Supported managed systems” on page 6
- “HMC architecture” on page 16
- “HMC connectivity” on page 18
- “HMC order information” on page 23

For the detailed information about the HMC, refer to the following publications:

- *IBM Hardware Management Console for pSeries Maintenance Guide*, SA38-0603
- *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590

You can access the soft copy of these publications, by accessing the IBM @server pSeries Information Center, found at:

`http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base/index.htm`

Click **Hardware documentation** → **Hardware Management Console for pSeries**.

1.1 What is the HMC?

The HMC is a dedicated desktop PC workstation that provides several functions for configuring and operating pSeries servers functioning either partitioned or in the Full System Partition, using the graphical user interface[1](GUI) or command line interface[2] (CLI). The functions provided by HMC include:

- Logical partitioning management

  The HMC provides a set of tasks that are necessary to manage logical partitions. These tasks include:

  - Starting, stopping, resetting, and shutting down a partition.

    We explain these tasks in sections 3.3, "Activate partitions" on page 65 through 3.5, "Reset the operating system in a partition" on page 70.

  - Opening a virtual console for each partition or connected pSeries server system.

    We explain this task in sections 2.5, "Virtual terminal window" on page 49 through 3.5, "Reset the operating system in a partition" on page 70.

  - Creating partition profiles that define the processor, memory, and I/O resources allocated to an individual partition.

    This book does not contain detailed information about these tasks except for the advanced command line interface examples explained in Chapter 10, "Advanced HMC command examples" on page 217. Refer to these publications for this subject:

    - *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590
    - *The Complete Partitioning Guide for IBM @server pSeries Servers*, SG24-7039

  - Performing DLPAR operations that dynamically change the resource allocation (such as processor, memory, and I/O) for the specified partition.

    This task is not also covered by this book. Refer to the publications listed above for this subject:

- Displaying system resources and status.

  We explain these tasks in 3.1, "Viewing properties of the managed system" on page 56.

- Booting, starting, and stopping the connected pSeries server systems.

  We explain these tasks in 3.2, "Power on the managed system" on page 61.

[1] See Chapter 2, "HMC graphical user interface" on page 31.

[2] See Chapter 9, "HMC command line interface" on page 175.

> **Note:** A pSeries server managed by HMC is also referred to as a managed system.

- Configuring the HMC itself

  We explain these tasks in 4.2, “HMC Maintenance” on page 80.
- Managing the HMC software level

  We explain these tasks in Chapter 6, “Managing software levels on the HMC” on page 107.
- A service focal point that gives you tools for problem determination and service support such as call-home and error log notification through an analog phone line

  We explain these tasks in Chapter 11, “Service functions on the HMC” on page 247.

1.1.1 HMC at a glance

Figure 1-1 on page 4 shows the rear view of 7135-C02, which is the current HMC. It features one DVD-RAM drive, one Ethernet port, two native serial ports, six USB ports, as well as other ports.

> **Note:** IBM may adopt newer PC hardware models to be used as the HMC in the future.

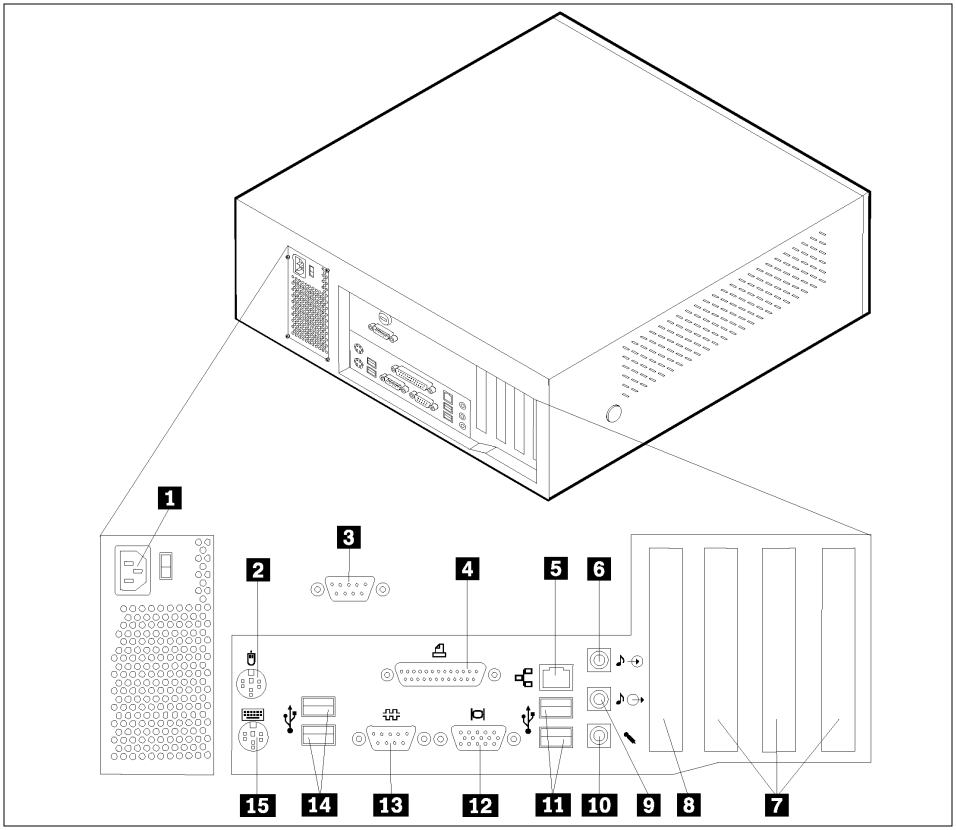


Figure 1-1 7135-C02 rear view[3]

Numbers shown in Figure 1-1 represents the following connectors:

1. Power connector
2. Mouse connector
3. Serial connector (S2)
4. Parallel connector
5. Ethernet connector
6. Audio line in connector
7. PCI slots (three available)
8. AGP slot (not used)
9. Audio line out connector (not used)
10. Microphone connector (not used)
11. USB connectors
12. VGA monitor connector
13. Serial connector (S1)

[3] Two USB connectors are located in the front.

14. USB connectors
15. Keyboard connector

The HMC provides two native serial ports. One serial port should be used to attach a modem for the Service Agent. The second port can be used to attach a server. If multiple servers are attached to the HMC, additional serial ports are necessary. The ports can be provided by adding asynchronous adapters.[4]

The HMC also provides an Ethernet port to connect to partitions on its managed systems. The network connection is mandatory for the support of the following functions as well as the system management purpose on those partitions:

- Dynamic logical partitioning
- Service functions (for example, Microcode Updates and Service Focal Point)

Figure 1-2 illustrates a simple but typical network configuration in a partitioned environment that is composed of an HMC and its managed system running two partitions. We explain the technical detail of the network configuration in a partitioned environment in Chapter 8, “Secure networking in a partitioned environment” on page 155 and Appendix B, “Recommended network configuration in a partitioned environment” on page 309.

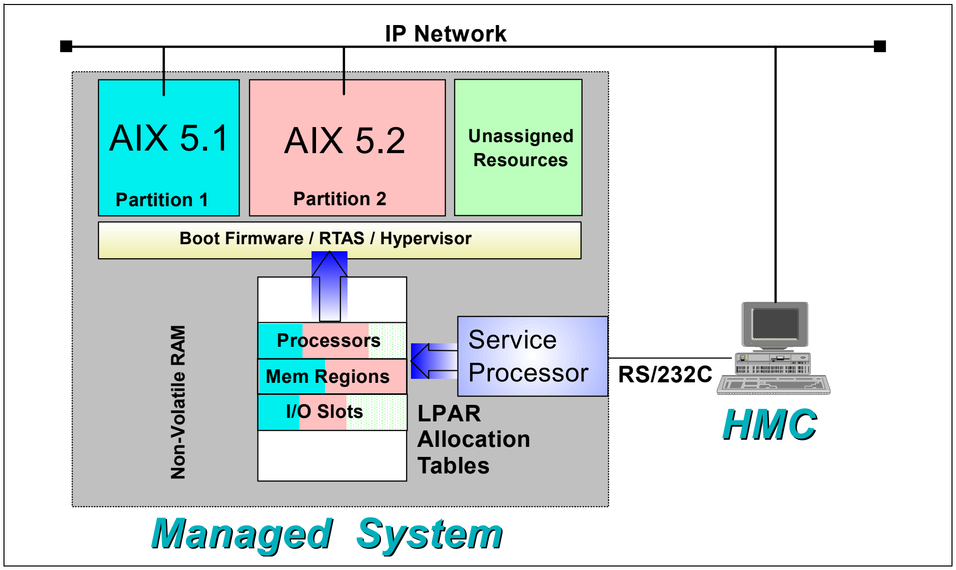


Figure 1-2 Communication between the HMC and the service processor

[4] See 1.5.4, “Asynchronous serial adapter configurations” on page 25 for the detailed information.

1.2 Supported managed systems

At the time of writing, the following IBM @server pSeries server models shown in Table 1-1 can be managed by HMC.

Table 1-1 Supported managed systems

Official product model name	Short product name	MT-MDL	Relevant section
IBM @server pSeries 690 Model 681	pSeries 690	7040-681	1.2.1, “pSeries 690 and pSeries 670” on page 7
IBM @server pSeries 670 Model 671	pSeries 670	7040-671	
IBM @server pSeries 655	pSeries 655	7039-651	1.2.2, “pSeries 655” on page 9
IBM @server pSeries 650 Model 6M2	pSeries 650 Model 6M2	7038-6M2	1.2.3, “pSeries 650 Model 6M2” on page 10
IBM @server pSeries 630 Model 6C4	pSeries 630 Model 6C4	7028-6C4	1.2.4, “pSeries 630 models 6C4 and 6E4” on page 11
IBM @server pSeries 630 Model 6E4	pSeries 630 Model 6E4	7028-6E4	
IBM @server pSeries 615 Model 6C3	pSeries 615 Model 6C3	7029-6C3	1.2.5, “pSeries 615 models 6C3 and 6E3” on page 13
IBM @server pSeries 615 Model 6E3	pSeries 615 Model 6E3	7029-6E3	

Note: Hereafter, short product names are used throughout this book.

The logical partitioning concept and required tasks are basically similar on these partitioning-capable pSeries server models. However, there is a substantial difference when assigning I/O resources to partitions depending on the models. For the hardware model-specific information about the I/O resource assignment, refer to the appropriate publications listed in the following sections.

The maximum number of partitions, which depends on the supported number of processors, is shown in Table 1-2.

Table 1-2 Maximum number of processors, memory size, and partitions

Short product name	Maximum number of processors	Maximum memory size in GB	Maximum number of I/O drawers	Maximum number of partitions
pSeries 690	32[1]	512	8	32
pSeries 670	16	256	3	16

Short product name	Maximum number of processors	Maximum memory size in GB	Maximum number of I/O drawers	Maximum number of partitions
pSeries 655	8	32	1	2
pSeries 650 Model 6M2	8	64	8	8[2]
pSeries 630 Model 6C4	4	32	2	4[3]
pSeries 630 Model 6E4	4	32	0	2

1. The High Performance Computing (HPC) feature of pSeries 690 is equipped with up to 16 processors.
2. Needs external disk subsystems for the boot disk.
3. When equipped with I/O drawers.

Note: pSeries 615 models 6C3 and 6E3 do not support partitioning.

1.2.1 pSeries 690 and pSeries 670

The high-end pSeries 690 and the mid-range pSeries 670 are both partitioning-capable pSeries server models that share the same physical component design. Several hardware components, Bulk Power Assembly (BPA), Central Electronics Complex (CEC), media drawer, and I/O drawers, as well as optional internal battery features (IBFs) are combined in one or two 7040-61R system racks.[5]

The pSeries 690 and pSeries 670 are equipped with two HMC ports (HMC1 and HMC2) in the primary I/O book, which is plugged into the rear of CEC, as shown in Figure 1-3 on page 8.

[5] The pSeries 690 supports up to two system racks, whereas the pSeries 670 supports only one.

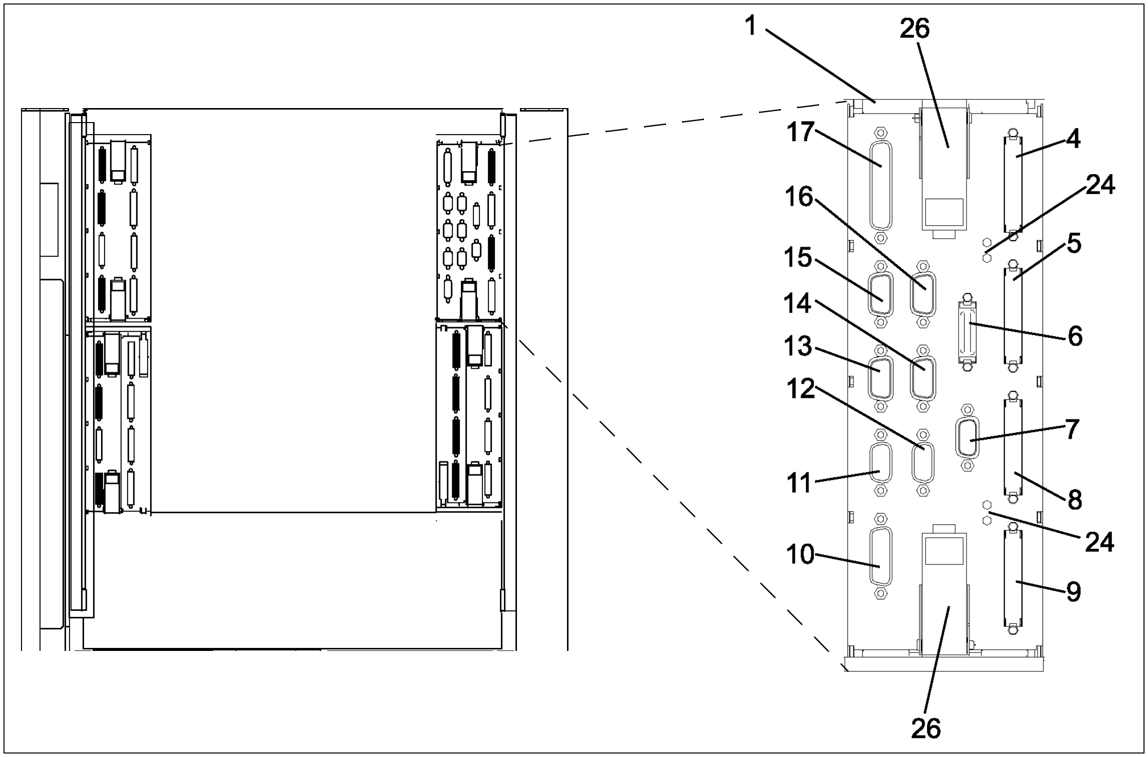


Figure 1-3 pSeries 670 and pSeries 690 CEC rear view (primary I/O book)

Table 1-3 explains numbers shown in Figure 1-3.

Table 1-3 Description of components in the primary I/O book

Number	Description
1	Primary I/O book, GX slot 0 (U1.18-P1-H2)
4	I/O port 0 (A0) (U1.18-P1-H2/Q1)
5	I/O port 0 (A1) (U1.18-P1-H2/Q2)
6	Operator panel (U1.18-P1-H2/Q7)
7	BPC Y-cable connector[1]
8	I/O port 1 (B0) (U1.18-P1-H2/Q3)
9	I/O port 1 (B1) (U1.18-P1-H2/Q4)
10	Diskette Drive (U1.18-P1-H2/Q10)

Number	Description
11	HMC port 1 (U1.18-P1-H2/S3)
12	HMC port 2 (U1.18-P1-H2/S4)
13	Serial port 1 (U1.18-P1-H2/S1)
14	Serial port 2 (U1.18-P1-H2/S2)
15	SPCN 0 (manufacturing use only)
16	SPCN 1 (manufacturing use only)
17	Debug (manufacturing use only)
24	Indicator LEDs
26	Camming latches
1. The Y-cable that attaches to this connector, terminates at BPC-A connector U1.35-P1-X4/Q10 and BPC-B connector U1.35-P2-X4/Q10.	

For further detailed information about these models, refer to the following publications:

- *IBM @server pSeries 670 and pSeries 690 System Handbook*, SG24-7040
- *IBM @server pSeries 670 Service Guide*, SA38-0615
- *IBM @server pSeries 670 User's Guide*, SA38-0614
- *IBM @server pSeries 670 Installation Guide*, SA38-0613
- *IBM @server pSeries 690 Service Guide*, SA38-0589
- *IBM @server pSeries 690 User's Guide*, SA38-0588
- *IBM @server pSeries 690 Installation Guide*, SA38-0587

1.2.2 pSeries 655

The mid-range pSeries 655 is a partitioning-capable pSeries server model. The pSeries 655 is designed as a building block of clusters, especially for the high-performance computing (HPC) area, therefore multiple pSeries 655 servers can be accommodated in a single 7040-W42 system rack. The 7040-W42 system rack shares the same physical form factor with 7040-R61 used for pSeries 670 or pSeries 690, but the BPA of 7040-W42 must be connected to HMC using RS-422.[6]

The pSeries 655 is equipped with two HMC ports (HMC1 and HMC2) on the rear side as shown in Figure 1-4 on page 23.

[6] See 1.2.6, "RS-422 serial connection to the 7040-W42 system rack" on page 14 for the detailed information about the RS-422 connection between the HMC and 7040-W42.

Note: The pSeries 655 has no native serial or parallel port.

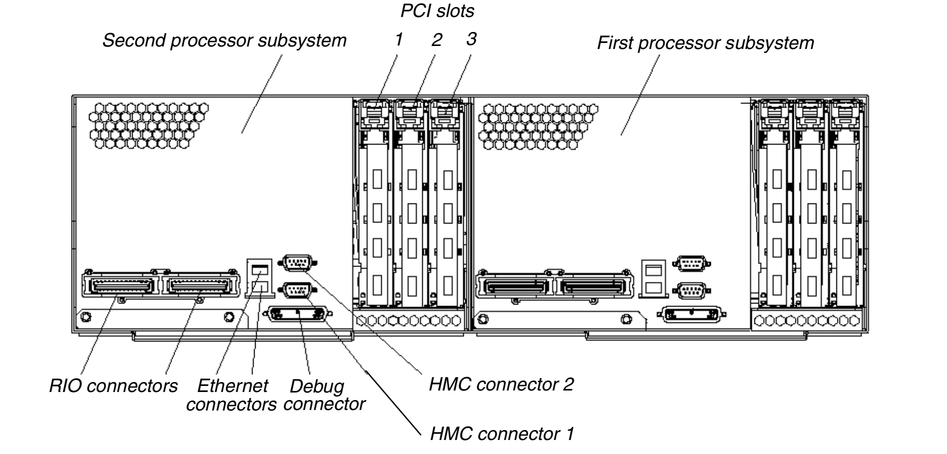


Figure 1-4 Rear view of pSeries 655[7]

For further detailed information about the pSeries 655, refer to the following publications:

- *IBM @server pSeries 655 Installation Guide*, SA38-0616
- *IBM @server pSeries 655 Service Guide*, SA38-0618
- *IBM @server pSeries 655 User's Guide*, SA38-0617

1.2.3 pSeries 650 Model 6M2

The mid-range pSeries 650 Model 6M2 is a partitioning-capable pSeries server model. It is a rack mount server that can be accommodated in an industry standard 19-inch rack.

The pSeries 650 Model 6M2 is equipped with two HMC ports (HMC1 and HMC2) on the rear side as shown in Figure 1-5 on page 11.

[7] Two pSeries 655 processor systems are contained in a single frame cage in a rack drawer position.

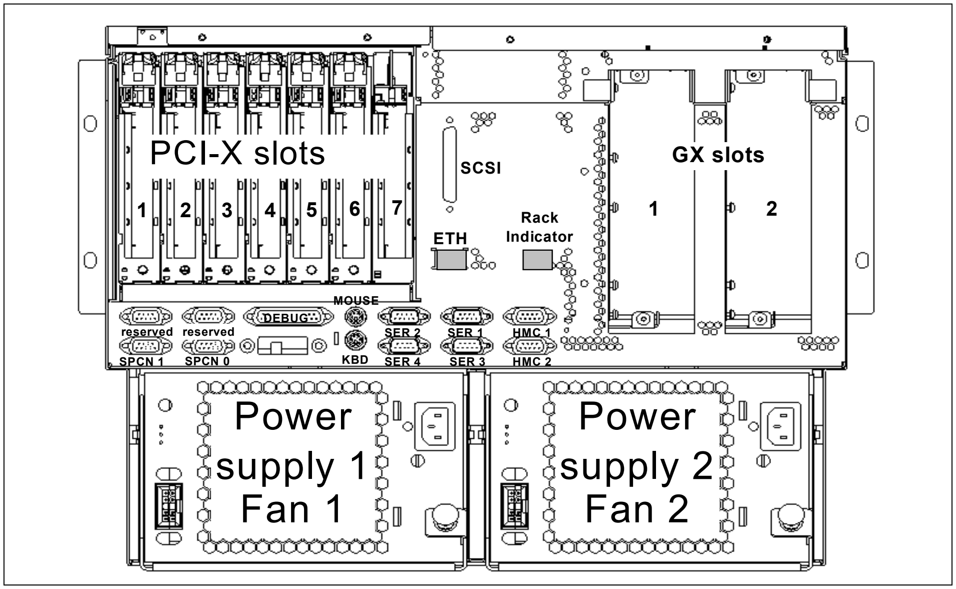


Figure 1-5 Rear view of pSeries 650 Model 6M2

For further detailed information about the pSeries 650 Model 6M2, refer to the following technical white paper and publications:

- *IBM @server pSeries 650 Model 6M2 Technical Overview and Introduction*, REDP0194, available at:
  `http://www.redbooks.ibm.com/redpapers/pdfs/redp0194.pdf`
- *IBM @server pSeries 650 Model 6M2 Installation Guide*, SA38-0610
- *IBM @server pSeries 650 Model 6M2 User's Guide*, SA38-0611
- *IBM @server pSeries 650 Model 6M2 Service Guide*, SA38-0612

1.2.4 pSeries 630 models 6C4 and 6E4

The low-end pSeries 630 models 6C4 and 6E4 are both partitioning-capable pSeries server models. The pSeries 630 Model 6C4 is a rack mount server that can be accommodated in an industry standard 19 inch rack, whereas the pSeries 630 Model 6E4 is a deskside-type server.

The pSeries 630 models 6C4 and 6E4 are equipped with two HMC ports (HMC1 and HMC2) on the rear side as shown in Figure 1-6 on page 12.

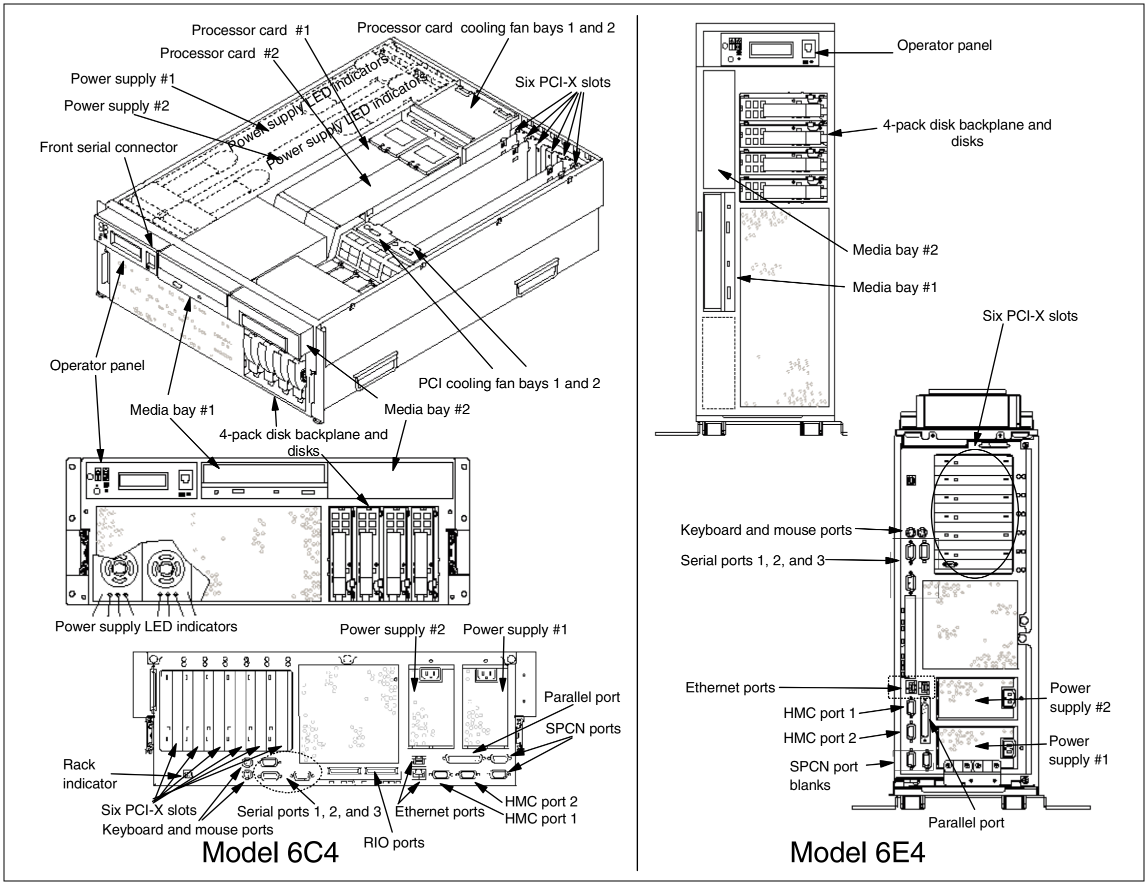


Figure 1-6 Views of pSeries 630 models 6C4 and 6E4[8]

For further detailed information about the pSeries 630 models 6C4 and 6E4, refer to the following technical white paper and publications:

- *IBM @server pSeries 630 Models 6C4 and 6E4 Technical Overview and Introduction*, REDP0195, available at:
  `http://www.redbooks.ibm.com/redpapers/pdfs/redp0195.pdf`
- *IBM @server pSeries 630 Model 6C4 and 6E4 Installation Guide*, SA38-0605
- *IBM @server pSeries 630 Model 6C4 and 6E4 User's Guide*, SA38-0606
- *IBM @server pSeries 630 Model 6C4 and 6E4 Service Guide*, SA38-0604

[8] This figure shows the views of latest pSeries 630 models 6C4 and 6E4 (POWER4™+ system with six PCI-X slots).

1.2.5 pSeries 615 models 6C3 and 6E3

The low-end pSeries 615 models 6C3 and 6E3 are both *non* partitioning-capable pSeries server models. The pSeries 615 Model 6C3 is a rack mount server that can be accommodated in an industry standard 19-inch rack, whereas the pSeries 615 Model 6E3 is a deskside-type server.

The pSeries 615 Model 6C3 can be used as a building block of the IBM cluster product IBM @server Cluster 1600, so multiple pSeries 615 Model 6C3 servers can be incorporated into the cluster, which is managed by Cluster Systems Management (CSM).[9]

The pSeries 615 models 6C3 and 6E3 are equipped with two HMC ports (HMC1 and HMC2) on the rear side as shown in Figure 1-7.

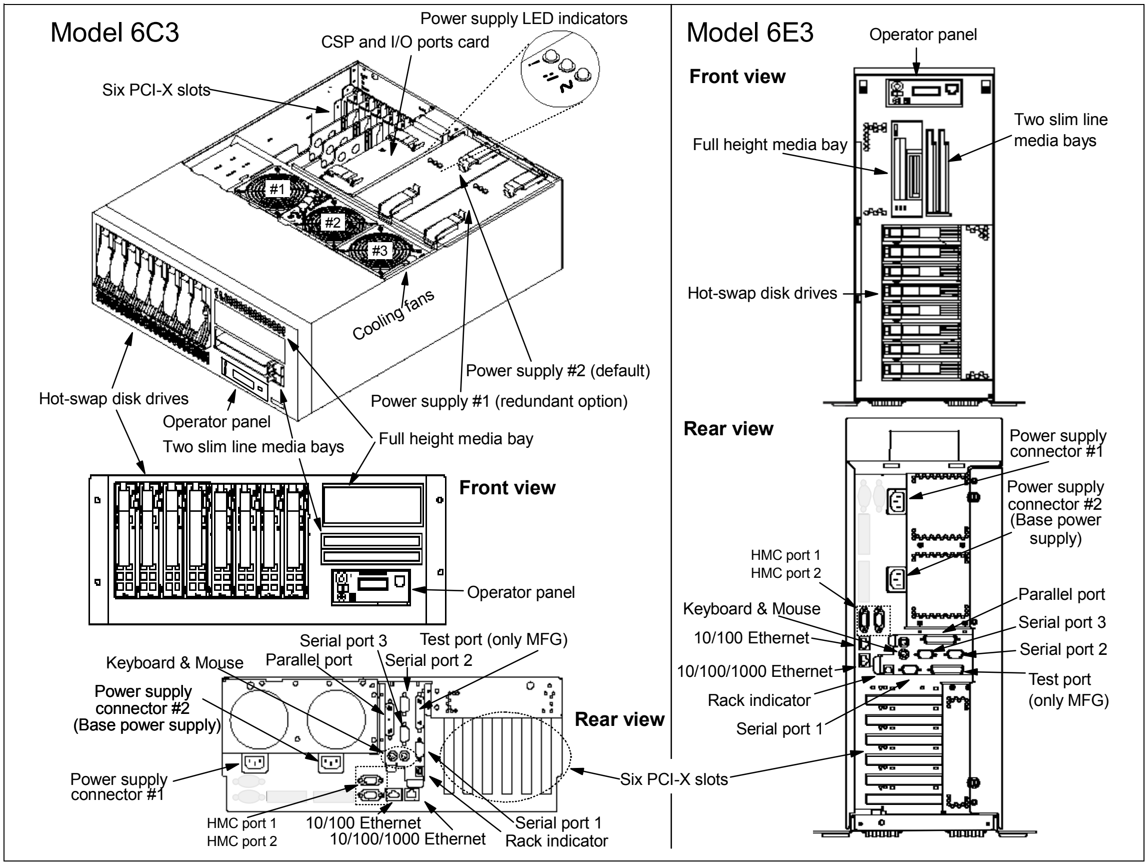


Figure 1-7 Views of pSeries 615 models 6C3 and 6E3

[9] Refer to the publications listed in “CSM for AIX official publications” on page 335 for detailed information about CSM.

If a pSeries 615 Model 6C3 or pSeries 615 Model 6E3 is managed by CSM, an HMC must be attached to an HMC port of these models for power management.

For further detailed information about the pSeries 630 models 6C4 and 6E4, refer to the following technical white paper and publications:

- *IBM @server pSeries 615 Models 6C3 and 6E3 Technical Overview and Introduction*, REDP0160, available at:
  `http://www.redbooks.ibm.com/redpapers/pdfs/redp0160.pdf`
- *IBM @server pSeries 615 Model 6C3 and 6E3 Installation Guide*, SA38-0628
- *IBM @server pSeries 615 Model 6C3 and 6E3 User's Guide*, SA38-0630
- *IBM @server pSeries 615 Model 6C3 and 6E3 Service Guide*, SA38-0629

1.2.6 RS-422 serial connection to the 7040-W42 system rack

If the 7040-W42 system rack is used to accommodate hardware components, such as pSeries 655 servers, the BPA of the rack must be connected to an HMC using RS-422, as shown in Figure 1-8 on page 15.

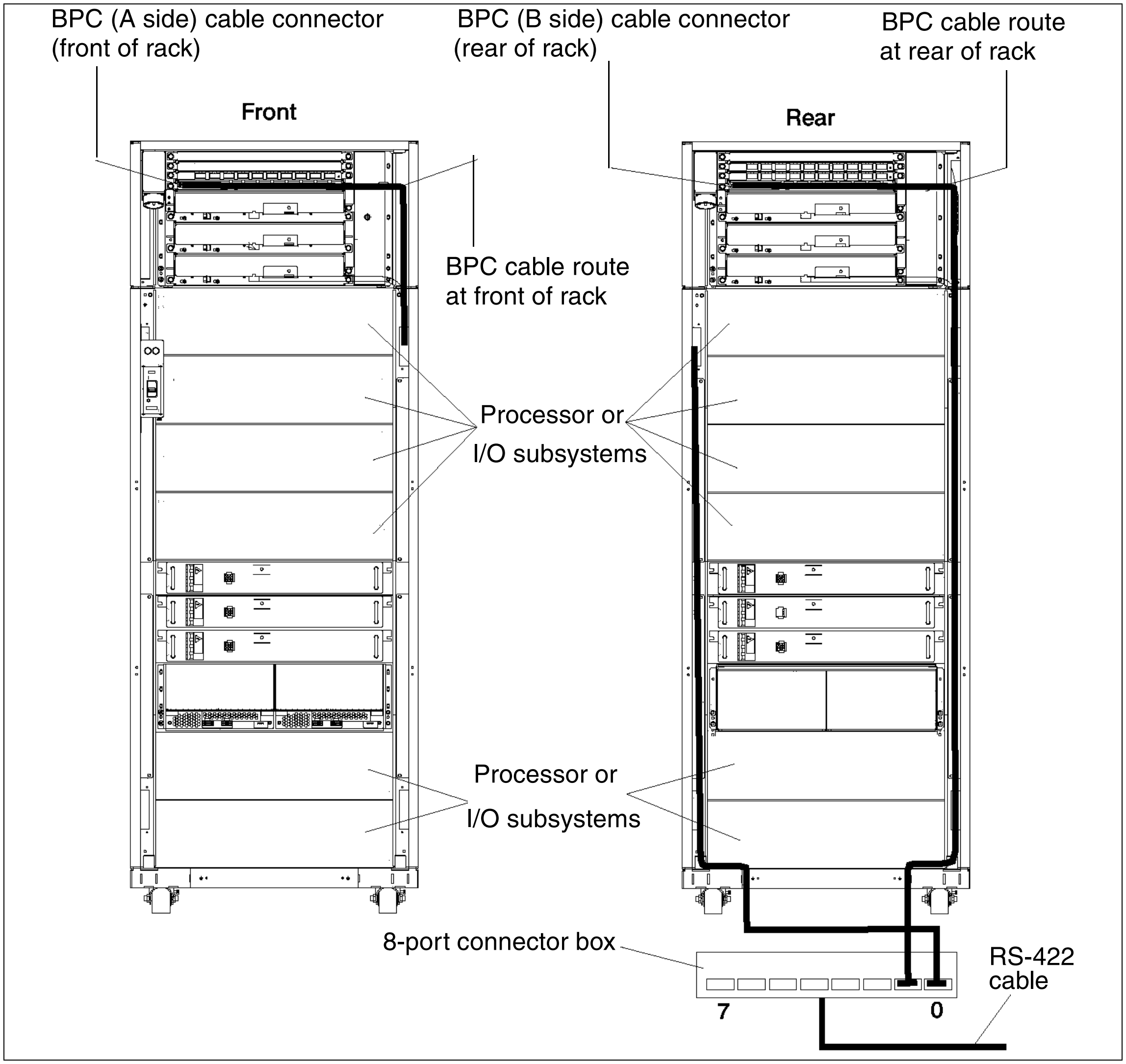

BPC (A side) cable connector (front of rack)
BPC (B side) cable connector (rear of rack)
BPC cable route at rear of rack
Front
Rear
BPC cable route at front of rack
Processor or I/O subsystems
Processor or I/O subsystems
Processor or I/O subsystems
Processor or I/O subsystems
8-port connector box
RS-422 cable
7
0

Figure 1-8 RS-422 serial cable connection from HMC to 7040-W42 system rack[10]

A BPA contains two Bulk Power Controllers (BPCs) in its front and rear sides. An RS-422 connection is required for each BPC; thus two RS-422 connections are needed per 7040-W42 system rack.

[10] The RS-422 cable shown in Figure 1-8 is connected to the 8-port asynchronous adapter of the HMC.

Note: If the 8-port asynchronous adapter (FC 2943) is used to connect the HMC to the BPCs of 7040-W42, the corresponding serial ports must be explicitly set to the RS-422 mode (see Appendix , “Configuring RS-422 ports on an 8-port asynchronous adapter” on page 305).

1.3 HMC architecture

The HMC provides a graphical user interface for configuring and operating single or multiple managed systems. It consists of a 32-bit Intel-based desktop PC with a DVD-RAM drive and running the Linux operating system. The application environment, with a set of hardware management applications for configuration and partitioning, is written in Java. The applications are based on the object-oriented schema using the Common Information Model (CIM), an industry standard sponsored by the Distributed Management Task Force (DMTF). A CIM Object Manager acts as repository and database look-up for all managed objects.

The DMTF Standards web site can be a good starting point to learn these technologies, found at:

`http://www.dmtf.org/standards/standard_cim.php`

The graphical user interface is based on the AIX 5L™ Version 5.2 Web-based System Manager, which allows the management integration of other HMCs or pSeries systems running AIX 5L Version 5.1 and 5.2. Except for IBM customer engineers and debugging purposes, the native Linux interfaces are hidden from the user and are not accessible. No Linux skills are required to operate the HMC. The graphical user interface can display dynamic events and static information from pSeries machines running AIX as well as from partitions on any partitioning-capable pSeries servers.

Figure 1-9 on page 17 shows an overview of the HMC software architecture.

- A user who logs in to the HMC from the local console is accessing the application using the Web-based System Manager graphical user interface as represented in the big upper arrow.
- The HMC communicates with the service processor on the managed system using the serial communication.
- If configured, the Service Agent communicates with the modem using the serial communication.
- The Resource Monitoring and Control (RMC) subsystem on the HMC connects the RMC subsystem on remote nodes, such as partitions, over the TCP/IP network (shown as A in Figure 1-9 on page 17).

- A remote user can access the HMC using either the ssh or rexec facility over the TCP/IP network (shown as B).
- A user who logs in to the HMC from the local console can access to the remote Web-based System Manager server on remote nodes, such as AIX partitions over the TCP/IP network (shown as C).
- A user using the remote Web-based System Manager client can access the HMC over the TCP/IP network (shown as D).

Further detailed information about the remote connection over the TCP/IP network is provided in 8.1, “Networking in a partitioned environment” on page 156.

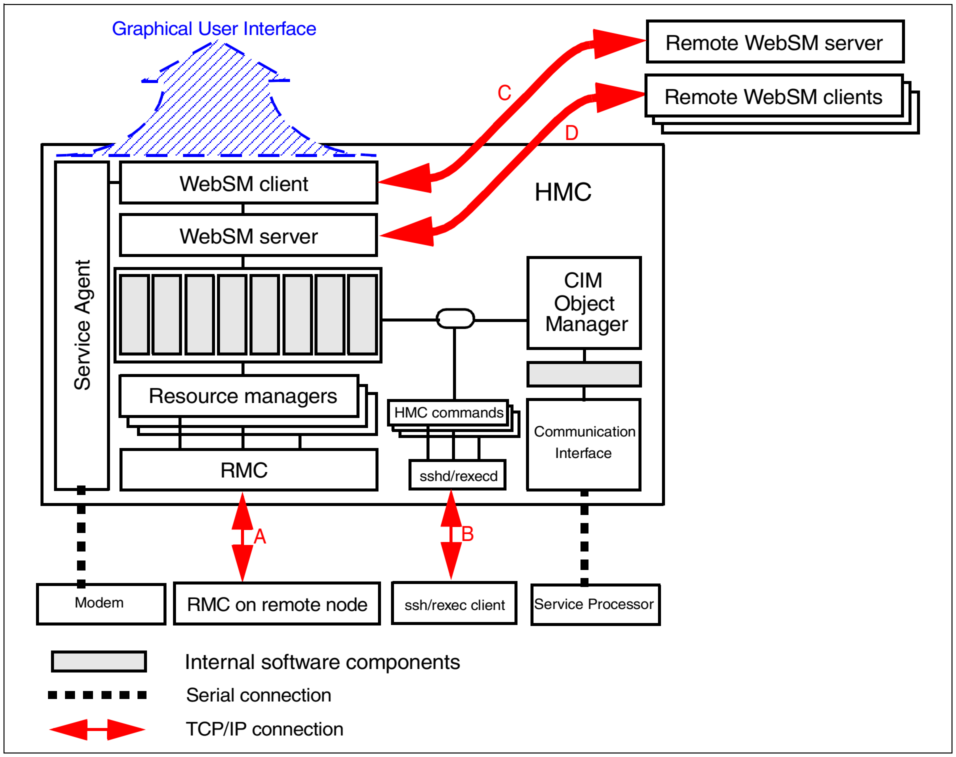


Figure 1-9 HMC software architecture overview[11]

[11] The figure does not show all communication paths and software components. For example, remote virtual terminal access is not shown to avoid unnecessary complexity.

1.4 HMC connectivity

In this section, we explain several HMC connectivity configurations. We group these configurations into two categories: 1.4.1, "Serial connectivity" on page 18 and 1.4.2, "Remote connectivity" on page 21.

Note: You should not confuse the managed system name with the host name. Because multiple operating system instances can run concurrently on a single partitioning-capable pSeries server, you cannot use the host name, which usually depends on the IP address, to distinguish multiple partitioning-capable pSeries servers. The managed system name is a label used for this purpose.

1.4.1 Serial connectivity

A managed system has to be connected by at least one HMC using a serial connection. To connect a serial line between an HMC and a managed system, use one of the serial ports on the HMC and one of two dedicated serial ports (HMC1 and HMC2) on the managed system.

As long as at least one serial connection is configured, you can configure the following serial connectivity options:

- Redundant HMC configuration

  For redundancy of the system management control point, you can configure a redundant HMC configuration, as shown in Figure 1-10 on page 19. In this case, both serial ports have one HMC connected.

  For further information about redundant HMC configuration, see "Redundant HMC configuration consideration" on page 19.

- Multiple managed system configuration

  To save space and to centralize multiple system management control points, you can configure multiple managed systems using a single HMC, as shown in Figure 1-10 on page 19. If more than two managed systems are connected with one HMC, asynchronous adapters must be configured on the HMC.[12]

  The information is considered as objects in the HMC applications. Because the serial connection is relatively slow (19200 bps), the HMC applications run slower as the number of objects increases.

  The performance of the HMC applications are affected by three factors:

  – Number of the managed systems
  – Number of the equipped I/O devices on each managed system
  – Number of defined partitions defined on each managed system

[12] See 1.4.1, "Serial connectivity" on page 18 for the detailed information.

Note: The HMC gathers all of the objects from managed systems on every power cycle. Therefore if the connected multiple managed systems reboot at the same time, it can take longer for HMC to discover all of the information from the managed systems.

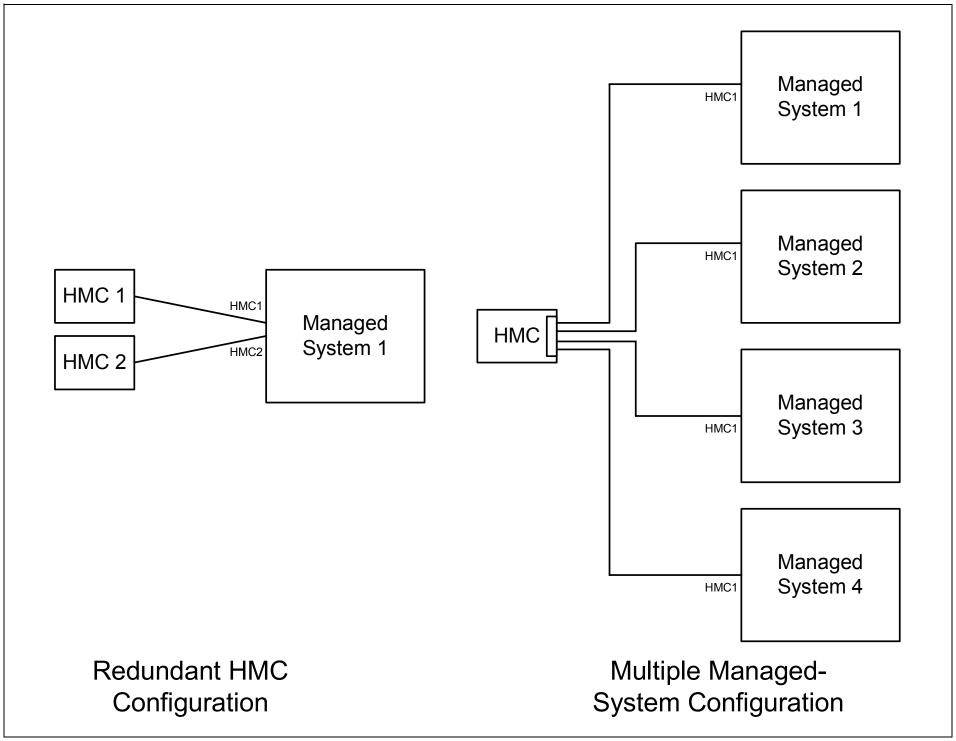


Figure 1-10 Serial connectivity option

Redundant HMC configuration consideration

In a redundant HMC configuration, both HMCs are fully active and accessible at all times, enabling you to perform management tasks from either HMC at any time. There is no primary or backup designation.

Because both HMCs can be used concurrently, you have to consider the following points:

- Because authorized users can be defined independently for each HMC, determine whether the users of one HMC should be authorized on the other. If so, the user authorization must be set up separately on each HMC.

- Because both HMCs provide Service Focal Point and Service Agent functions, connect a modem and phone line to only one of the HMCs and enable its Service Agent. To prevent redundant service calls, do not enable the Service Agent on both HMCs.
- Perform software maintenance separately on each HMC, at separate times, so that there is no interruption in accessing HMC function. This allows one HMC to run at the new fix level, while the other HMC can continue to run at the previous fix level. However, the best practice is to upgrade both HMCs to the same fix level as soon as possible.

The basic design of HMC eliminates the possible operation conflicts issued from two HMCs in the redundant HMC configuration. A locking mechanism provided by the service processor allows inter-operation in a parallel environment. This allows an HMC to temporarily take exclusive control of the interface, effectively locking out the other HMC. Usually, this locking is held only for the short duration of time it takes to complete an operation, after which the interface is available for further commands.

Both HMCs are automatically notified of any changes that occur in the managed systems, so the results of commands issued by one HMC are visible in the other. For example, if you choose to activate a partition from one HMC, you will observe the partition going to the Starting and Running states on both HMCs.

The locking between HMCs does not prevent users from running commands that might seem to be in conflict with each other. For example, if the user on one HMC activates a partition, and a short time later a user on the other HMC selects to power the system off, the system will power off. Effectively, any sequence of commands that you can do from a single HMC is also permitted when it comes from redundant HMCs. For this reason, it is important to consider carefully how to use this redundant capability to avoid such conflicts. You might choose to use them in a primary and backup role, even though the HMCs are not restricted in that way. The interface locking between two HMCs is automatic, usually of short duration, and most console operations wait for the lock to release without requiring user intervention. However, if one HMC experiences a problem while in the middle of an operation, it may be necessary to manually release the lock.[13]

Connect and disconnect managed systems

Because the HMC is not required for managed systems to properly function, you can connect or disconnect them from the HMC without service interruption of managed systems. For further details about connecting or disconnecting managed systems to or from the HMC, see 2.4.1, “Connect and disconnect managed systems” on page 45.

[13] See “Release Console Lock” on page 48.

Note: If your managed system is connected to only one HMC, you cannot perform several administration tasks, such as partition management and DLPAR operation, while the HMC is disconnected from the managed system.

1.4.2 Remote connectivity

Depending on what communication method or protocols are used, there are several options in the remote connectivity of HMC, as illustrated in Figure 1-11 on page 22. In this figure, we assume the following points:

- The dashed lines between HMCs and managed systems are serial connections.
- The solid lines connecting HMCs and other systems are Ethernet connections. These systems have appropriate TCP/IP configuration, so they can communicate using various TCP/IP protocols supported by the HMC.
- We exclude the possible connection to the AIX systems managed by Web-based System Manager from the HMC to avoid complexity in Figure 1-11 on page 22. You can also manage these AIX systems from the HMC, even if the AIX system is running in a partition.
- We assume that the HMC1 shown in Figure 1-11 on page 22 is a *server*; all connections are made to HMC1 from the other systems, and some operations are executed on it, such as configuring a partition or powering on the managed system.

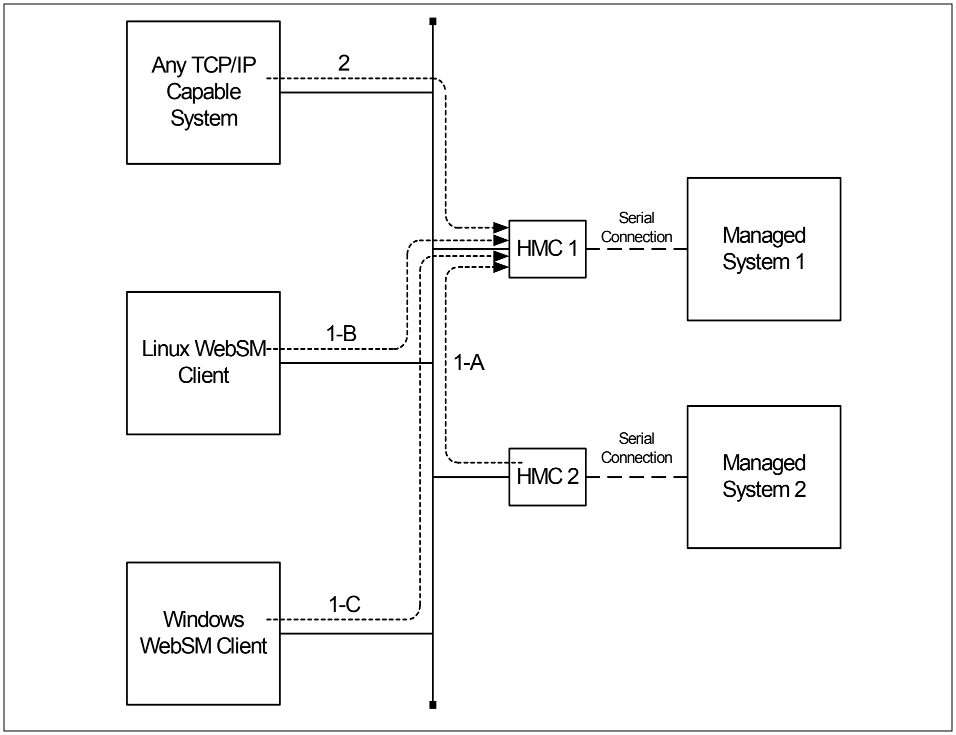


Figure 1-11 Remote connectivity option

Figure 1-11 shows two categories of remote connectivity options explained in the following sections: remote access to the HMC graphical user interface, as shown by 1-A, 1-B, and 1-C (using the dotted line), and the remote execution of command line function, as shown by 2 (using the dotted line).

Remote access to the HMC graphical user interface

The HMC allows remote access to the graphical user interface from the Web-based System Manager client installed on the following operating systems:

- AIX
- Linux[14]
- Windows

For installation and usage of the remote client, see 7.2, “Remote client setup on a Windows system” on page 141 and 7.3, “Remote client setup on a Linux system” on page 145.

[14] Only the Linux operating system for the IA-32 architecture is supported.

Remote execution of command line functions

The HMC provides a set of commands in order to be used for many management tasks; however, those commands are only accessible from the remote system, not from the HMC local console. This remote connectivity option is shown as 2 in Figure 1-11 on page 22, and any TCP/IP-capable system that supports `rexec` or `ssh` can use the remote execution of command line functions.

> **Note:** We recommend that you use `ssh` instead of `rexec`, because the `rexec` method transports a non-secure clear text copy of the password across the network.

For further information about the command line interface on the HMC, see Chapter 9, “HMC command line interface” on page 175.

1.5 HMC order information

In order to configure and administer a partitioning-capable pSeries server, you must attach at least one IBM Hardware Management Console for pSeries (HMC) to the system. Depending on the partitioning-capable pSeries server model, the HMC is ordered as a feature code or a separate orderable product, as shown in Table 1-4.

> **Note:** Currently, only the 7315-C02 is orderable. The 7316 and 7315-C01 are shown only for reference purposes.

Table 1-4 Previous Hardware Management Console feature code or MT-MDL

Short product name	HMC FC or MT-MDL	Note
pSeries 690	FC 7316	1
pSeries 670	FC 7316	1
pSeries 655	MT-MDL 7315-C01	1
pSeries 650 Model 6M2	MT-MDL 7315-C01	2
pSeries 630 Model 6C4	MT-MDL 7315-C01	2
pSeries 630 Model 6E4	MT-MDL 7315-C01	2

1. The HMC is required regardless of whether the system is partitioned or running in the Full System Partition.
2. The HMC is required if the system is partitioned. If the system is running in the Full System Partition, the HMC is not required.

To place an order of a new HMC (7315-C02), use the IBM Configurator for e-business (e-config). The redbook *IBM @server pSeries 670 and pSeries 690 System Handbook*, SG24-7040, can be used as a good example of how to use this application.

1.5.1 Supported number of managed systems and partitions

One HMC is capable of controlling multiple pSeries servers. As this publication is being written, an HMC can control any of the following:

- 12 pSeries 670 and pSeries 690 servers with 64 partitions
- 16 pSeries 655 servers with up to 32 partitions
- 16 pSeries 630 models 6C4 and 6E4 or pSeries 650 Model 6M2 servers with up to 64 partitions
- 16 pSeries servers and 64 partitions in a mixed server environment

  A mixed server environment can contain a combined maximum of eight pSeries 670 or pSeries 690 servers.

1.5.2 HMC software release numbering scheme

The latest HMC software release (program number 5639-N47) is preloaded on the HMC upon product shipment.

Although many IBM software products follow the release numbering scheme known as V.R.M.F (version, release, maintenance, and fix), the current HMC uses a different scheme, represented as R.V.M.F (release, version, maintenance, and fix). Therefore, the latest release available at the time of writing this book is represented as Release 3, Version 2.2, not *Version 3, Release 2.2*.

1.5.3 Ethernet adapter configuration

The HMC can be equipped with an optional Ethernet adapter in addition to the built-in Ethernet port. To use the second Ethernet port, the following feature must be configured:

- 10/100 Mbps Ethernet PCI adapter II (FC 4962)

The second Ethernet port typically is used when the HMC is incorporated into a cluster complex that is managed by CSM.

1.5.4 Asynchronous serial adapter configurations

The HMC can be equipped with none, one, or both of these asynchronous adapters:

- 8-port asynchronous adapter (FC 2943)
- 128-port asynchronous adapter (FC 2944)

Note:

- To ensure that the asynchronous adapter is installed in the HMC and not in the server, make sure that the adapter is configured as a feature of the HMC at the time of order.
- A combination of an FC 2943 and an FC 2944 is supported; however, the total number of asynchronous adapters cannot exceed two.

Use these adapters if more than two serial ports are required on your HMC. To configure these adapters, see Appendix A, "Configuring asynchronous adapters on the HMC" on page 295.

Using 8-port asynchronous adapters

FC 2943 is composed of the following:

- A PCI adapter card with a physical port
- A cable with a breakout box that has eight DB-25 connectors (see Figure 1-12)

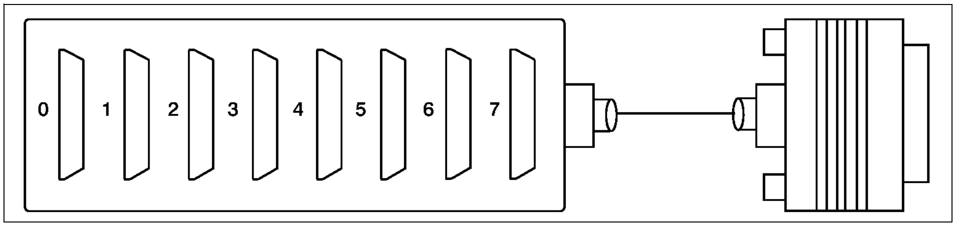


Figure 1-12 8-port fanout box with a connector cable

To connect between an FC 2943 port and one of the HMC ports on a managed system, the following cables are used:

FC 8120	Attachment Cable, HMC to Host, 6 meters
FC 8121	Attachment Cable, HMC to Host, 15 meters

To connect between an FC 2943 port and one of the BPC RS-422 ports on the 7040-W42 system rack, the following cables are used:

FC 8122	Attachment Cable, HMC to 7040-W42, 6 meters

FC 8123	Attachment Cable, HMC to 7040-W42, 15 meters

Figure 1-13 illustrates the relationship of these cabling configurations.

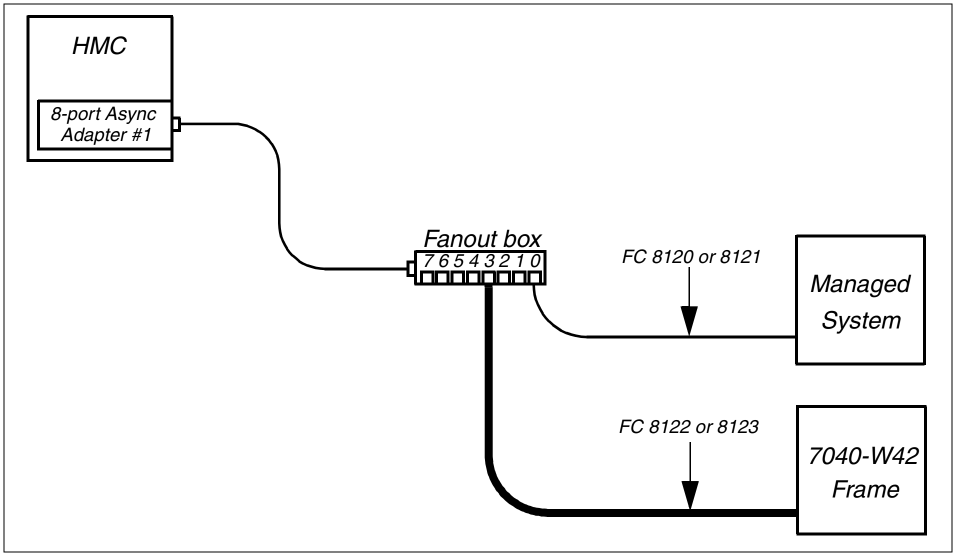


Figure 1-13 Connecting with an 8-port asynchronous adapter

Using 128-port asynchronous adapters

Unlike FC 2943, FC 2944 is a PCI adapter card that has two physical connectors. In order to use this adapter, the following features must be ordered:

- At least one of the following features:

FC 8131	128-port asynchronous controller cable, 4.5 meters
FC 8132	128-port asynchronous controller cable, 23 cm

- At least one FC 8137 Enhanced Remote Asynchronous Node 16-port

FC 8131 or 8132 is connected to one of the connectors of the 128-port asynchronous adapter card and is also connected to the IN port of the first Remote Asynchronous Node (RAN). Up to four RANs can be daisy-chained, as shown in Figure 1-14 on page 27.

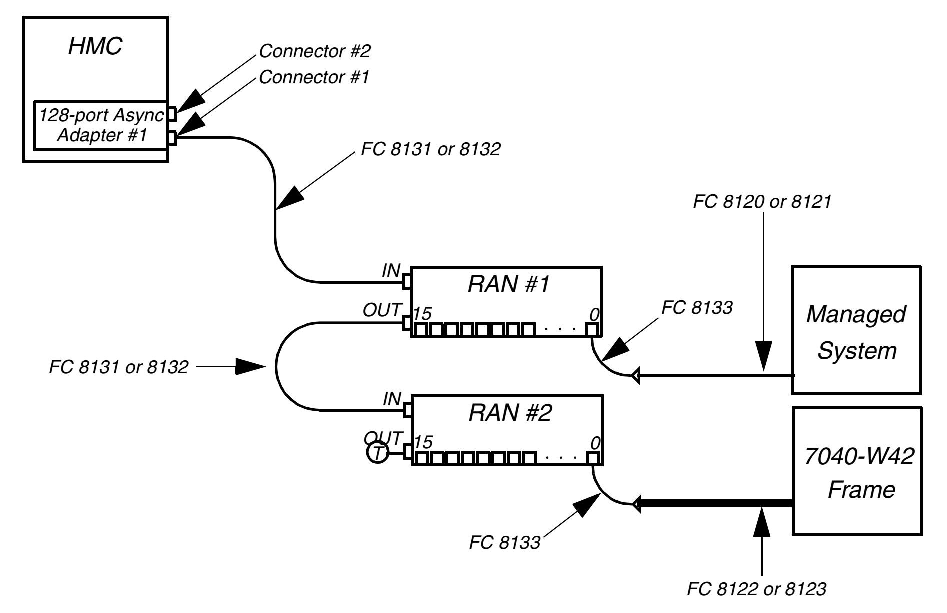


Figure 1-14 Connecting with a 128-port asynchronous adapter

Note the following:

- If up to four RANs are connected to a 128-port asynchronous adapter, FC 8131 or 8132 must be connected to the first connector of the adapter (see Figure 1-15).
- If five to eight RANs are connected to a 128-port asynchronous adapter, FC 8131 or 8132 must be also connected to the second connector of the adapter.
- FC 8131 and 8132 are also used to connect one RAN to another.

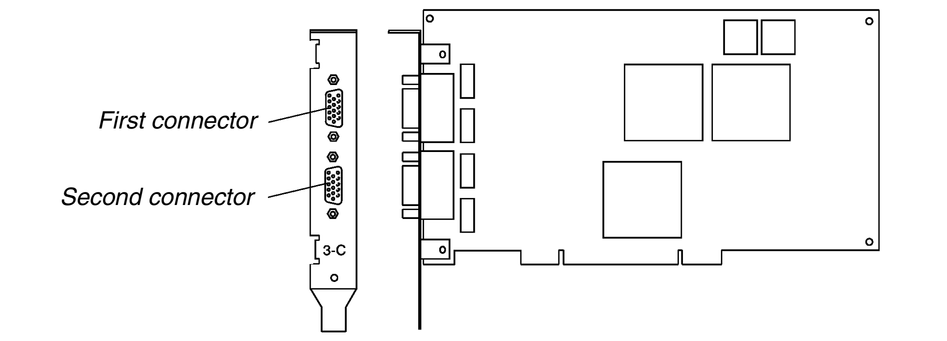


Figure 1-15 128-port asynchronous adapter card edge

Enhanced Remote Asynchronous Node 16-port (FC 8137)

The RAN is a separate box that has the following ports (see Figure 1-16):

- An IN connector
- An OUT connector
- 16 RJ-45 asynchronous ports

The IN and OUT connectors are used to connect an RAN with the 128-port asynchronous adapter or another RAN.

Note: If the RAN is the last in a daisy chain, the OUT port must be terminated.

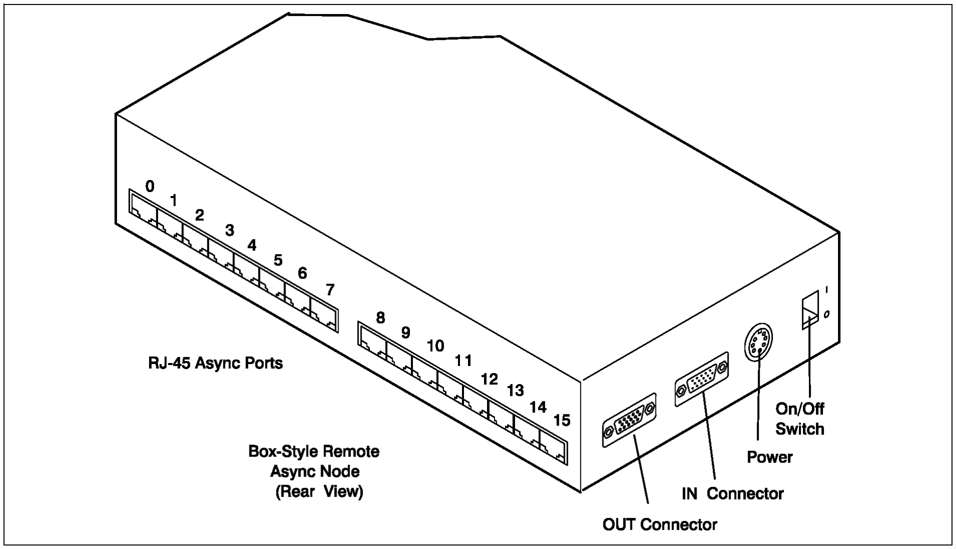


Figure 1-16 Enhanced Remote Asynchronous Node 16-port (FC 8137)

The 16 RJ-45 ports are connected to managed systems or BPC ports on the 7040-W42 system rack.

To connect between a port on an RAN and one of the HMC ports on a managed system, the following cables are used:

FC 8120	Attachment Cable, HMC to Host, 6 meters
FC 8121	Attachment Cable, HMC to Host, 15 meters
FC 8133	RJ-45 to DB-25 Converter cable

To connect between a port on an RAN and one of the BPC RS-422 ports on the 7040-W42 frame, the following cables are used:

FC 8122	Attachment Cable, HMC to 7040-W42, 6 meters

FC 8123	Attachment Cable, HMC to 7040-W42, 15 meters
FC 8133	RJ-45 to DB-25 Converter cable

> **Note:** Ports on RAN use the RJ-45 connector while FC 8120, 8121, 8122, and 8123 use the DB-25 connector. Use FC 8133 to connect these cables to a port on RAN.

Two 128-port asynchronous adapter and 16 RANs

If two 128-port asynchronous adapters and 16 RANs are used, the maximum of 256 serial ports is supported on an HMC (2 x 128 = 256). However, the actual usable and supported number of serial ports on an HMC is much smaller than this number, as explained in 1.5.1, "Supported number of managed systems and partitions" on page 24.

Distance solution

When the 128-port asynchronous adapter is used, the distance between the adapter and the last RAN can be extended up to 300 meters (see Figure 1-17). If the distance is longer than 4.5 meters, which is the length provided by FC 8131, you must purchase an RS-422 based compatible cable from another cable manufacturer, because IBM does not sell such a long cable.

If FC 8121 is used to connect the RAN and a managed system, the maximum distance between the HMC and the managed system can be up to 315 meters.

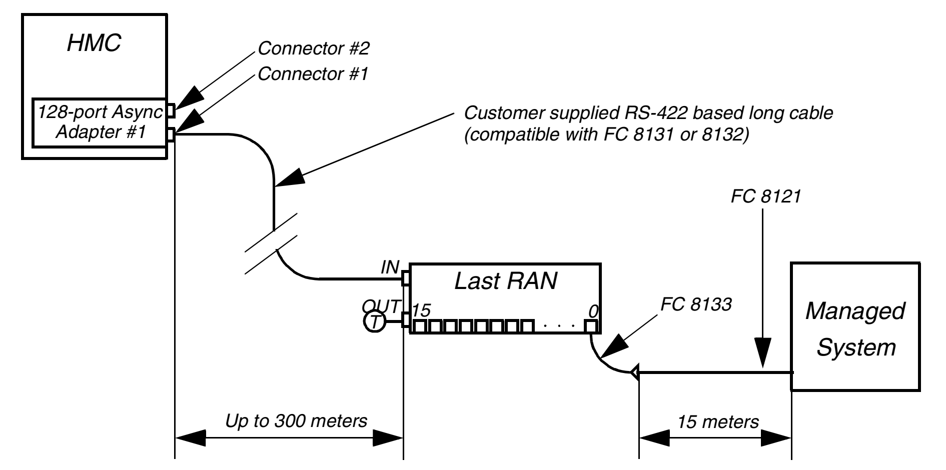

HMC
128-port Async Adapter #1
Connector #2
Connector #1
Customer supplied RS-422 based long cable (compatible with FC 8131 or 8132)
FC 8121
IN
OUT
T
Last RAN
15
0
FC 8133
Managed System
Up to 300 meters
15 meters

Figure 1-17 Distance solution

Note: The distance shown as “Up to 300 meters” in Figure 1-17 means that the distance between the 128-port asynchronous adapter and the last RAN in the daisy chain; therefore, if multiple RANs exist, the distance between the adapter and the first RAN in the daisy chain is shorter than 300 meters.

2

HMC graphical user interface

This chapter describes the HMC graphical user interface by providing the following sections:

- “Login and logout” on page 32
- “HMC graphical user interface at a glance” on page 32
- “HMC application overview” on page 40
- “Server and Partition” on page 41
- “Virtual terminal window” on page 49
- “Open xterm to access remote system using telnet” on page 52

Before proceeding to following chapters, you should be familiar with the terms and concepts used in the HMC graphical user interface explained in this chapter.

2.1 Login and logout

After power-on, the HMC shows the graphical login panel prompting for the user ID and the password. The HMC is supplied with a predefined user ID `hscroot` and the default password `abc123`. Both the user ID and password are case sensitive and must be typed exactly as shown. After the successful login, the HMC graphical user interface opens, as shown in Figure 2-1 on page 33.

To log out from the HMC graphical user interface, do the following:

1. From the menu bar, select **Console** → **Exit**.

   At this point, you can choose to save the state of the console for the next session by selecting the check box next to the option.

2. Select **Exit Now**.

3. When you exit from your HMC session, you have to choose from the following three logout modes:[1]

   Shutdown Console Powers off the HMC system.

   Reboot Console Shuts down the HMC system and then reboots it to the login prompt.

   Logout Returns the user to the login prompt without shutting down the HMC system.

   In either mode, the managed systems are not affected by these operations.

2.2 HMC graphical user interface at a glance

The HMC graphical user interface has the same appearance, key concepts, and basic tasks and tools as the AIX 5L Version 5.2 Web-based System Manager. For further information about the Web-based System Manager, refer to *AIX 5L Version 5.2 System Management Guide: AIX 5L Version 5.2 Web-based System Manager Administration Guide*, available at:

http://techsupport.services.ibm.com/server/library

[1] You can also use the **`hmcshutdown`** command to shut down or reboot your HMC (see “hmcshutdown” on page 190).

The HMC graphical user interface is composed of several elements, as shown in Figure 2-1.

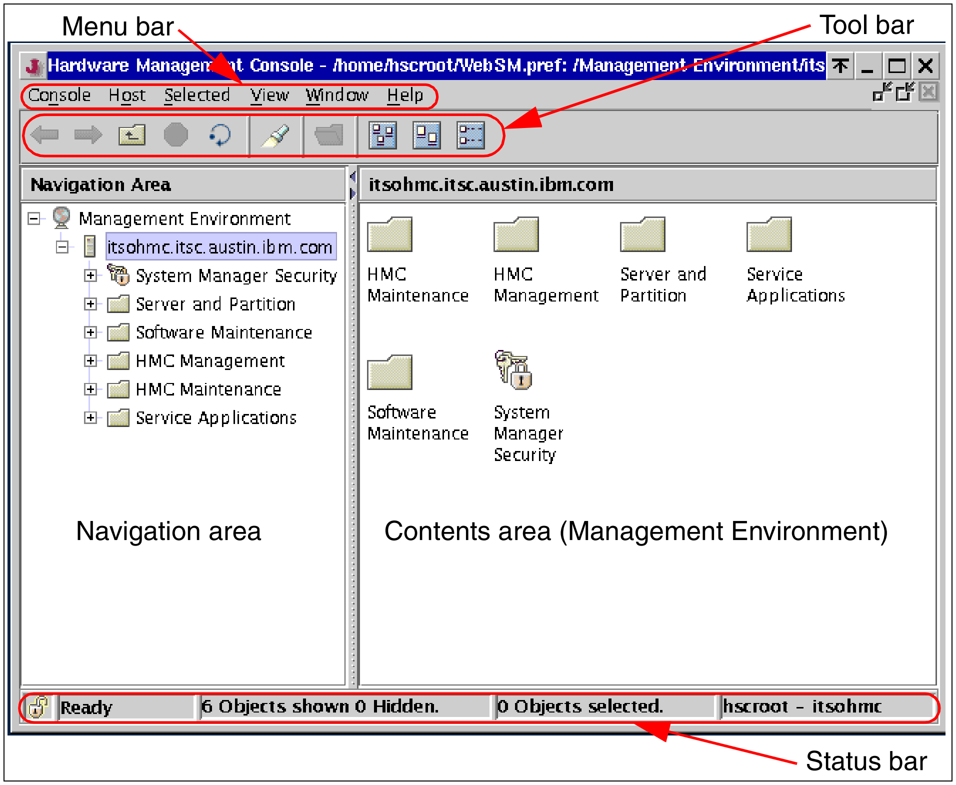


Figure 2-1 HMC graphical user interface

Table 2-1 shows the relevant section number for each element indicated in Figure 2-1.

Table 2-1 Elements in the HMC graphical user interface

Element	Relevant section number
Navigation area	2.2.1
Contents area	2.2.2
Menu bar	2.2.3
Tool bar	2.2.4
Status bar	2.2.5

2.2.1 Navigation area

The left side of the HMC graphical user interface is the Navigation area. It displays a hierarchy of items ordered in a tree structure. The root of the tree is the Management Environment. It contains the name of the HMC that you are currently logged in to. For example, you can see the icon with the host name itsohmc.itsc.austin.ibm.com in the Navigation area in Figure 2-1 on page 33. It is the host name of the HMC from which this panel image has been taken. In this example, there is only one host system, the HMC itsohmc.itsc.austin.ibm.com.

The Management Environment is a set of host systems that can be managed from the HMC. The host systems can be the HMC into which you are currently logged, the other remote HMCs, and also AIX systems managed by their Web-based System Manager interface.

To add a host system under the Management Environment, do the following:

1. From the menu bar, select **Console** → **Add** → **Hosts**.

   You have two options here: you can add a single host or multiple hosts. For a single host, add the host name of the system that you want to add; for multiple hosts, provide the path name of the file that contains the hosts to be added.

   You also have the option to verify whether the hosts added are on the network by selecting the option provided to you.

To remove a host system under the Management Environment, do the following[2]:

1. From the menu bar, select **Console** → **Remove**.
2. Select the host name from the displayed list that you want to remove, and then confirm in the next panel that you want to remove the designated host.

> **Note:** The managed system itself never appears in the Navigation area unless you manage AIX instances running in partitions managed by the Web-based System Manager.

Every folder contains different HMC applications used in the specific management task, such as Server and Partition or Software Maintenance, as shown in the Navigation area in Figure 2-1 on page 33. If you choose one of these HMC applications, it provides its own submenus and objects in the Contents area determined by the application context.

[2] This remove operation does not affect the managed system deleted from the HMC application.

2.2.2 Contents area

The right side of the panel is the Contents area. It displays managed objects and related tasks. You can choose different views in the Contents area: large icons, small icons, or details in the form of a list.

> **Note:** The label of the Contents area is changed depending on the application context. For example, if you select **Management Environment** in the Navigation area, the label is changed to Management Environment, as shown in Figure 2-1 on page 33.

2.2.3 Menu bar

The following six menu items are provided in the menu bar:

Console The Console menu contains choices that control the console. It enables you to add and remove managed systems, other HMCs, or other AIX systems managed by Web-based System Manager from the management environment. It also enables you to change themes on the desktop, change font sizes, open an outbound Telnet terminal session using an IP address or a host name, and exit the console.

Object The title of the Object menu changes to indicate the type of resource managed by the current HMC application. For example, when the Server Management application is selected, the Object menu title becomes Server Management. The Object menu contains general choices and actions for a HMC application that do not require the selection of specific objects to act on. The find function is also located in the Object menu. The contents of the Object menu are updated when a new HMC application is selected. In the case where you are managing an AIX system remotely, the AIX 5L Version 5.2 Web-based System Manager applications appear here.

Selected The Selected menu contains the set of actions that are applicable to the object selected in the Contents pane. The contents of the Selected menu are updated based on which object you select. It is disabled when Overview and Launch applications are loaded. The open tab in the Selected menu expands the view of a managed system in the Navigation area.

View The View menu contains choices for navigating, such as Back, Forward, and Up One Level. It also includes choices for customizing the console in the Show submenu. For example, you can select to show or hide the tool bar and status bar. This menu also includes options that control how objects are presented. For example, if the Contents area content provides a choice of views, such as Large Icon, Small Icon, Details, and Tree, these choices are listed here. If the content has only a single view, no view choices are listed. When the content displays an icon or Details view, the View menu includes choices for sorting and filtering the container.

Window The Window menu contains actions for managing subpanels in the console workspace. The new virtual terminal creates a new console subpanel in the workspace. Other choices control how all console subpanels are placed. For example, you can choose to have the panels completely cover the workspace-like tiles, or have them stacked in a cascade style.

Help The Help menu lists user assistance choices. Different options enable you to view help contents, search for help on a particular topic, and view help information about shortcut keys.

2.2.4 Tool bar

The tool bar lists commonly used actions that are available when the current plug-in application is loaded. It includes navigation controls, Find and View choices (if available), and a refresh option of the HMC graphical user interface. The tool bar also provides tool tip help when the pointer remains over a tool bar icon for a few seconds.

Reload button

The HMC graphical user interface provides the **Reload** button in the tool bar as shown in Figure 2-2.[3] If the HMC does not display the operation task result correctly, you can click this button to reload the latest information.

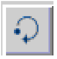


Figure 2-2 Reload button

[3] The function can be also selected from **View** → **Reload** or pressing the F5 key on the keyboard.

Details, Tree, Tree-Details buttons

The HMC graphical user interface provides the Details, Tree, and Tree-Details buttons in the tool bar as shown in Figure 2-3.[4] Once one of these buttons are selected, the selected view is preserved across the power recycle of HMC.

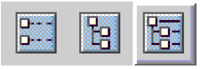
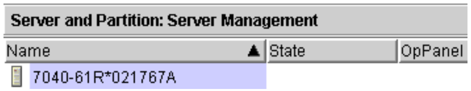


Figure 2-3 Details, Tree, Tree-Details buttons

For example, if you click the Details button while a managed system is selected in the Server Management application, the Contents area will show the detailed information about the selected managed system itself, as shown in Figure 2-4.

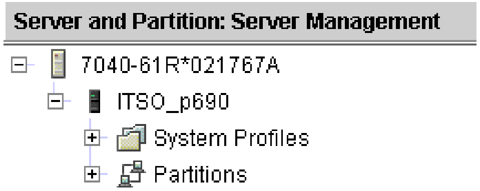


Server and Partition: Server Management

Name ▲	State	OpPanel
7040-61R*021767A		

Figure 2-4 Detailed view

If you click the Tree button, the Contents area will show a tree that represents objects belonging to the managed system, as shown in Figure 2-5.



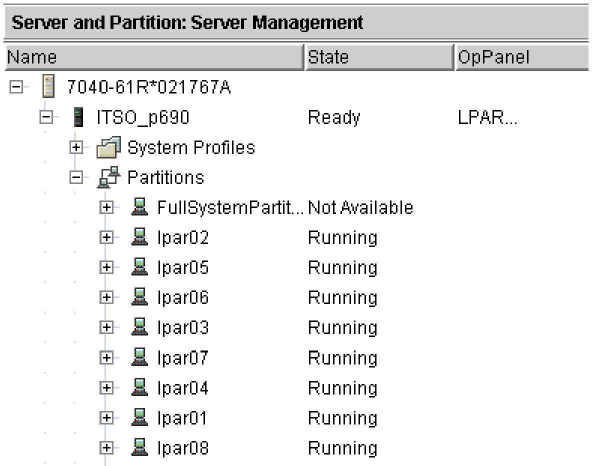
Server and Partition: Server Management

```
⊟ 7040-61R*021767A
   ⊟ ITSO_p690
      ⊞ System Profiles
      ⊞ Partitions
```

Figure 2-5 Tree view

If you click the Tree-Details button, the Contents area will show a tree that represents objects belonging to the managed system as well as the detailed information for each object as shown in Figure 2-6 on page 38.

[4] Same functions are available in the **View** menu.



Server and Partition: Server Management

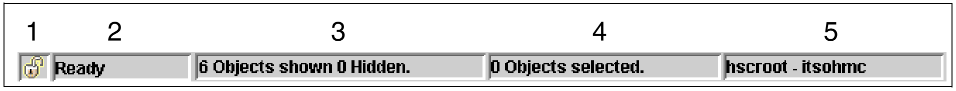
Name	State	OpPanel
⊟ 7040-61R*021767A		
⊟ ITSO_p690	Ready	LPAR...
⊞ System Profiles		
⊟ Partitions		
⊞ FullSystemPartit...	Not Available	
⊞ lpar02	Running	
⊞ lpar05	Running	
⊞ lpar06	Running	
⊞ lpar03	Running	
⊞ lpar07	Running	
⊞ lpar04	Running	
⊞ lpar01	Running	
⊞ lpar08	Running	

Figure 2-6 Tree-Details view

Note: It is recommended to select this view while you are managing partitions.

2.2.5 Status bar

The status bar displays at the lower edge of a console panel (see Figure 2-7).



Ready | 6 Objects shown 0 Hidden. | 0 Objects selected. | hscroot - itsohmc

Figure 2-7 Status bar

It has the following five fields ordered from left to right for displaying status information:

1. Padlock icon

   The padlock icon is open when secure communications are not active. When locked, the padlock icon indicates that the Web-based System Manager client on the HMC is running in secure mode. In this case, the communication between the Web-based System Manager client on the HMC and the connected Web-based System Manager server on the other system is encrypted using Secure Sockets Layer (SSL). A Web-based System Manager server is always running on the HMC itself, and can be running on the following remote systems:

   – The other remote HMCs
   – AIX systems (including on partitions)

The padlock icon indicates whether the Web-based System Manager client on the HMC is running in secure mode. It does not indicate whether the Web-based System Manager server on the HMC is running in secure mode. Therefore, while you are logging in to your HMC from its local console, the padlock icon is locked only when:

   - You are accessing to other manageable systems, including the other HMCs.
   - A public key ring file that was generated on the remote system has been already copied onto the local HMC.[5]

2. Plug-in loading status

   When a plug-in application is loaded, the text `Ready` is present. When an application is in the process of loading, a graphic bounce bar is displayed.

3. Number of objects visible in the Contents area

   Objects can be present on the managed system but hidden from the view by the view filter.

4. Number of objects selected in the Contents area
5. Security context (user name and host name)

   This displays the administrator user name and the HMC host name for the currently active HMC.

   The status bar can be hidden or shown by clearing or checking the Status Bar option in the Show submenu under View.

The HMC also provides a pop-up menu (it is also called context menu) for quick access to menu choices. To use pop-up menus with a mouse, point to an object, and then right-click. The pop-up menu lists the actions found in the Selected and Object menus for the current object or objects.

Reset the current HMC graphical user interface session

If your HMC graphical user interface session hangs, it means that even if you wait 10 minutes after an operation, and the pointer is still a clock-shaped icon, you can restart the X server to reset the session. You can reset your hung session by pressing the Ctrl+Alt+Backspace key combination. The X server restarts and displays the HMC login prompt. All messages and panels regarding the hung session will be lost.

[5] This operation is performed by the “Copy another Certificate Authority’s Public Key Ring File from diskette” task, which is shown in Figure 7-3 on page 129.

2.3 HMC application overview

As shown in Figure 2-8, seven application folders are provided in the Navigation area in the HMC graphical user interface.

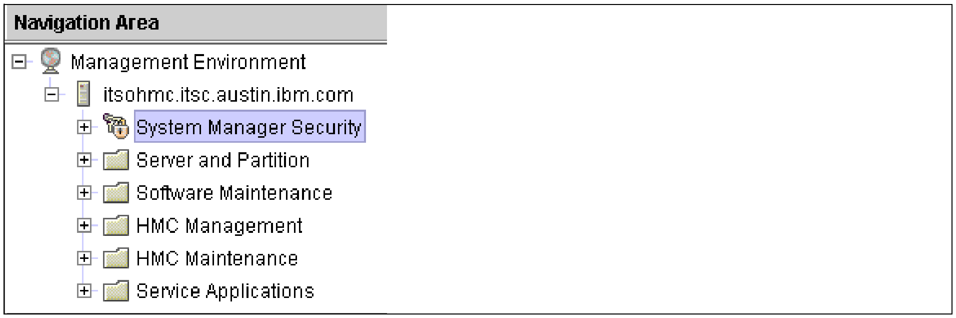


Figure 2-8 HMC application folders in the Navigation area

These folders contain several applications to be used for different system management tasks on the HMC and managed systems as shown in Table 2-2.

Table 2-2 HMC application folders

Folder name	**Description**	**Relevant section number**
System Manager Security	This folder contains several applications that enable a secure network connection from other Web-based System Manager clients for the remote control of an HMC in client/server mode.	7.1
Server and Partition	This folder contains only one application, Server Management, which provides all partition-related tasks. It is used to create, maintain, activate, and delete logical partitions and affinity partitions.	2.4
Software Maintenance	This folder contains three applications (Frame, HMC, and Software Maintenance) that enable you to perform software level management tasks on a frame as well as on an HMC. The available tasks for the HMC are: save and back up important HMC-related information, format removable media, save upgrade data, and install corrective fixes.	6.1
HMC Management	This folder contains only one application, Users, which controls user access to the HMC and enables the user to perform different tasks in the HMC environment depending on the different roles assigned to each user you create.	4.1

Folder name	Description	Relevant section number
HMC Maintenance	This folder contains several applications that enable you to set the console's date and time, modify and view HMC network information, view console events, and schedule routine backups. It is also used to enable and disable remote command execution and secure shell access, change the language locale, and configure the serial adapter.	4.2
Service Applications	This folder contains several applications to be used for service-related tasks, such as Inventory Scout, Service Agent, and Service Focal Point.	11.1

2.4 Server and Partition

The Server and Partition folder contains only the Server Management application, which provides all partition-related tasks.

It is important to understand how to select the managed system that you are going to manage using the Server Management application. If this application is selected, you will see the object hierarchy illustrated in Figure 2-9 on page 42 in the content area.

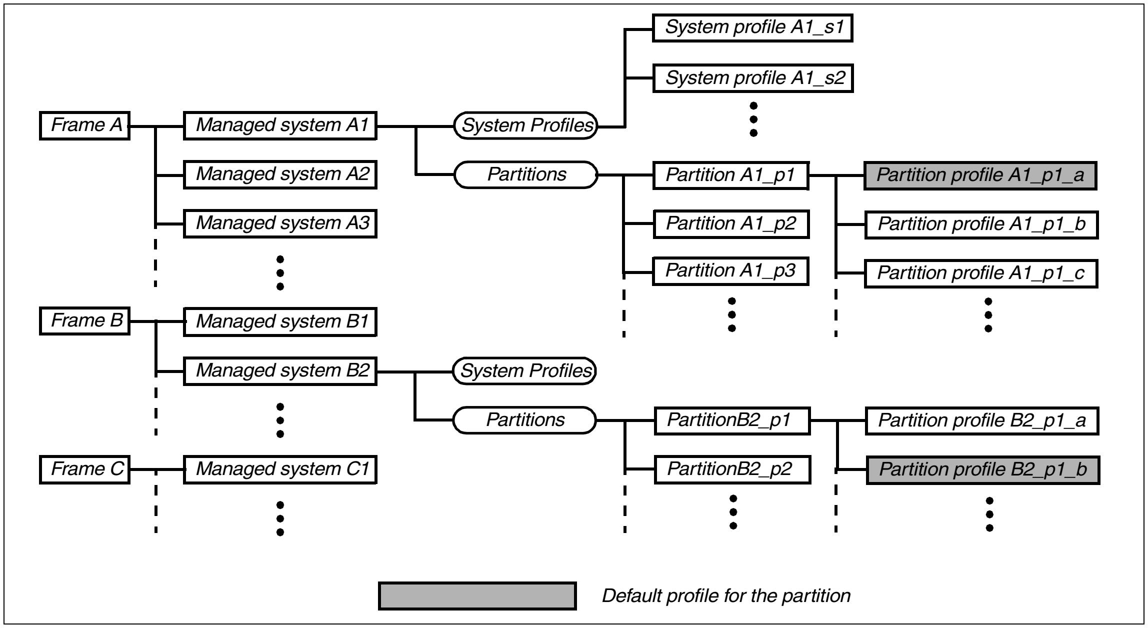


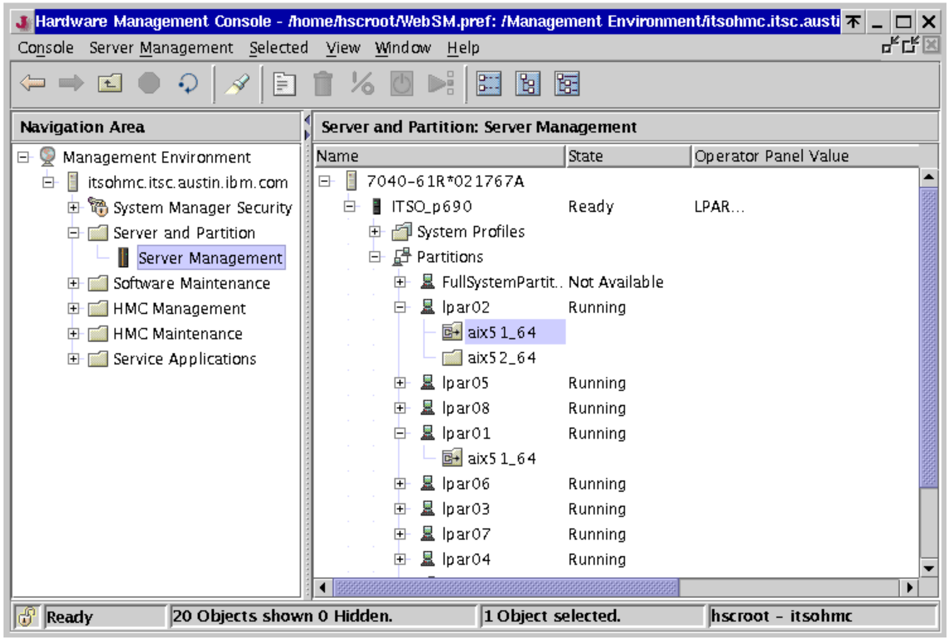
Figure 2-9 Object hierarchy for the Server Management application

The object hierarchy is summarized as follows:

- Multiple frames can exist in the content area.
- A frame can contain multiple managed systems.
- A partitioning-capable managed system always has two branch nodes:
  - System Profiles
  - Partitions
- The System Profiles branch node can contain multiple system profiles.
- The Partitions branch node can contain multiple partitions.
- A partition can contain multiple partition profiles.
- One of partition profiles is designated as the default profile for the partition; if a partition has only one partition profile, that profile is always treated as the default partition profile.

For example, a frame icon (7040-61R*021767A) is shown in the content area in Figure 2-10 on page 43, where 7040-61R is the machine type and model for the 24” system frame for pSeries 690, pSeries 670, and pSeries 655. In this frame, there is only one managed system ITSO_p690 is shown, which has two branch nodes: System Profiles and Partitions.

Under the Partitions branch node, nine partitions are shown, including the Full System Partition. While the lpar02 partition has two partition profiles, lpar01 has only one; therefore aix51_64 is the default profile for lpar01.


Hardware Management Console - /home/hscroot/WebSM.pref: /Management Environment/itsohmc.itsc.austi
Console
Server Management
Selected
View
Window
Help
Navigation Area
Server and Partition: Server Management

```
Management Environment
  itsohmc.itsc.austin.ibm.com
    System Manager Security
    Server and Partition
      Server Management
    Software Maintenance
    HMC Management
    HMC Maintenance
    Service Applications
```

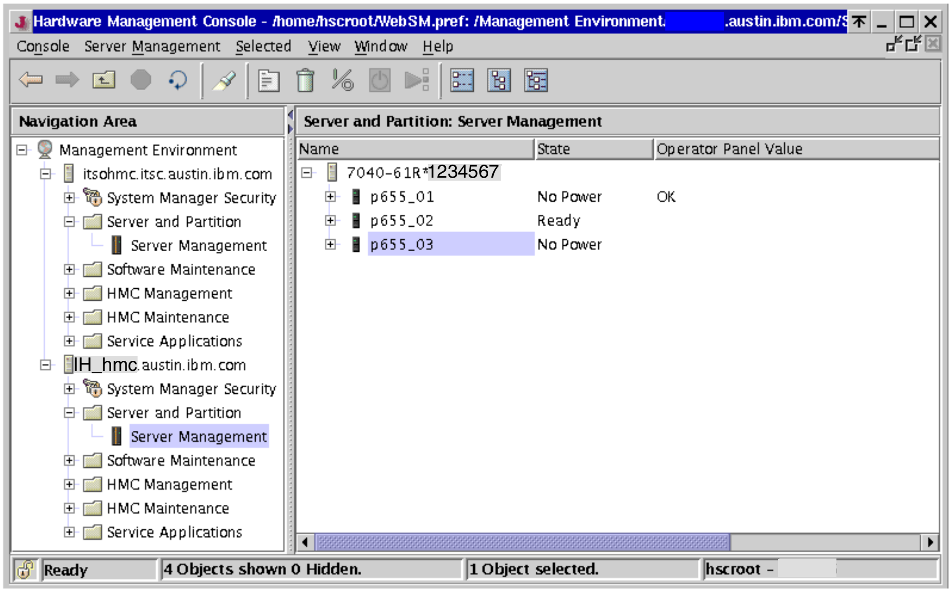
Name	State	Operator Panel Value
7040-61R*021767A		
ITSO_p690	Ready	LPAR...
System Profiles		
Partitions		
FullSystemPartit..	Not Available	
lpar02	Running	
aix51_64		
aix52_64		
lpar05	Running	
lpar08	Running	
lpar01	Running	
aix51_64		
lpar06	Running	
lpar03	Running	
lpar07	Running	
lpar04	Running	

Ready | 20 Objects shown 0 Hidden. | 1 Object selected. | hscroot - itsohmc

Figure 2-10 Server Management (one managed system)

As more complex examples for the graphical user interface on the HMC that manages multiple managed systems:

- Figure 2-11 on page 44 shows a frame (7040-61R*1234567) in the content area that contains three managed systems (three pSeries 655 servers).
- Figure 2-12 on page 44 shows four frames in the content area. The first frame contains a pSeries 670 whereas the other frames contain pSeries 630 Model 6C4 each.

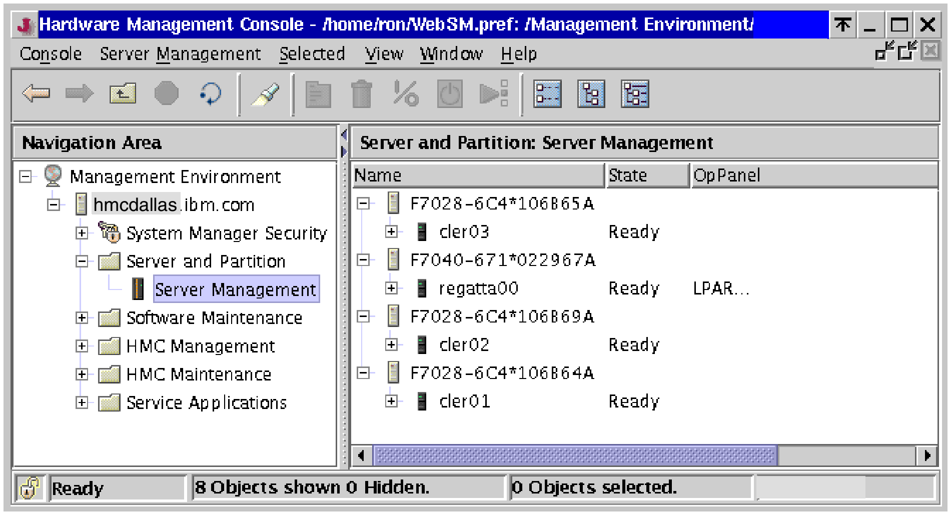

Hardware Management Console - /home/hscroot/WebSM.pref: /Management Environment/ .austin.ibm.com/S
Console Server Management Selected View Window Help
Navigation Area
Server and Partition: Server Management

- Management Environment
  - itsohmc.itsc.austin.ibm.com
    - System Manager Security
    - Server and Partition
      - Server Management
    - Software Maintenance
    - HMC Management
    - HMC Maintenance
    - Service Applications
  - IH_hmc.austin.ibm.com
    - System Manager Security
    - Server and Partition
      - Server Management
    - Software Maintenance
    - HMC Management
    - HMC Maintenance
    - Service Applications

Name	State	Operator Panel Value
7040-61R*1234567		
p655_01	No Power	OK
p655_02	Ready	
p655_03	No Power	

Ready | 4 Objects shown 0 Hidden. | 1 Object selected. | hscroot -

Figure 2-11 Server Management (three pSeries 655 servers)[6]


Hardware Management Console - /home/ron/WebSM.pref: /Management Environment/
Console Server Management Selected View Window Help
Navigation Area
Server and Partition: Server Management

- Management Environment
  - hmcdallas.ibm.com
    - System Manager Security
    - Server and Partition
      - Server Management
    - Software Maintenance
    - HMC Management
    - HMC Maintenance
    - Service Applications

Name	State	OpPanel
F7028-6C4*106B65A		
cler03	Ready	
F7040-671*022967A		
regatta00	Ready	LPAR...
F7028-6C4*106B69A		
cler02	Ready	
F7028-6C4*106B64A		
cler01	Ready	

Ready | 8 Objects shown 0 Hidden. | 0 Objects selected.

Figure 2-12 Server Management (four managed systems)[7]

[6] This screen shot is taken from an HMC that manages three pSeries 655 nodes being used for the internal test purpose. Therefore, the HMC host name is purposely hidden.

[7] The frame icon descriptions start with F, not from MT-MDL in Figure 2-12, since those systems are installed with V3.0 system firmware.

Note:

- A single 7040-61R frame can accommodate only one pSeries 670 or pSeries 690 server.
- A single 7040-61R frame can accommodate multiple pSeries 655 servers.
- Although multiple pSeries 650 Model 6M2 server, and pSeries 630 models 6C4 and 6E4 servers can be physically accommodated in a single 19-inch rack, those servers always appear in separate frames in the content area of Server Management.

2.4.1 Connect and disconnect managed systems

You can connect or disconnect managed systems on the HMC using the following procedures.

Connect to the managed systems

The first time you connect a managed system to the HMC, a predefined name of the managed system appears in the Contents area of Partition Management. You can change this name by selecting the managed system in the Contents area, selecting the **Select** option in the menu bar, and clicking the **Properties** menu option.[8]

Disconnect from the managed systems

You can delete managed systems from the HMC graphical user interface if you no longer want to manage a particular system.

Note: Do not physically disconnect the serial connection before performing the procedures explained here.

To delete the managed system from the Contents area, do the following:

1. In the Contents area, select the managed system.
2. From the menu bar, choose **Selected** → **Delete**.
3. Click **Yes** to delete the managed system from the Contents area.
4. Pull out the serial cable from the managed system.

2.4.2 Server Management

The Server Management application is used to create, maintain, activate, and delete logical partitions and affinity partitions. It is also used to power on and power off the managed system and partitions, open and close virtual terminal

[8] The properties panel is shown in Figure 3-1 on page 57.

windows for the partitions, view properties of the managed system, perform backups, restore profile data, and rebuild the managed system.[9] For more information about the use of this application, see the following sections:

- 2.4.3, "Server Management menus" on page 46
- Chapter 3, "Basic managed system operation tasks" on page 55

For further detailed information how to create and manage partitions and partition profiles, refer to the following publications:

- *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590
- *The Complete Partitioning Guide for IBM @server pSeries Servers*, SG24-7039

2.4.3 Server Management menus

As shown in Figure 2-13 on page 47, the following 10 menus are available in this application if you select a managed system.

[9] You can create, view, and remove partitions (including affinity partitions), system profiles, and partition profiles using the **mksyscfg**, **lssyscfg**, and **rmsyscfg** commands. The **chsyscfg** command can be also used to modify those already created objects. See 9.3.4, "Commands to manage system configuration" on page 195 for the detailed information about these commands.

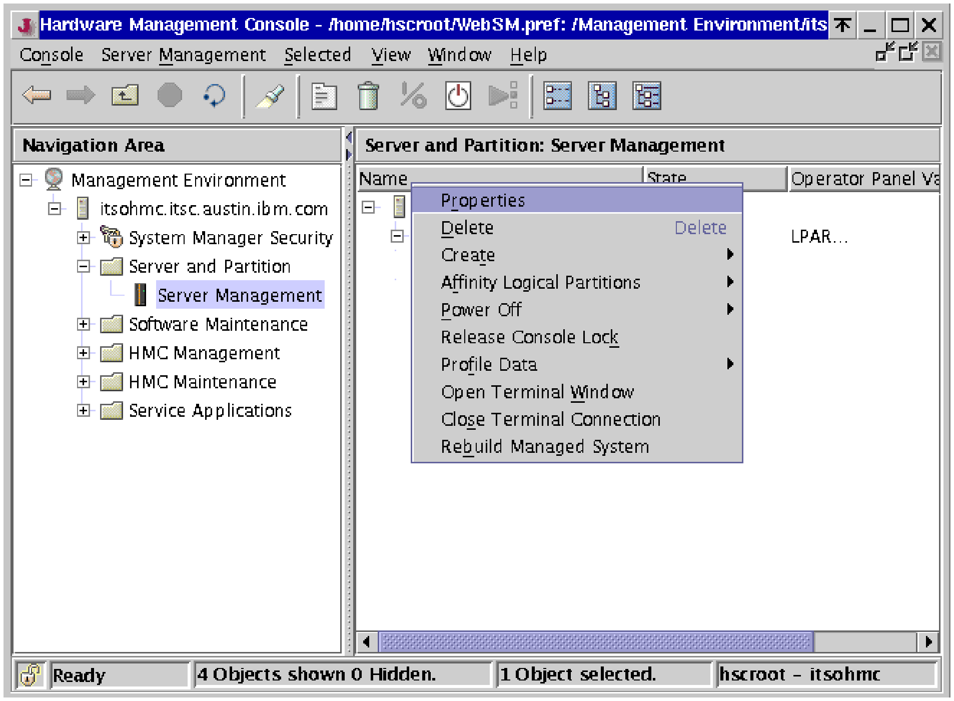


Figure 2-13 Server Management options

Properties

This menu enables you to see the properties of the managed system. The application queries several attributes and capabilities and displays them in the machine, processors, memory, I/O slot, and policy attributes in the property window (see 3.1, “Viewing properties of the managed system” on page 56).

Delete

This menu enables a user with System Administrator role[10], such as hscroot, to delete a selected managed system that is controlled from this HMC.

Create

This menu enables a user with System Administrator role, for example hscroot, to create logical partitions or system profiles. The system profile option is dimmed on a system that has no logical partition profiles defined.

[10] See 4.1.1, “User role descriptions” on page 77.

Affinity Logical Partitions

This menu is used to set up partitions that have a predefined affinity for processors and memory. You can set up these affinity logical partitions with either a four-way processor MCM configuration or with an eight-way processor MCM configuration. The application setup wizard automatically defines the number of affinity partitions that can be defined based on the systems processor configuration. Affinity partitions cannot run with normal partitions on a single managed system at the same time.

Note: This menu is only available on the pSeries 670 and pSeries 690.

Power On and Off

This menu enables the user to toggle the power states of the managed system. Only one option is available based on the state of the managed system. If the state is *powered on*, the *Power Off* option is available, and if the state is *powered off*, the *Power On* option is available.

We explain this menu in 3.2, “Power on the managed system” on page 61 and 3.6, “Power off the managed system” on page 72.

Release Console Lock

This menu provides a way to manually override the HMC operations lock held in the service processor on a managed system, which coordinates activities between two HMCs.

To release an HMC lock, do the following:[11]

1. In the Contents area, select the managed system.
2. From the menu bar, choose **Selected** → **Release Console Lock**.

Note: This menu should normally only be needed if there have been HMC failures that left the lock on.

Profile Data

This menu enables the hscroot user to restore, initialize, back up, and remove profile data. We explain this menu in Chapter 5, “Managing partition profile data on the HMC” on page 99.

[11] The `rmsplock` command can be also used to remove leftover locks (see “rmsplock” on page 211).

Open Terminal Window

This menu enables the opening of a virtual terminal window to the partition. This connection is necessary to define the default console and the network interface for the partition when it is created.

Close Terminal Connection

This menu enables the closing of the virtual terminal window to the partition.

> **Note:** Clicking the X at the top-right of the opened virtual terminal window is not enough to close the terminal connection. You must explicitly select this menu in order to close the opened virtual terminal connection.

Rebuild managed system

This menu instructs the HMC to retrieve the information from the NVRAM in the managed system and then refresh the graphical user interface using the retrieved information.[12]

2.5 Virtual terminal window

AIX needs a console for installation and some service activities. The native serial ports on the managed system are only assignable together to one partition. The virtual terminal window provides virtual terminal console access to every partition without a physical device assigned.

2.5.1 Virtual terminal window concept

A virtual terminal window is available for each partition or Full System Partition of the managed system. Some functions are limited, and the performance cannot be guaranteed because of the limited bandwidth of the serial connection between the HMC and the managed system.

To open the virtual terminal window, do the following:[13]

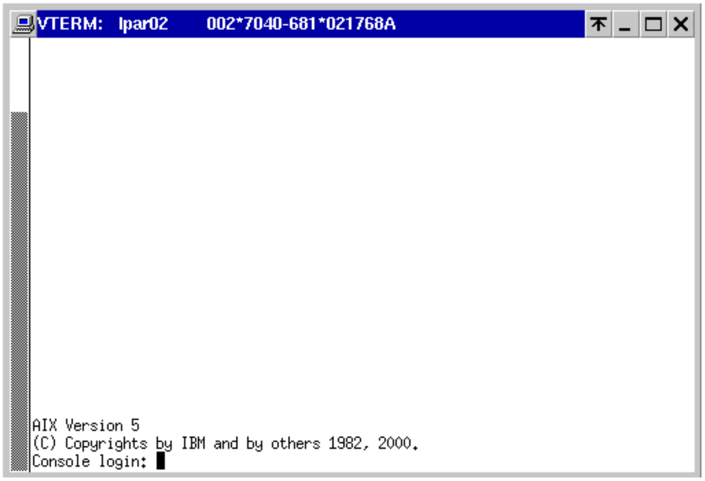
1. Expand the **System and Partition** folder in the navigation area.
2. Select the **Server Management** application.
3. Select the frame in which the target managed system resides.
4. Select the managed system on which the target partition is running.
5. Expand the **Partitions** tree.

[12] The **`chsysstate`** command can be also used to rebuild the managed system (see “chsysstate” on page 213).

[13] The **`mkvterm`** and **`rmvterm`** commands can be also used to open and close a virtual terminal to the specified partition (see 9.3.7, “Commands for virtual terminals” on page 209).

6. Select the target partition and right-click on it.
7. Select the **Open Terminal** menu.

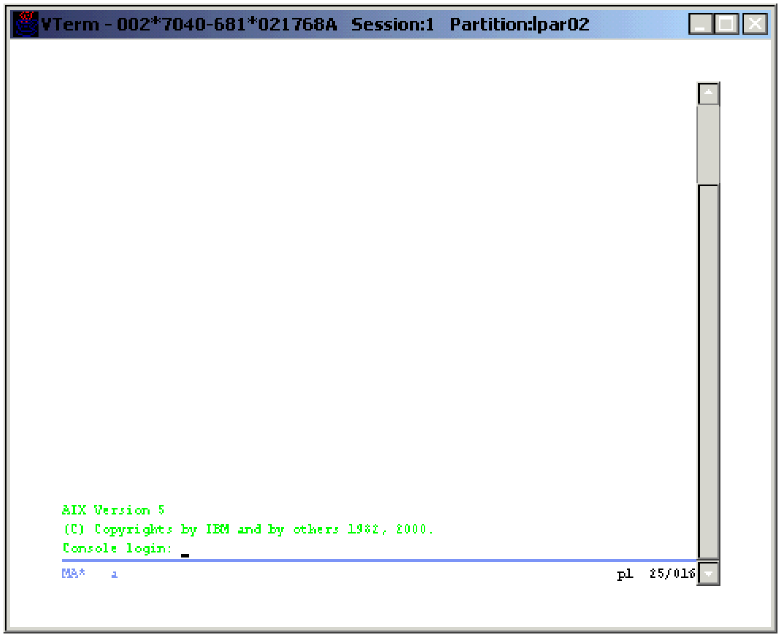
If you have done this operation on the HMC local console, you will see the virtual terminal window shown in Figure 2-14.



```
AIX Version 5
(C) Copyrights by IBM and by others 1982, 2000.
Console login: █
```

Figure 2-14 Virtual terminal window on the HMC

If you have done this operation on the remote Web-based System Manager client, you will see the virtual terminal window shown in Figure 2-15 on page 51.



VTerm - 002*7040-681*021768A Session:1 Partition:lpar02

```
AIX Version 5
(C) Copyrights by IBM and by others 1982, 2000.
Console login: _
MA*    1                                                    pl  25/016
```

Figure 2-15 Virtual terminal window on the remote WebSM client

Note: In Figure 2-14 and Figure 2-15, the title bar displays the machine type and model name (7040-681), the serial number of the pSeries 690 (021768A), and the partition name (lpar02) to which the virtual terminal window is connected.

The virtual terminal window should only be used for installation and service purposes. For AIX configuration and management, we recommend you use a network adapter assigned to the partition exclusively. The virtual terminal window does not support:

- Printing to a virtual terminal
- Transparent print services
- Modem connection for the virtual console port
- Real-time applications

The virtual terminal window supports the AIX **`smitty`** and other curses-driven applications. The virtual terminal window emulates a VT320 terminal. To set the terminal type on a virtual terminal window session, you can use the AIX **`export TERM=vt320`** command on the Korn shell prompt.

The following operations are available for the virtual terminal window:

- Open a virtual terminal window

  From the HMC graphical user interface, select a partition or the Full System Partition in the Contents area using Partition Management, right-click, and select **Open Terminal Window**.

- Close a virtual terminal window

  To close a virtual terminal window, click the X in the top-right corner of the panel. To force a virtual terminal window to close, select the partition, right-click, and then select **Close Terminal Connection**.

2.5.2 Virtual terminal window in the Full System Partition

When you open a virtual terminal window to the Full System Partition, the output of the native S1 serial port is redirected to the virtual terminal window. Then, the output of any command is directed from the serial port S1 to the virtual terminal window. After closing the virtual terminal window, the serial port S1 is normally accessible.

In the No Power state, you can access the service processor of a managed system with a virtual terminal window.

2.5.3 Partition virtual terminal windows

You can open a virtual terminal window at any time, regardless of the state of a partition, but only one per partition. The virtual terminal window is blank until the partition is activated. After you activate one of partitions, you cannot connect a virtual terminal window to the service processor of the managed system. In a partitioned environment, the native serial port S1 is not redirected to the virtual terminal of that partition.

2.6 Open xterm to access remote system using telnet

You can open xterm windows to connect to the other hosts[14] using **`telnet`** over the network in order to access the other hosts, including partitions.

To use this function, do the following from the HMC graphical user interface:

1. From the menu bar, select **Console** → **Open Terminal**.
2. Enter the host name or the IP address, then click **OK**.

[14] Except for the HMC itself.

To access to a partition using this function, the partition has to be assigned at least one network adapter, and the adapter has to be configured with an IP address that can be accessible from the HMC.

Note: The **Open Terminal** menu is available only on the local HMC console.

3

Basic managed system operation tasks

This chapter explains in the following sections how to start, stop, and reset an operating system on a managed system in both a partitioned environment and Full System Partition using the Server Management application:

- “Viewing properties of the managed system” on page 56
- “Power on the managed system” on page 61
- “Activate partitions” on page 65
- “Shut down the operating system in a partition” on page 68
- “Reset the operating system in a partition” on page 70
- “Power off the managed system” on page 72
- “Operating the managed system with the HMC” on page 72

In addition, the Contents area of the Server Management application provides status information about the managed system and the partitions and displays the operator panel value of the managed system and the partitions.

3.1 Viewing properties of the managed system

To view the properties of your managed system, select the managed system in the Contents area, and from the menu bar choose **Selected** → **Properties**. Or select the managed system in the Contents area, right-click, and select **Properties**. The property panel shown in Figure 3-1 on page 57 opens.

The properties panel includes the five property tabs of the managed system shown in Table 3-1.

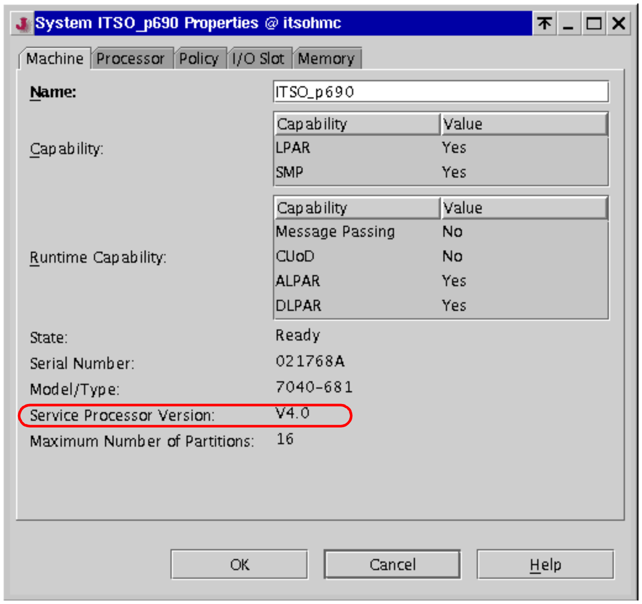
Table 3-1 Properties of the managed system

Property name	Figure number
Machine	Figure 3-1 on page 57
Processor	Figure 3-2 on page 58
Policy	Figure 3-3 on page 59
I/O Slot	Figure 3-4 on page 60
Memory	Figure 3-5 on page 61

3.1.1 Machine property

The Machine property tab displays the following information, as shown in Figure 3-1:

- Capability
- Runtime Capability
- State
- Serial Number
- Model/Type
- Service Processor Version



Name: ITSO_p690

Capability:

Capability	Value
LPAR	Yes
SMP	Yes

Runtime Capability:

Capability	Value
Message Passing	No
CUoD	No
ALPAR	Yes
DLPAR	Yes

State: Ready

Serial Number: 021768A

Model/Type: 7040-681

Service Processor Version: V4.0

Maximum Number of Partitions: 16

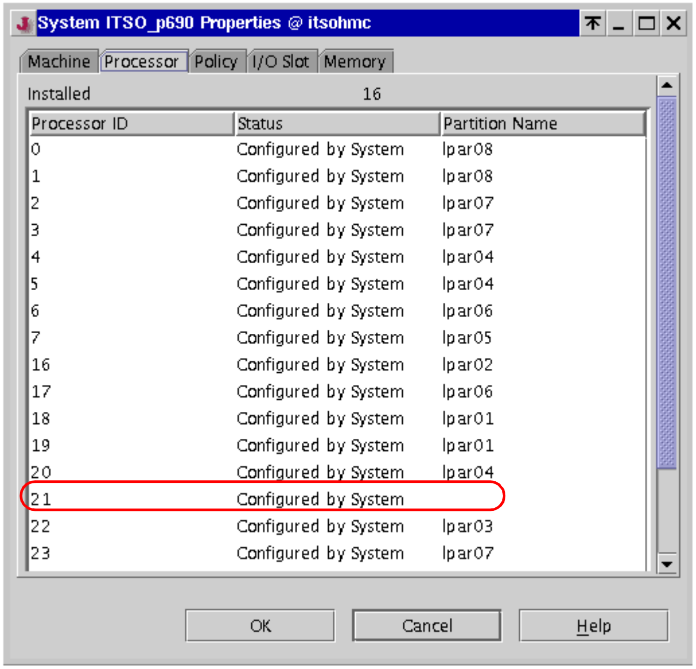
Figure 3-1 System properties: Machine[1]

Note: The Service Processor Version field (highlighted in Figure 3-1) shows the system firmware version on your managed system.

[1] The same information can be obtained using the `lssyscfg` command (see Example 9-3 on page 196).

3.1.2 Processor property

The Processor property tab displays information about the installed processors, identified by their processor ID[2] and their assignment to partitions, as shown in Figure 3-2.



Installed 16

Processor ID	Status	Partition Name
0	Configured by System	lpar08
1	Configured by System	lpar08
2	Configured by System	lpar07
3	Configured by System	lpar07
4	Configured by System	lpar04
5	Configured by System	lpar04
6	Configured by System	lpar06
7	Configured by System	lpar05
16	Configured by System	lpar02
17	Configured by System	lpar06
18	Configured by System	lpar01
19	Configured by System	lpar01
20	Configured by System	lpar04
21	Configured by System	
22	Configured by System	lpar03
23	Configured by System	lpar07

Figure 3-2 System properties: Processor[3]

Processor 21 is not assigned to any partitions in Figure 3-2.

[2] This is the physical processor ID.

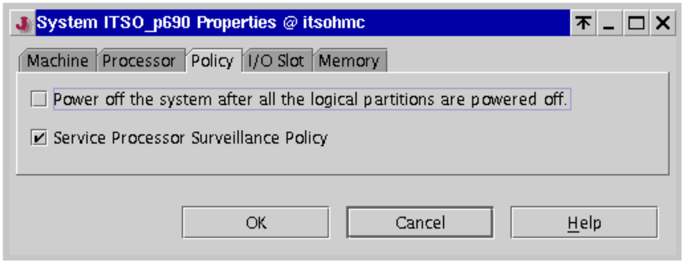
[3] The same information can be obtained using the `lshwres` command (see “lshwres” on page 206).

3.1.3 Policy property

In the Policy tab, you can choose to switch these two options on or off, as shown in Figure 3-3:

- Power off the system after all the logical partitions are powered off.
- Service Processor Surveillance Policy.

The Service Processor Surveillance Policy is a program that monitors the managed system. If the managed system is not responding, and the Service Processor Surveillance Policy is set, the state of the managed system changes from `Ready` to `No Connection` on the HMC graphical user interface.



□ Power off the system after all the logical partitions are powered off.

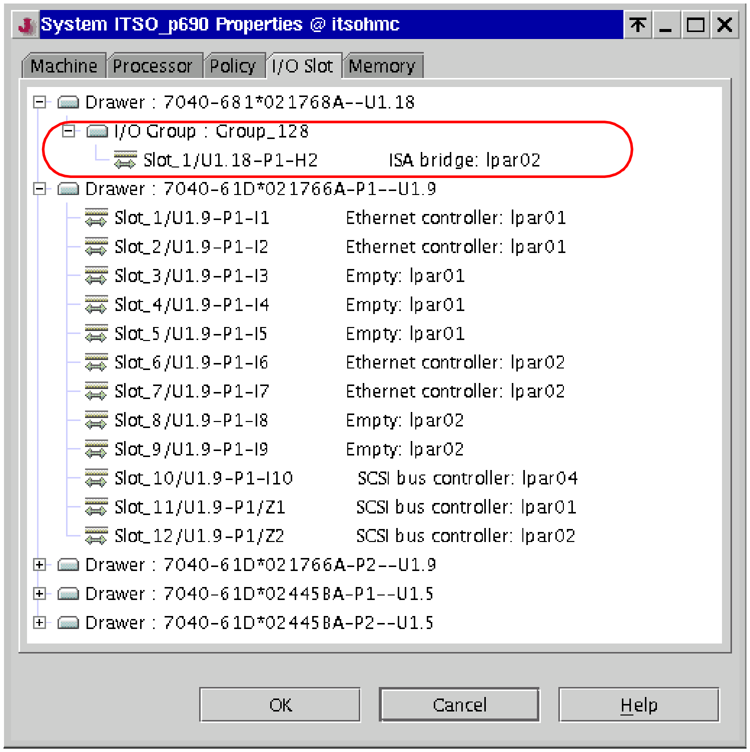
☑ Service Processor Surveillance Policy

Figure 3-3 System properties: Policy[4]

[4] Figure 3-3 shows the default setting.

3.1.4 I/O Slot property

The I/O Slot property tab displays the assignment of I/O slots to partitions and the adapter-type information grouped by drawers, as shown in Figure 3-4.



```
Drawer : 7040-681*021768A--U1.18
    I/O Group : Group_128
        Slot_1/U1.18-P1-H2            ISA bridge: lpar02
Drawer : 7040-61D*021766A-P1--U1.9
    Slot_1/U1.9-P1-I1         Ethernet controller: lpar01
    Slot_2/U1.9-P1-I2         Ethernet controller: lpar01
    Slot_3/U1.9-P1-I3         Empty: lpar01
    Slot_4/U1.9-P1-I4         Empty: lpar01
    Slot_5/U1.9-P1-I5         Empty: lpar01
    Slot_6/U1.9-P1-I6         Ethernet controller: lpar02
    Slot_7/U1.9-P1-I7         Ethernet controller: lpar02
    Slot_8/U1.9-P1-I8         Empty: lpar02
    Slot_9/U1.9-P1-I9         Empty: lpar02
    Slot_10/U1.9-P1-I10        SCSI bus controller: lpar04
    Slot_11/U1.9-P1/Z1         SCSI bus controller: lpar01
    Slot_12/U1.9-P1/Z2         SCSI bus controller: lpar02
Drawer : 7040-61D*021766A-P2--U1.9
Drawer : 7040-61D*02445BA-P1--U1.5
Drawer : 7040-61D*02445BA-P2--U1.5
```

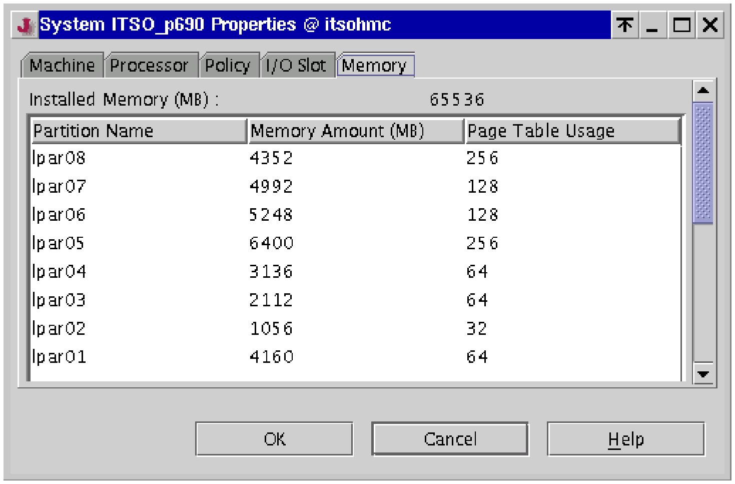
Figure 3-4 System properties: I/O Slot[5]

Note: ISA devices are not supported by DLPAR operations. The I/O slot Slot_1/U1.18-P1-H2 in Figure 3-4 represents a group of ISA devices, such as the diskette drive and native serial ports, on the pSeries 670 and pSeries 690.

[5] The same information can be obtained using the `lshwres` command (see “lshwres” on page 206).

3.1.5 Memory property

The Memory property tab displays the assigned memory amount to partitions and the page table usage information, as shown in Figure 3-5. It also shows the total installed physical memory size.



Installed Memory (MB) : 65536

Partition Name	Memory Amount (MB)	Page Table Usage
lpar08	4352	256
lpar07	4992	128
lpar06	5248	128
lpar05	6400	256
lpar04	3136	64
lpar03	2112	64
lpar02	1056	32
lpar01	4160	64

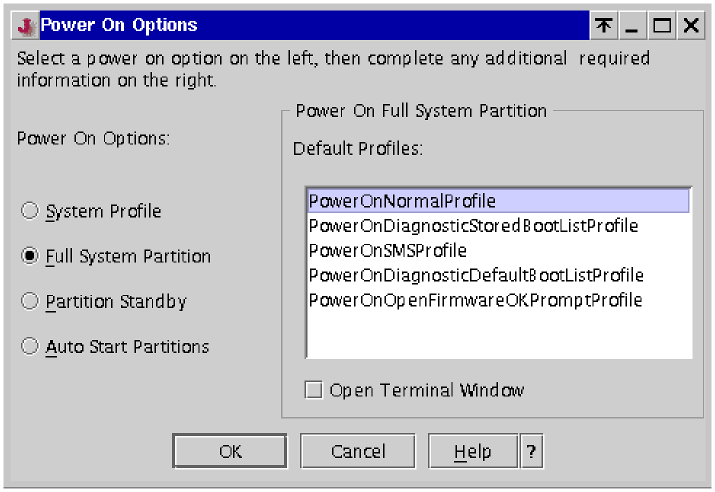
Figure 3-5 System properties: Memory[6]

3.2 Power on the managed system

To power on the managed system, open the Server Management application from the Server Management folder and select the managed system in the Contents area. From the menu bar choose **Selected** → **Power On**. A panel opens that offers the four power-on modes shown in Figure 3-6 on page 62: System Profile, Full System Partition, Partition Standby, and Auto Start Partitions.[7]

[6] The same information can be obtained using the `lshwres` command (see “lshwres” on page 206).

[7] The `chsysstate` command can be also used to power on and off the managed systems (see “chsysstate” on page 213).



Select a power on option on the left, then complete any additional required information on the right.

Power On Options:

○ System Profile

● Full System Partition

○ Partition Standby

○ Auto Start Partitions

Power On Full System Partition

Default Profiles:

PowerOnNormalProfile
PowerOnDiagnosticStoredBootListProfile
PowerOnSMSProfile
PowerOnDiagnosticDefaultBootListProfile
PowerOnOpenFirmwareOKPromptProfile

□ Open Terminal Window

Figure 3-6 Power On Modes panel

The following modes are available:

System Profile The managed system activates partition profiles in the order listed in the given system profiles.

Full System Partition Only one AIX operating system image is activated that has access to all resources of the managed system. The operator panel on the media drawer displays all progress codes during the boot process. The Full System Partition has predefined profiles, as shown in Figure 3-6. You cannot change, add, or delete them. The predefined profiles are as follows:

Power On Normal

Boots an operating system from the designated boot device.

Power On Diagnostic Stored Boot List

Causes the system to perform a service mode boot using the service mode boot list saved on the managed system. If the system boots AIX from the disk drive, and AIX diagnostics are loaded on the disk drive, AIX boots to the diagnostics menu. Using this option to boot the system is the preferred way to run online diagnostics.

Power On SMS

Boots to the System Management Services (SMS) menus. The SMS menus include Password Utilities, Display Error Log, Remote Initial Program Load Setup, SCSI Utilities, Select Console, MultiBoot, Select Language, and the OK Prompt.

Power On Diagnostic Default Boot List

Similar to Power On Diagnostic Stored Boot List Profile, except the system boots using the Default Boot List that is stored in the system firmware. This is normally used to try to boot diagnostics from the CD-ROM drive. Using this option to boot the system is the preferred way to run stand-alone diagnostics.

Power On Open Firmware OK Prompt

Used only by service personnel to obtain additional debug information. When this selection is enabled, the system boots to the Open Firmware prompt.

Partition Standby This power-on mode provides two actions:

- Creating partitions
- Activation of individual partitions

When the Partition Standby power-on is completed, the operator panel on the managed system displays `LPAR…`, indicating that the managed system is ready for you to use the HMC to partition its resources or to activate configured partitions.

In Partition Standby power-on mode, the state of the Full System Partition is shown as `Not Available`.

Auto Start Partitions[8] Powers on the managed system to partition standby mode and then activates all partitions that have been powered on by the HMC at least once. For example, if you create a partition with four processors, use DLPAR operation to remove one processor, then shut down the system, the Auto Start Partitions power-on mode activates this partition with three processors. This is because the three-processor configuration was the last configuration used, and the HMC ignores whatever you have specified in the partition's profile. Using this option, the activated partitions boot the operating system using a normal mode boot, even if the default profile for the partition specifies the other modes, such as boot to SMS.

[8] This power-on mode is available on the HMC software release beginning with Release 3, Version 2.

3.2.1 Operation states of a managed system

This attribute of the managed system is displayed in the content area of the HMC window under the State label (see Table 3-2).

Table 3-2 Operating states of managed systems[9]

State	Description
Initializing	The managed system is powered on and is initializing. The initialization time may vary depending on the hardware and partition configuration of the managed system.
Ready	The managed system is powered on and is operating normally.
No Power	The managed system is powered off.
Error	The operating system or the hardware of the managed system is experiencing errors.
Incomplete	The HMC cannot gather complete partition, profile, or resource information from the managed system. To rebuild the managed system, see 3.2.2, “Rebuild the managed system in the HMC” on page 64.
No Connection	The HMC cannot contact the managed system. Check the serial cable or delete and configure the managed system again.
Recovery	The partition and profile data stored in the managed system must be refreshed. To initialize the data, see 5.1.3, “Initialize profile data” on page 105.
Version Mismatch	The managed system’s service processor level is later than the code level of the HMC.
CUOD CTA	You must accept the CUoD license.

3.2.2 Rebuild the managed system in the HMC

The Rebuild managed system function downloads the data stored in the NVRAM of the managed system to the HMC. The NVRAM contains the properties of the managed system, the partition, system profile information, and the current states. Rebuilding the managed system is useful when the operating state

[9] As for the recovery and imcomplete status, see 5.1, “Managing profile data” on page 100 for further detailed information.

indicator of a managed system in the Contents area is shown as `Incomplete`. This operation is different from performing a reload of the local HMC panel. In this operation, the HMC reloads from the information that is stored on the local database on the HMC.

To rebuild the managed system, select the managed system in the Contents area, and from the menu bar choose **Selected** → **Rebuild** managed system. When the operation finishes, the current system information of the managed system appears.

3.3 Activate partitions

If you *activate* a partition, you are virtually powering on the partition. To activate a partition, select the partition name and select activate by right-clicking. This opens a window that enables you to choose the profile that you want to activate for this partition. If the minimum and required resources you specified when you created the partition profile exceeds the amount of available resources, this partition will not be activated with the selected profile. Available resources are all resources currently not being used by other active partitions. It is important that you keep track of your system's resources at all times.

3.3.1 Change the default partition profile

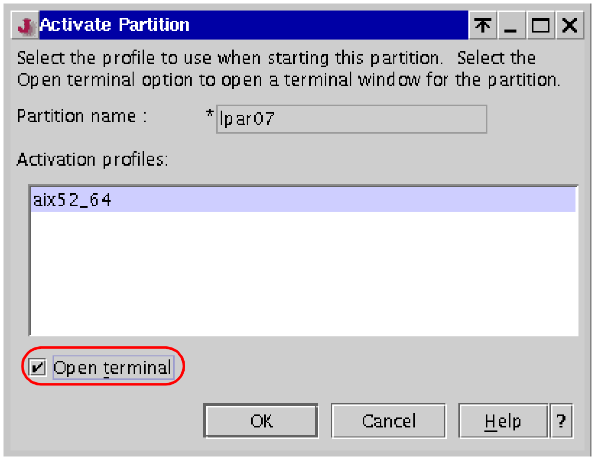
When a partition is created, a profile also has to be created by default to define the resources associated with this partition. The application requires that you create at least one profile when a partition is created. The first profile created is the *default* profile. Additionally, the default partition profile is marked with an icon. The default partition profile can be changed at any time. To change the default partition profile, select the partition profile name in the Contents area, from the menu bar choose **Selected** → **Change Default Profile**, and select the profile name from the list that you want to make the default. This operation can also be completed by selecting the profile name, right-clicking, and following the menus. The default profile can be changed even when the partition is in the active state with the profile running.

3.3.2 Activate a specific partition profile

To activate a partition profile, select one of the partition profiles you created, and from the menu bar choose **Selected** → **Activate**. The profile name is highlighted. Click **OK** to activate the partition using this partition profile. If you want to activate using the other partition profiles, select another profile in the list and then click **OK**. This operation can also be accomplished by selecting the desired profile name, right-clicking, and selecting the **Activate** option.

3.3.3 Activate partitions without selecting a specific partition profile

To activate a partition without selecting a specific partition profile, select the partition in the Contents area, and from the menu bar choose **Selected** → **Activate**. The default profile name is highlighted as shown in Figure 3-7. Then, click **OK**.


Activate Partition

Select the profile to use when starting this partition. Select the Open terminal option to open a terminal window for the partition.

Partition name : * lpar07

Activation profiles:

aix52_64

☑ Open terminal

Figure 3-7 Activate a partition

If you select the **Open terminal** check box (highlighted in Figure 3-7), a virtual terminal window opens upon activation of the partition.

3.3.4 Reactivating a partition with a different partition profile

To reactivate a partition with a different profile, select the partition for which you want to change profiles in the Contents area. Open a virtual terminal window for that partition to log in to the operating system, and then issue an appropriate operating system shutdown command.[10] The system shuts down the operating system, and the partition's state changes from `Running` to `Ready` in the Contents area. In the Contents area, select the new partition profile you want to activate for that partition. From the menu bar choose **Selected** → **Activate**, or select the profile that you want to activate, right-click, and then select the **Activate** option.

[10] As we will explain in 3.4, “Shut down the operating system in a partition” on page 68, the HMC software level Release 3, Version 2 provides the operating system shutdown menu, if the target partition is installed with AIX 5L Version 5.2 and 5200-01 Recommended Maintenance Level and later.

3.3.5 Partition operating states

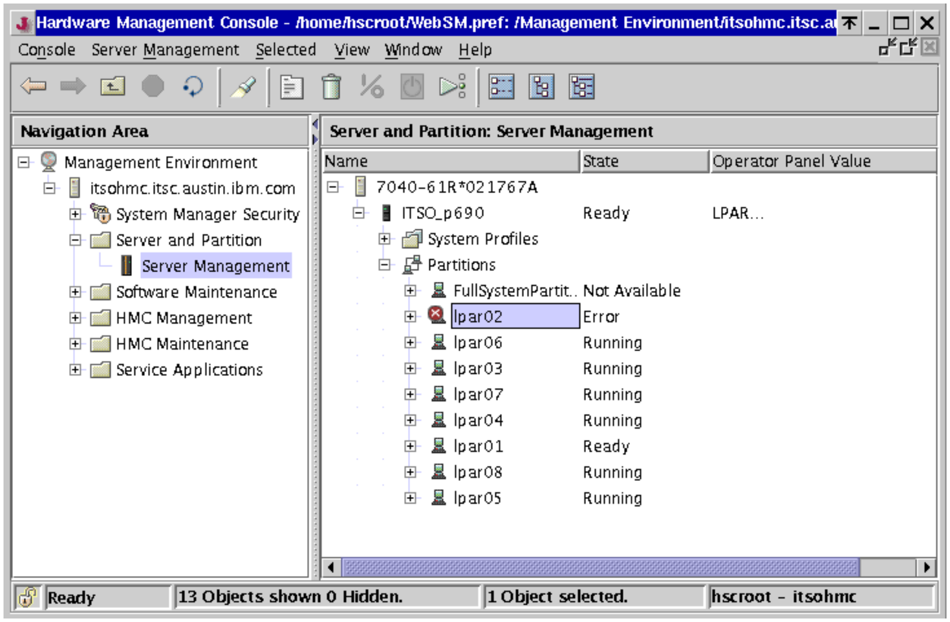
In the column to the right of the names of the partitions in the Contents area, the HMC indicates the operating status of the partitions. Table 3-3 lists all possible partition operating states.

Table 3-3 Operating states of partitions

Operating state	Description
Ready	The partition is not active, but is ready to be activated.
Starting	The partition is activated and is undergoing booting routines.
Running	The partition has finished its booting routines. The operating system can be performing its booting routines or is in its normal running state.
Error	Activation of this partition failed due to a hardware or operating system error.
Not available	This partition is not available for use. Reasons can include: ► The managed system is powered off. ► The Full System Partition is not available when the managed system is powered on with the Partition Standby power-on option. ► Partitions are not available when the managed system is powered on with the Full System Partition power-on option. ► Affinity partitions are not available when the managed system is powered on and the non-affinity partitions are activated first. ► Non-affinity partitions are not available when the managed system is powered on and affinity partitions are powered on first.
Open Firmware	The partition was activated by a profile that specified an OPEN_FIRMWARE boot mode.

If the partition operation state is `Error` after you attempt to activate it, you can select **Read Boot Error Value** to understand why the partition gets an error during the boot.

For example, if you have set the service authority to more than one partition and tried to activate the second partition with the authority, then the activation would fail with the Error state as shown in Figure 3-8 on page 68.

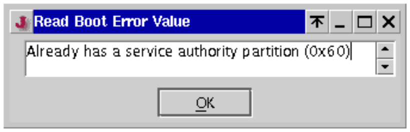


Name	State	Operator Panel Value
7040-61R*021767A		
ITSO_p690	Ready	LPAR...
System Profiles		
Partitions		
FullSystemPartit..	Not Available	
lpar02	Error	
lpar06	Running	
lpar03	Running	
lpar07	Running	
lpar04	Running	
lpar01	Ready	
lpar08	Running	
lpar05	Running	

Ready | 13 Objects shown 0 Hidden. | 1 Object selected. | hscroot - itsohmc

Figure 3-8 Partition activation failure

In this case, the boot error message shown in Figure 3-9 explains the reason for the failure of this partition activation.



Already has a service authority partition (0x60)

Figure 3-9 Read Boot Error Values

3.4 Shut down the operating system in a partition

To shut down the operating system in a partition, do the following:

1. In the Contents area, select the partition you want to shut down.
2. From the menu bar choose **Selected** → **Operating System** → **Shutdown**.

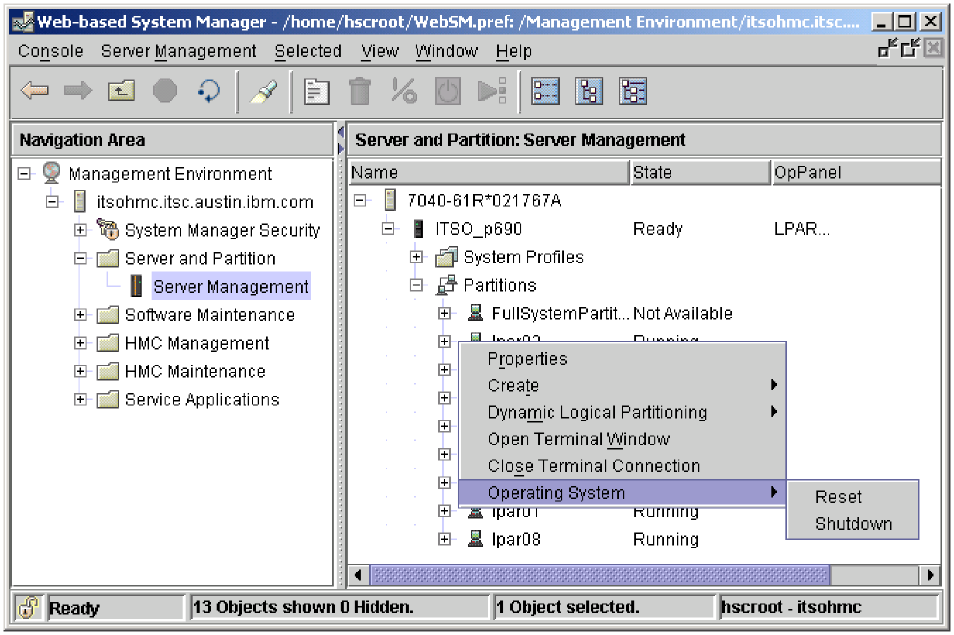
This function is available when the following requirements are met:

- HMC is installed with software Release 3, Version 2 and later.[11]

[11] The menu does not exist on the HMC installed with software Release 3, Version 1 and before.

- The target partition is installed with AIX 5L Version 5.2 plus 5200-01 Recommended Maintenance Level and later.[12]

You can also perform this operation by selecting the partition name and right-clicking to display the window shown Figure 3-10.



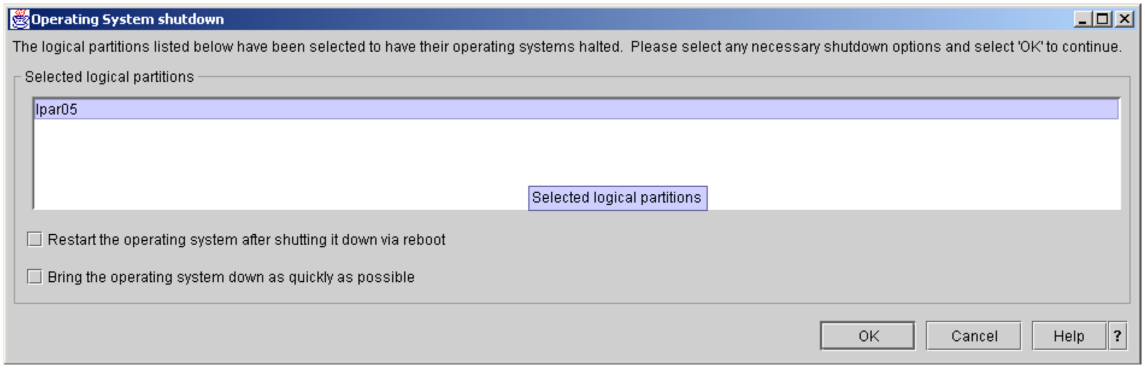
Name	State	OpPanel
7040-61R*021767A		
ITSO_p690	Ready	LPAR...
System Profiles		
Partitions		
FullSystemPartit...	Not Available	
lpar02	Running	
lpar01	Running	
lpar08	Running	

Figure 3-10 Operating System shutdown or reset

A dialog box shown in Figure 3-11 on page 70 will appear. Select the partition name and click **OK** to shut down the operating system in the selected partition. You may select the following options in the dialog box before clicking **OK**:

- Restart the operating system after shutting it down via reboot.
- Bring the operating system down as quickly as possible.

[12] If the partition is not installed with AIX 5L Version 5.2 plus 5200-01 Recommended Maintenance Level and later, the **Shutdown** menu selection is grayed out and unselectable.


Operating System shutdown

The logical partitions listed below have been selected to have their operating systems halted. Please select any necessary shutdown options and select 'OK' to continue.

Selected logical partitions

lpar05

Selected logical partitions

□ Restart the operating system after shutting it down via reboot

□ Bring the operating system down as quickly as possible

Figure 3-11 Operating System shutdown

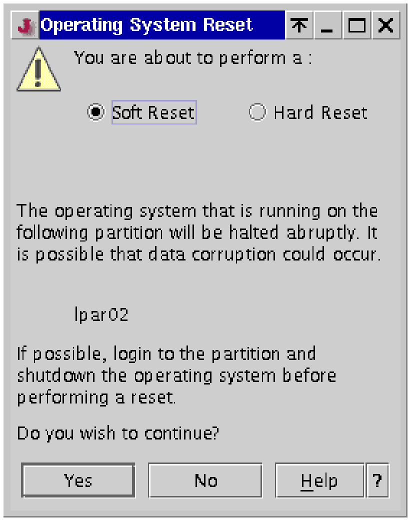
3.5 Reset the operating system in a partition

When an operating system in a partition stalls, you can use the HMC to restart the operating system.

> **Important:** This operation may corrupt data on the resetting partition. Perform this procedure only after you have attempted to restart the operating system manually.

In the Contents area, select the partition you want to reset. From the menu bar choose **Selected** → **Operating System** → **Reset**. You can also perform this operation by selecting the partition name and right-clicking to display the window shown in Figure 3-10 on page 69.

A dialog box opens that offers two reset options, as shown in Figure 3-12 on page 71.



Operating System Reset

You are about to perform a :

● Soft Reset ○ Hard Reset

The operating system that is running on the following partition will be halted abruptly. It is possible that data corruption could occur.

lpar02

If possible, login to the partition and shutdown the operating system before performing a reset.

Do you wish to continue?

Figure 3-12 Operating system reset options

The following operating system reset options are available:

Soft Reset The actions of the operating system after a soft reset are determined by its policy settings. Depending on how you have configured these settings, the operating system may perform a dump of system information or will restart automatically. For more information about configuring your operating system's policy settings, refer to its supporting documentation.

Hard Reset A hard reset acts as a virtual powering off of the partition, not the managed system. Issuing a hard reset forces termination and can corrupt information. Use this option only if the operating system is disrupted and cannot send or receive commands.

If you explicitly set the "Power off the system after all the logical partitions are powered off" policy shown in Figure 3-3 on page 59, and if you deactivate the last partition in the system (no partition is activated in the system), the managed system is powered off. The status of the managed system is changed from `LPAR…` to `No Power`.

3.6 Power off the managed system

Before powering off the managed system, ensure that all partitions or the Full System Partition have been shut down and their states have changed from `Running` to `Ready`. To shut down a partition, you can use a virtual terminal window to run the **`shutdown`** command or Telnet into the partition and issue the **`shutdown`** command.

To power off the managed system, select the managed system in the Contents area, and from the menu bar choose **Selected** → **Power Off**. If you attempt to power off a system that has active partitions, you will receive a warning to that effect, but you will still be able to power off the managed system.

3.7 Operating the managed system with the HMC

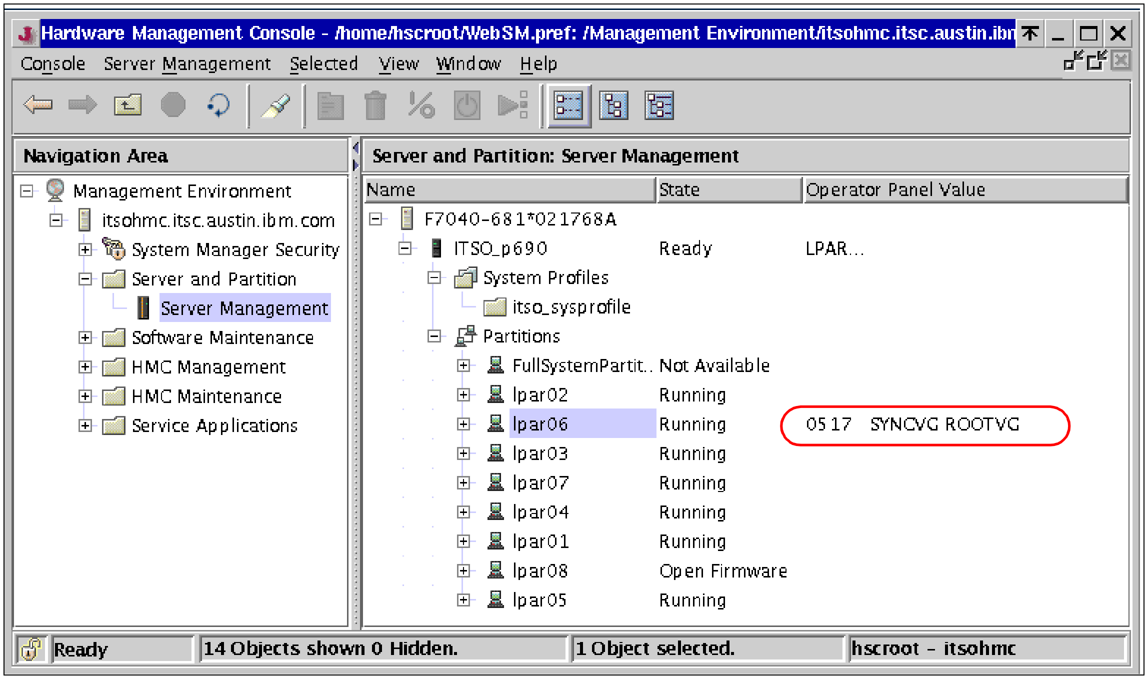
Although the managed system is designed not to put any dependency on the HMC, except the specific system management operation, you should not plan to run the managed system without an HMC. The HMC is required for the operations, such as to set up or change the partition configurations, and is also a key element in configuring the Service Applications. Without an HMC, the Service Applications will not be able to provide the extended RAS capabilities that are available on the partitioning-capable pSeries servers. The call home feature available with Service Focal Point provides this function through the HMC.

Without an HMC, it is still possible to bring up a managed system in its last configured partition state, including a boot of defined partitions, by pressing the power button on the operator panel. However, running partitions can be rebooted and restarted using the **`shutdown`** command, even if the HMC is not present.

3.7.1 Operator panel

The operator panel[13] is used to track the progress of the system unit's self tests and configuration program, to display codes when the operating system comes to an abnormal end, and to display system messages. In a logical partitioned environment, the operator panel displays an error code for most hardware or firmware problems, but you need the HMC to display any error information written to a partition's virtual operator panel. The operator panel values of the partitions are displayed in the HMC main menu for every partition, as shown in Figure 3-13 on page 73.

[13] The operator panel is physically located in the media drawer in the pSeries 670 and pSeries 690.



Name	State	Operator Panel Value
F7040-681*021768A		
ITSO_p690	Ready	LPAR...
System Profiles		
itso_sysprofile		
Partitions		
FullSystemPartit..	Not Available	
lpar02	Running	
lpar06	Running	0517 SYNCVG ROOTVG
lpar03	Running	
lpar07	Running	
lpar04	Running	
lpar01	Running	
lpar08	Open Firmware	
lpar05	Running	

Ready | 14 Objects shown 0 Hidden. | 1 Object selected. | hscroot - itsohmc

Figure 3-13 Hardware Management Console operator panel codes

> **Note:** AIX 5L Version 5.2 displays a detailed description and a four-digit LED value at the operating system boot phase, as highlighted in Figure 3-13.

3.7.2 Power button

The white power button in the operator panel acts in a logical partitioned environment and in Full System Partition, such as in a conventional pSeries machine. The managed system will come back up in the same mode in which it was previously booted. If the managed system was previously booted in a Partition Standby mode, all partitions will automatically start and run. To power off the whole system, press the button twice: once to indicate action, the second time to confirm. We recommend you shut down the operating system instances in the partitions before powering off the system.

3.7.3 Reset button

The reset button functions only in the Full System Partition mode. In Partition Standby mode, the reset button is not active. To reset a partition, use the operating system reset function of the HMC.

4

Configuring the HMC

In this chapter, we describe the administration and management tasks that you can perform from the Hardware Management Console (HMC) graphical user interface. We assume that you have system administrator authority on the HMC.

The management tasks are described in the following sections:

- “HMC Management” on page 76
- “HMC Maintenance” on page 80

4.1 HMC Management

An HMC system administrator can manage users and assign roles with the Users application in the HMC Management folder (see Figure 4-1).

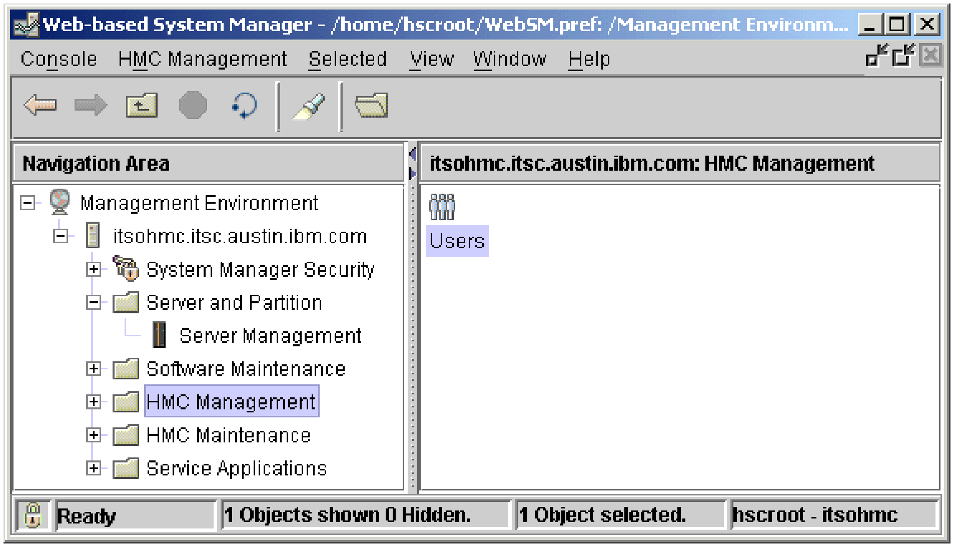


Figure 4-1 HMC Management, Users

To use the Users application, first determine who will use the HMC. After designating the user name, assign a role to that user based on the level of access that you want to grant that user. For example, you can create general users and assign operator roles to them so that they can perform basic HMC tasks.

Note: You must create a user named hscpe for your software support representative so that they have access to perform fixes on the HMC code. This user name is reserved for your support representative and is considered a *predefined* role. Do not assign the *hscpe* user name to any of your users. For more information about creating users and assigning roles, see Chapter 12, “User Management,” in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590.

4.1.1 User role descriptions

Each defined user on the HMC can have one of six different roles that enable the user to access different parts of the HMC. The user roles specified by the HMC are as follows:

- System Administrator

  The System Administrator acts as the root user, or manager, of the HMC system. The System Administrator has unrestricted authority to access and modify most of the HMC system.

  > **Note:** The hscroot user is a just predefined user with the System Administrator role. If needed, you can delete hscroot after defining the other users with the System Administrator role on your HMC.

- Advanced Operator

  An Advanced Operator can perform some partition-related tasks (for example, creating partition profiles, saving profile data, and resetting partitions) in addition to some system administration tasks on the HMC (for example, performing the “Backup Critical Console Data” or “Save Upgrade Data” task).

- Service Representative

  The Service Representative role is reserved for IBM service representatives who install, repair, or do problem determination tasks on systems at your location. Only the hscpe user should be given this role, which is not defined by default.

- Operator

  An Operator is responsible for daily system operation.

- User Administrator

  A User Administrator can perform user-management tasks but cannot perform any other HMC functions.

- Viewer

  A Viewer can view HMC information, but cannot change any configuration information.

Refer to Chapter 12, “User Management,” in the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590 for more information.

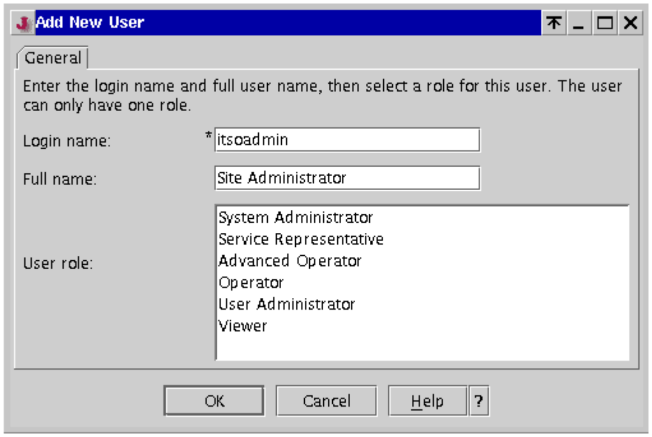
4.1.2 User Management

The user management tasks are performed with the Users application and are described in the following sections.[1]

Creating a user

This process enables you to create a new user on the HMC by doing the following:

1. Log in to the HMC using either the System Administrator or User Administrator role.
2. In the Navigation area, expand the HMC Management folder.
3. In the Contents area, click the Users application.
4. Select Users → **New** → **User**. This opens the Add New User window shown in Figure 4-2.



Enter the login name and full user name, then select a role for this user. The user can only have one role.

Login name: * itsoadmin

Full name: Site Administrator

User role:

- System Administrator
- Service Representative
- Advanced Operator
- Operator
- User Administrator
- Viewer

Figure 4-2 Adding a new user

5. Enter the following information:
   – Login name
   – Full name
   – User role
6. Click **OK**. The Change User Password window opens.

[1] You can list, create, and remove users on your HMC using the `lshmcusr`, `mkhmcusr`, and `rmhmcusr` commands. The `chhmcusr` command can be also used to modify the already created users' properties. See 9.3.2, "Commands to manage users on the HMC" on page 191 for detailed information about these commands.

7. In the Change User Password window, type the user's password twice. Click **OK**.

Deleting a user

This process enables you to delete a user on the HMC. To delete a user from the system, do the following:

1. Log in to the HMC using either the System Administrator or User Administrator role.
2. In the Navigation area, expand the HMC Management folder.
3. In the Contents area, select the Users application.
4. In the Contents area, right-click the appropriate user icon.
5. Select **Delete**, and then click **OK** to confirm that you want to delete this user.

Changing a user's properties

This process enables you to modify a user's properties on the HMC. To change a user's properties, do the following:

1. Log in to the HMC using either the System Administrator or User Administrator role.
2. In the Navigation area, click the HMC Management folder.
3. In the Contents area, double-click the Users application.
4. In the Contents area, right-click the appropriate user icon.
5. Select **Properties**.
6. Edit the user's base information (Login name, Full name, and User role).
7. Click **OK**. The Change User Password window opens.
8. Type the user's password twice.
9. Click **OK**.

Changing a user's password

This process enables you to change a user's password on the HMC. To change a user's password, do the following:

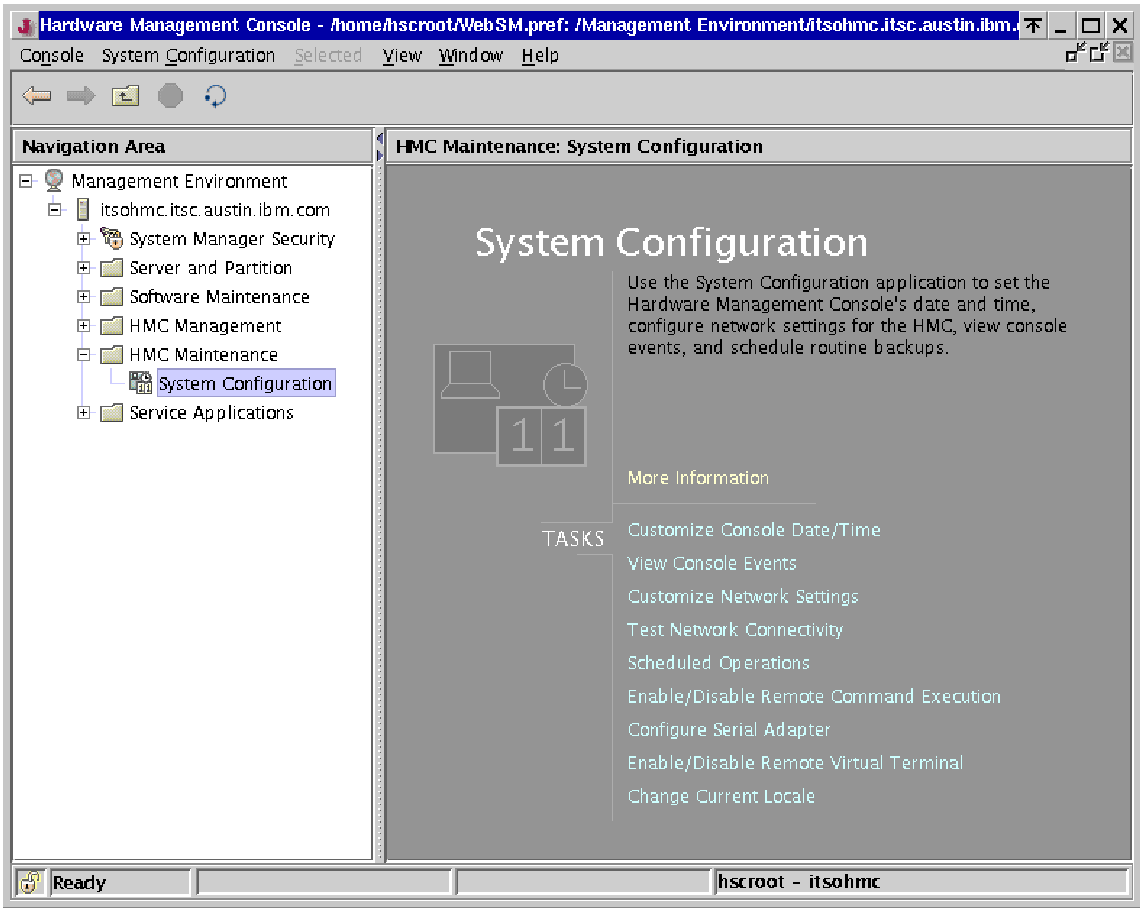
1. Log in to the HMC using either the System Administrator or User Administrator role.
2. In the Navigation area, expand the HMC Management folder.
3. In the Contents area, double-click the Users application.
4. In the Contents area, right-click the appropriate user icon.
5. Select **Change Password**.

6. Type the new password in the first field. Confirm the new password by typing it again in the Retype new password field.
7. Click **OK**.

> **Important:** Never change the password for hscroot using the `passwd` command after remote login to the HMC.

4.2 HMC Maintenance

The HMC Maintenance folder contains an application called System Configuration, as shown in Figure 4-3.



Use the System Configuration application to set the Hardware Management Console's date and time, configure network settings for the HMC, view console events, and schedule routine backups.

Figure 4-3 System Configuration application

4.2.1 System Configuration

The System Configuration application is used to modify and set several configuration options that are available on the HMC. The application enables you to configure the environmental variables, network connectivity, logging, hardware configurations, and backup and recovery.

As shown in Figure 4-3 on page 80, the System Configuration application contains the nine tasks shown in Table 4-1.

Table 4-1 Tasks in the System Configuration application

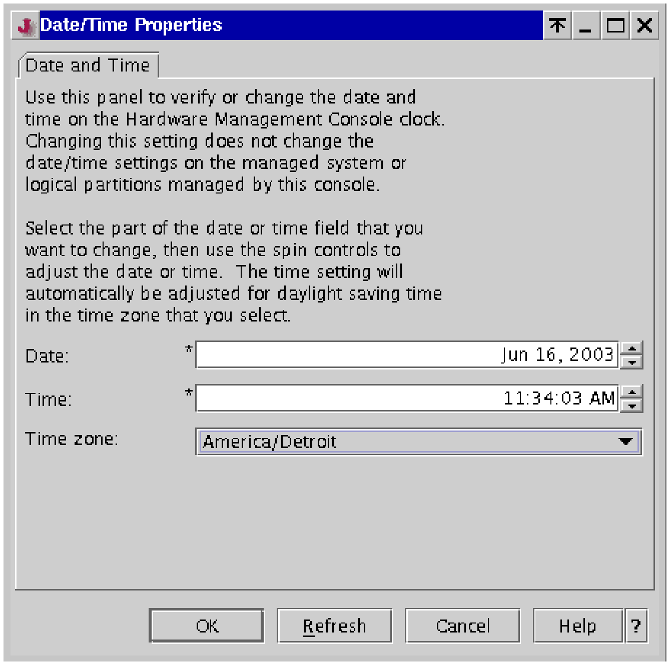
Task	Relevant section number
Customize Console Date/Time	4.2.2
View Console Events	4.2.3
Customize Network Settings	4.2.4
Test Network Connectivity	4.2.5
Scheduled Operations	4.2.6
Enable/Disable Remote Command Execution	4.2.7
Configure Serial Adapter	4.2.8
Enable/Disable Remote Virtual Terminal	4.2.9
Change Current Locale	4.2.10

4.2.2 Customize Console Date/Time

This task allows you to set the data, time, and time zone for the HMC. To increase or decrease any value for date and time, just highlight the field you want to change and then press the down or up arrows.

For time zone, click on the down arrow in the grey field and it will bring up a dialog box to scroll through with all the available time zones.

Changing any of these fields is automatically applied and does not require an HMC reboot.



Date/Time Properties

Date and Time

Use this panel to verify or change the date and time on the Hardware Management Console clock. Changing this setting does not change the date/time settings on the managed system or logical partitions managed by this console.

Select the part of the date or time field that you want to change, then use the spin controls to adjust the date or time. The time setting will automatically be adjusted for daylight saving time in the time zone that you select.

Date: * Jun 16, 2003

Time: * 11:34:03 AM

Time zone: America/Detroit

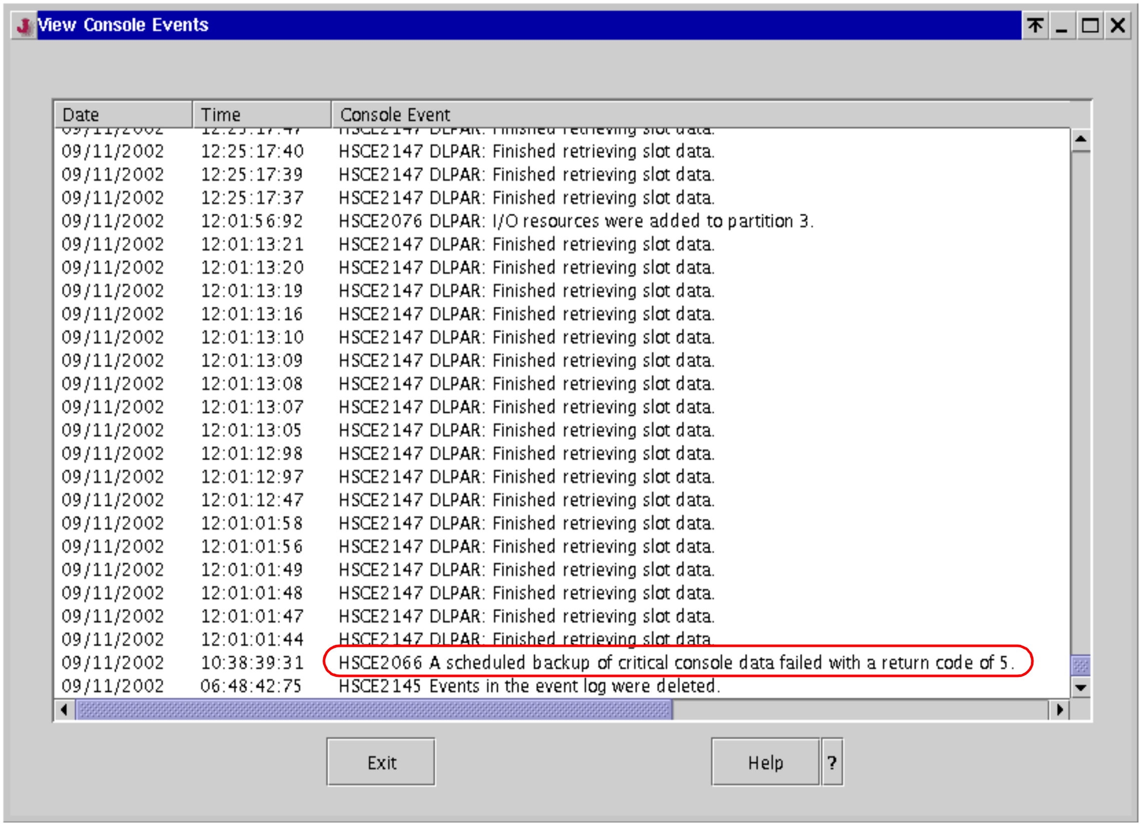
Figure 4-4 Date/Time Properties

4.2.3 View Console Events

This task shows the console event logs on the HMC. Console events can be tracked by periodically viewing the console event logs to address any error conditions that could be experienced during the operation of the system.[2]

Figure 4-5 on page 83 shows an example of console event logs.

[2] The `lssvcevents` command along with the -t console option can be also used to view the HMC console events (see “lssvcevents” on page 214).



```
Date        Time          Console Event
09/11/2002  12:25:17:47   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:25:17:40   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:25:17:39   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:25:17:37   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:56:92   HSCE2076 DLPAR: I/O resources were added to partition 3.
09/11/2002  12:01:13:21   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:13:20   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:13:19   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:13:16   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:13:10   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:13:09   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:13:08   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:13:07   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:13:05   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:12:98   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:12:97   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:12:47   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:01:58   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:01:56   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:01:49   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:01:48   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:01:47   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  12:01:01:44   HSCE2147 DLPAR: Finished retrieving slot data.
09/11/2002  10:38:39:31   HSCE2066 A scheduled backup of critical console data failed with a return code of 5.
09/11/2002  06:48:42:75   HSCE2145 Events in the event log were deleted.
```

Figure 4-5 View Console Events logs

> **Note:** For Figure 4-5, we purposely did not insert the media into the DVD-RAM drive on the HMC in order to cause the error HSCE2066.

4.2.4 Customize Network Settings

This task enables you to configure the following settings on the HMC:[3]

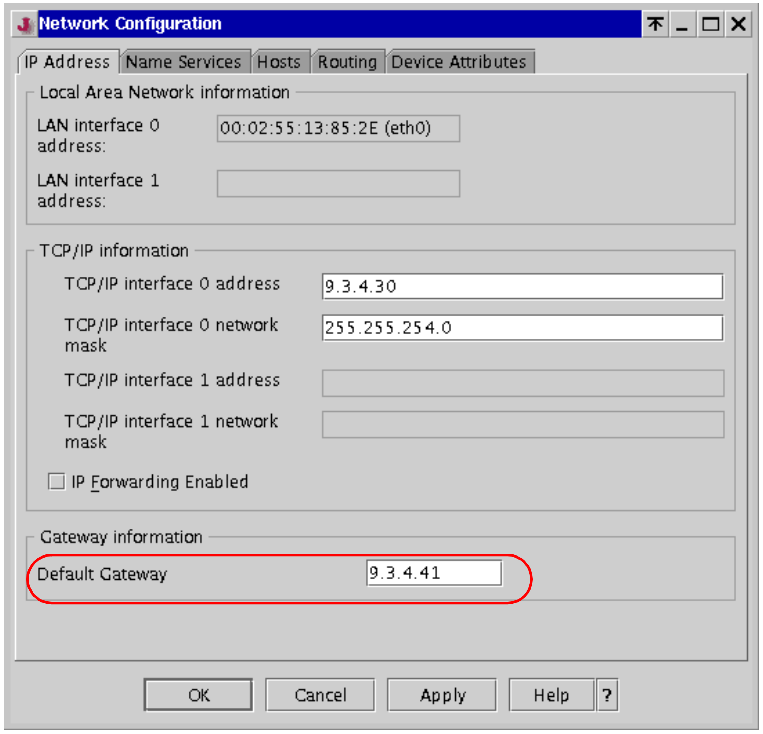
- IP Address
- Name Services
- Hosts
- Routing
- Device Attributes

[3] The configured information can be viewed using the **lshmc** command and altered later using the **chhmc** command except for the /etc/hosts file management (see 9.3.1, "Commands to manage HMC itself" on page 184).

Note: Before configuring or changing the host name and IP address assigned to each network interface on the HMC, it is recommended to carefully plan your network and follow the rules explained in Appendix , “Trouble-free network planning rules” on page 312.

To configure these settings, do the following:

1. In the Navigation area, expand HMC Maintenance and click the System Configuration icon.
2. In the Contents area, click the **Customize Network Settings** icon. The Network Configuration window opens, as shown in Figure 4-6.



Local Area Network information

LAN interface 0 address: 00:02:55:13:85:2E (eth0)

LAN interface 1 address:

TCP/IP information

TCP/IP interface 0 address: 9.3.4.30

TCP/IP interface 0 network mask: 255.255.254.0

TCP/IP interface 1 address:

TCP/IP interface 1 network mask:

□ IP Forwarding Enabled

Gateway information

Default Gateway: 9.3.4.41

Figure 4-6 Network Configuration: IP Address tab

These tasks’ names are shown on the tab in the Network Configuration window.

IP Address

To set the IP address and subnet mask of Ethernet adapters on the HMC:

1. Select the **IP Address** tab in the Network Configuration window.

2. Enter the IP address and network mask of the first Ethernet adapter in the TCP/IP interface 0 fields. If the HMC is equipped with two Ethernet adapters, then enter necessary information in the TCP/IP interface 1 fields, as shown in Figure 4-6 on page 84.
3. Enter the default route address in the Default Gateway field.
4. Click **OK**.

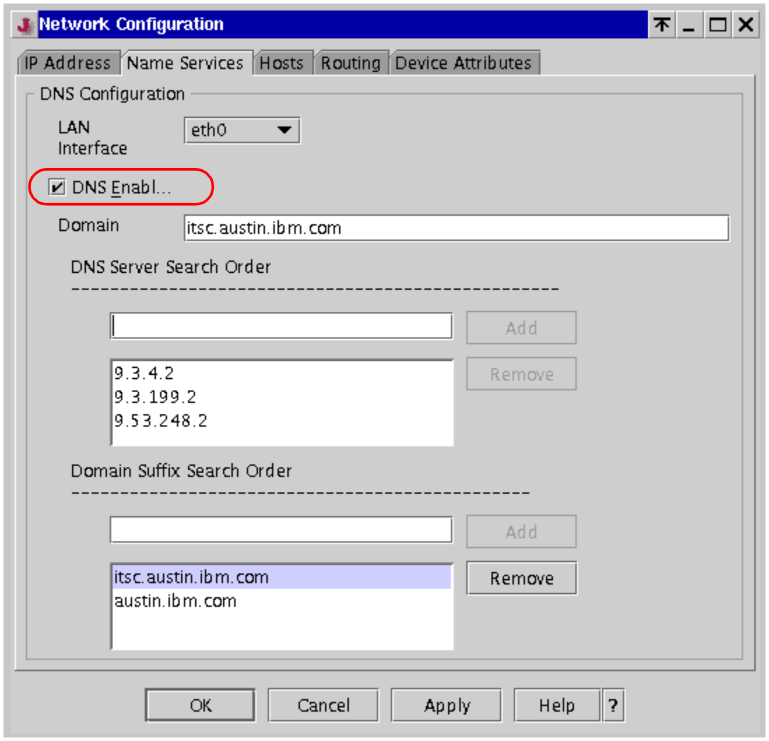
Note: You must reboot the HMC for this change to take effect.

Name Services

To configure DNS on the HMC, do the following:

1. Select the **Name Services** tab in the Network Configuration window, as shown in Figure 4-7 on page 86.
2. If you are using DNS in your network, select **DNS Enable** and specify the following information:
   - Domain
   - DNS Server Search Order
   - Domain Suffix Search Order

   If you are not using DNS, do not select **DNS Enable**.
3. Click **OK**.



Network Configuration

DNS Configuration

LAN Interface: eth0

☑ DNS Enabl...

Domain: itsc.austin.ibm.com

DNS Server Search Order

9.3.4.2
9.3.199.2
9.53.248.2

Domain Suffix Search Order

itsc.austin.ibm.com
austin.ibm.com

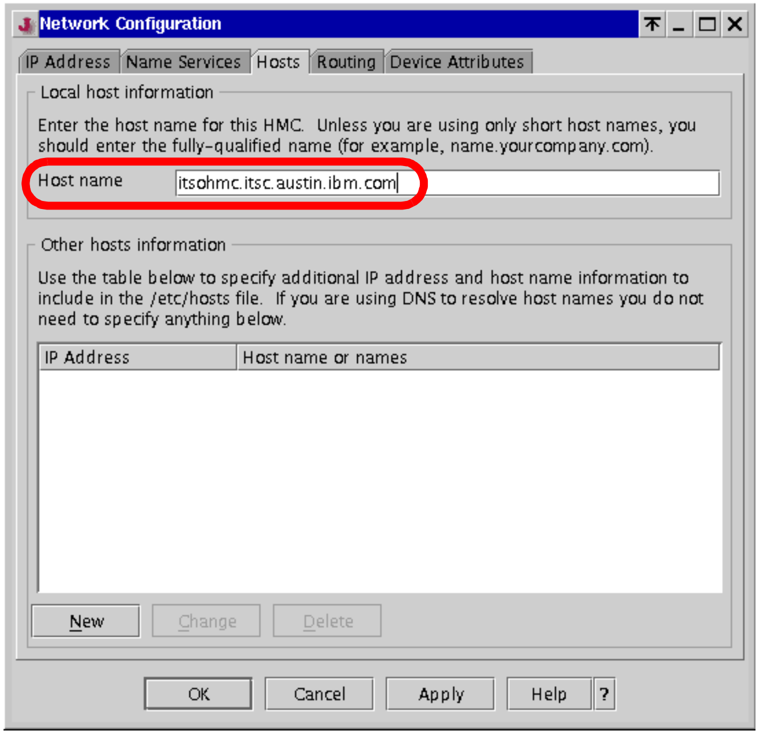
Figure 4-7 Network Configuration: Name Services tab

The LAN Interface drop-down list on the Name Services tab tells the HMC which interface on the HMC should be considered as the host name of the HMC for RMC communication purposes. The host name that RMC writes to the NVRAM of the managed system for use by partitions (as described in step 1 of Table B-1 on page 310) is determined by the IP address configured on the adapter specified in this selection box; it is not the result of the **hostname** command on the HMC.

Hosts

If you are not using DNS, all host names must be locally resolved on the HMC. To manage the /etc/hosts file on the HMC:

1. Select the **Hosts** tab in the Network Configuration window, as shown in Figure 4-8 on page 87.



Local host information

Enter the host name for this HMC. Unless you are using only short host names, you should enter the fully-qualified name (for example, name.yourcompany.com).

Host name: itsohmc.itsc.austin.ibm.com

Other hosts information

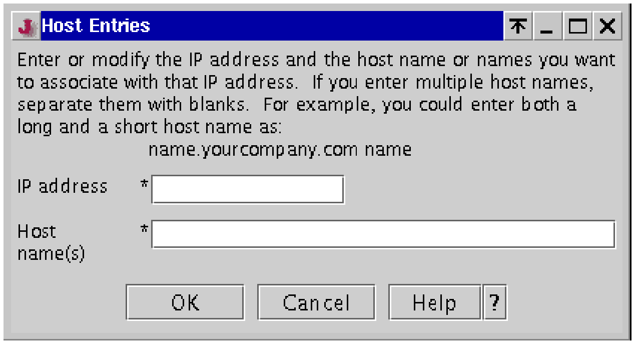
Use the table below to specify additional IP address and host name information to include in the /etc/hosts file. If you are using DNS to resolve host names you do not need to specify anything below.

Figure 4-8 Network Configuration: Hosts tab

2. Enter the host name of your HMC in the Host name field, as shown in Figure 4-8.

> **Note:** You must enter this information regardless of the use of DNS.

3. If you want to add, modify, or delete an host entry in the /etc/hosts file on the HMC, do the following:
   - To add a host entry, click **New**. The Host Entries window opens, as shown in Figure 4-9 on page 88. Enter the IP address and host name, then click **OK**.
   - To modify a host entry, select the entry and click **Change**. The Host Entries window with the specified entry opens. Modify the IP address and host name accordingly, then click **OK**.
   - To delete a host entry, select the entry and click **Delete**.


Host Entries

Enter or modify the IP address and the host name or names you want to associate with that IP address. If you enter multiple host names, separate them with blanks. For example, you could enter both a long and a short host name as:

name.yourcompany.com name

IP address *

Host name(s) *

Figure 4-9 Host Entries window

Note:

- If you use DNS in your network, you must specify the long host name (fully qualified domain name or FQDN) first, followed by the short host name in the Host name(s) field.
- FQDN cannot be more than 100 bytes in length.

4. After you have confirmed that all of the required host entries are appropriately inserted, click **OK**.

Routing

If you need additional static route entries besides the default gateway, or your network is using dynamic routing advertised by the Routing Information Protocol (RIP) Version 1, do the following:

1. Select the Routing tab in the Network Configuration window, as shown in Figure 4-10.

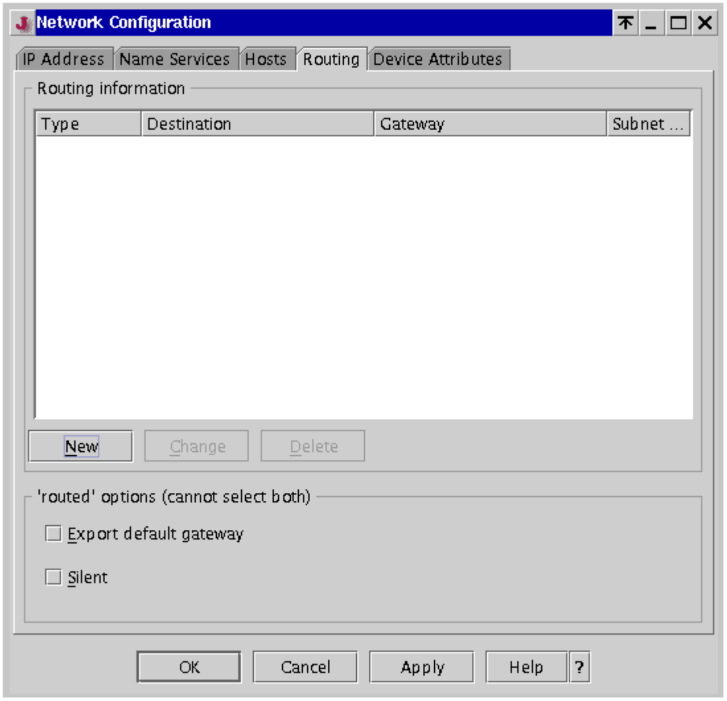
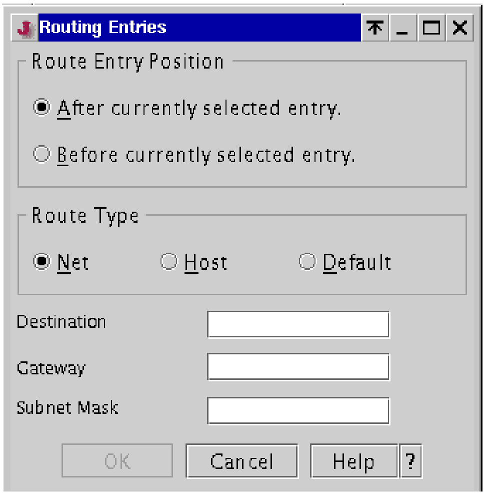


Figure 4-10 Network Configuration: Routing tab

2. If there are additional static routing entries to be defined, click **New**. The Routing Entries window opens, as shown in Figure 4-11. Enter the corresponding information for the static routing entry, and then click **OK**.


Routing Entries

Route Entry Position

● After currently selected entry.

○ Before currently selected entry.

Route Type

● Net ○ Host ○ Default

Destination

Gateway

Subnet Mask

Figure 4-11 Routing Entries window

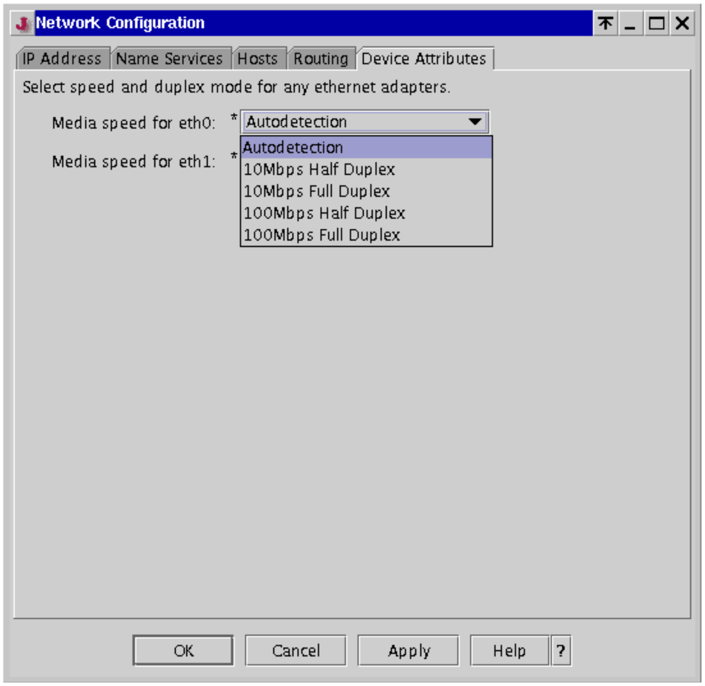
3. If dynamic routing is used in your network, select either of the following:
   - Export default gateway[4]
   - Silent[5]

Note: Do not enter the default gateway information using the window shown in Figure 4-10 on page 89. Use the Default Gateway field shown in Figure 4-6 on page 84.

Device Attributes

The HMC usually automatically detects Ethernet device settings. However, if you encounter some network connection problems, you may be able to avoid the problem by specifying the device attributes in the Network Configuration window, as shown in Figure 4-12 on page 91.

[4] This selection specifies the -s (supply) option of the routed daemon on the HMC.
[5] This selection specifies the -q (quiet) option of the routed daemon on the HMC.



Select speed and duplex mode for any ethernet adapters.

Media speed for eth0: * Autodetection

Media speed for eth1: *

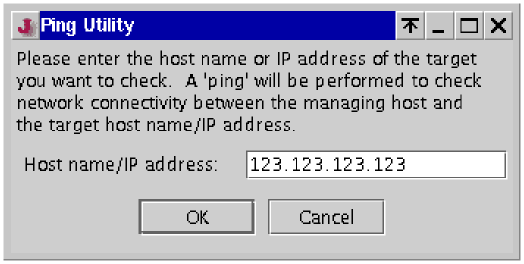
Figure 4-12 Network Configuration: Device Attributes tab

This setting defaults to autodetection, but it is advisable that the HMC administrator manually configure this screen to the setting he knows his network will have. If set on Autodetection, it is possible that the HMC could throttle to a mode lower than what is capable by the hardware resulting in a performance degradation.

4.2.5 Test Network Connectivity

This task is used to determine whether the target host can be IP-reachable by sending ICMP ECHO requests[6]. The target host can be specified by either IP address or host name as shown in Figure 4-13 on page 92.

[6] ICMP (Internet Connection Management Protocol) ECHO requests are usually sent by the **ping** command to determine whether the target host is IP-reachable.


Ping Utility

Please enter the host name or IP address of the target you want to check. A 'ping' will be performed to check network connectivity between the managing host and the target host name/IP address.

Host name/IP address: 123.123.123.123

Figure 4-13 Ping Utility

To test the network connectivity, click OK after specifying the target host in the Ping Utility window.

- If the test succeeds, a success message similar to the following example is displayed in the window:

```
123.123.123.123 is alive
```

- If the test fails, a failed message similar to the following example is displayed in the window:

```
123.123.123.123 is unreachable
```

4.2.6 Scheduled Operations

This task enables you to schedule the time and dates for backing up critical console data. When you schedule a backup operation, the data is saved on a formatted DVD-RAM media on your HMC. Each time this data is saved, old data is replaced with the more recent data. If you do not want older data overwritten, insert a new DVD-RAM media in the HMC drive each time you perform a backup.

While backing up your critical console data after every migration or code update is a good idea, you also might consider scheduling a monthly or weekly backup of the critical console data. In the event that you suffer an unplanned outage of your HMC, the last backup that was performed after your last migration may not contain all of the data you need to get back up and running. Scheduling a regular backup of the HMC data could save you time and effort in recovering from unplanned outages.

The scheduled backup can be configured to run as a one-time backup or on a repeated schedule. You must provide the time and date that you want the operation to occur. If the operation is scheduled to repeat, you must select how you want this backup to repeat (daily, weekly, or monthly).

Note: A DVD-RAM media can hold one generation of backup data only. Every time you perform this task using the same media, previous backup on the media will be overwritten by the latest backup. A DVD-RAM disk has two sides; each side should be considered separate media.

To customize schedule operations, do the following:

1. Expand the HMC Maintenance folder, then select the System Configuration application in the Navigation area.
2. Select the Scheduled Operations task in the Contents area. The Customize Schedule Operations window opens, as shown in Figure 4-14.

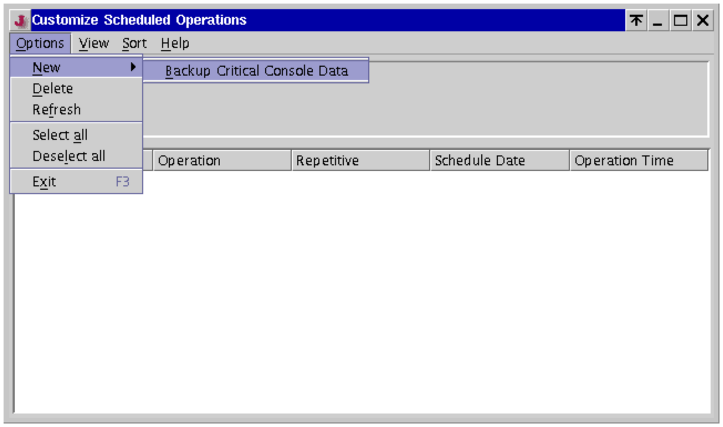
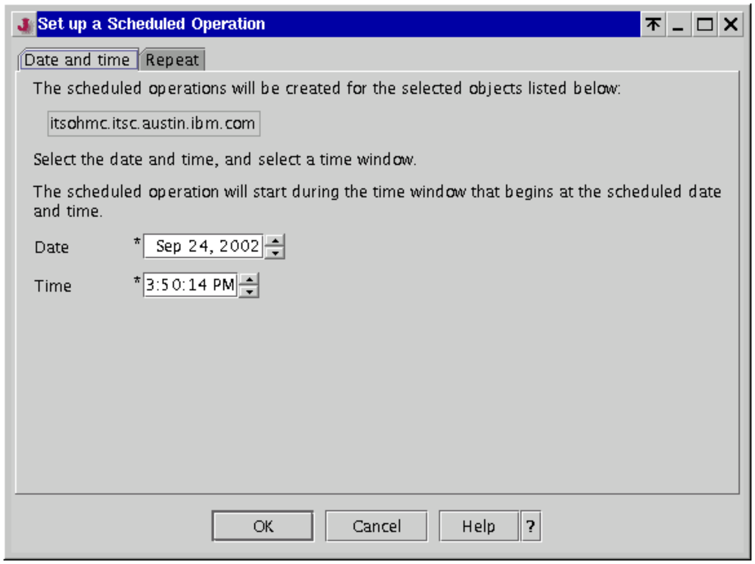


Figure 4-14 Customize Scheduled Operations window

3. Select **Options** → **New Backup** → **Critical Console Data**. The Set up a Scheduled Operation window opens, as shown in Figure 4-15 on page 94.



The scheduled operations will be created for the selected objects listed below:

itsohmc.itsc.austin.ibm.com

Select the date and time, and select a time window.

The scheduled operation will start during the time window that begins at the scheduled date and time.

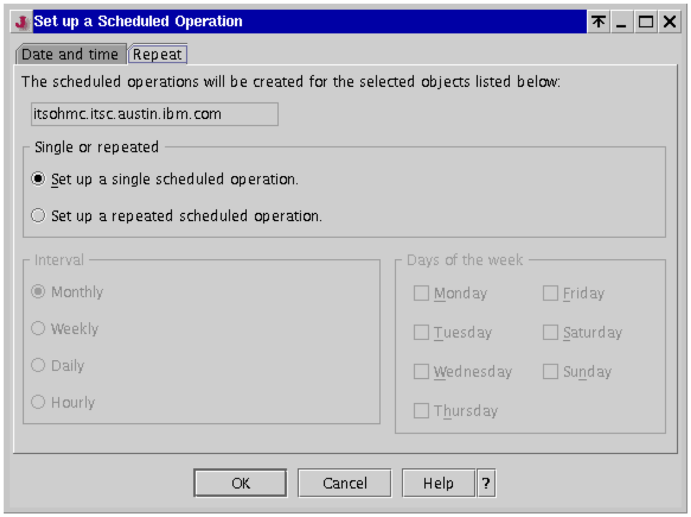
Date * Sep 24, 2002

Time * 3:50:14 PM

Figure 4-15 Set up a Scheduled Operation: Date and time tab

4. Under the **Date and time** tab, specify the date and time to invoke the critical console data backup.

5. Select the **Repeat** tab. Choose **Set up a single scheduled operation** or **Set up a repeated scheduled operation**, as shown in Figure 4-16 on page 95. If you select a repeated scheduled operation, specify the Interval and Days of the week fields accordingly. Click **OK**.



The scheduled operations will be created for the selected objects listed below:

itsohmc.itsc.austin.ibm.com

Single or repeated

● Set up a single scheduled operation.

○ Set up a repeated scheduled operation.

Interval

● Monthly
○ Weekly
○ Daily
○ Hourly

Days of the week

□ Monday □ Friday
□ Tuesday □ Saturday
□ Wednesday □ Sunday
□ Thursday

Figure 4-16 Set up a Scheduled Operation: Repeat tab

Verifying critical console data backup

The backed-up DVD contains a complete backup of all important data, such as:

- User-preference files
- User information
- HMC platform configuration files
- HMC log files
- Service Focal Point configuration files
- Inventory Scout data

The Backup Critical Console Data function saves the HMC data stored on your HMC hard disk to the DVD-RAM and is critical to support HMC operations. You must always back up the HMC after you have made changes to the HMC or to the information associated with logical partitions.

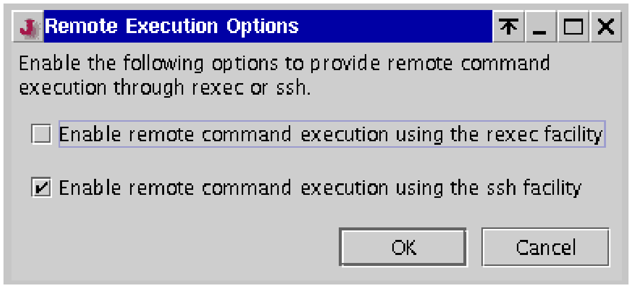
To confirm the backup operation, the user should review the log entries under the System Configuration application of View Console Events. For an example of this, see Figure 4-5 on page 83 where the log event for the failed critical console data backup has a red circle around it.

4.2.7 Enable/Disable Remote Command Execution

The Enable/Disable Remote Command Execution task is used to enable or disable the remote command line interface access to the HMC using the **rexec** or **ssh** facility.[7]

To perform this task, do the following:

1. In the Navigation area, select System Configuration.
2. In the Contents area, select Enable/Disable Remote Command Execution.
3. Select the appropriate check box in the window shown in Figure 4-17.
4. Click **OK**.



Remote Execution Options

Enable the following options to provide remote command execution through rexec or ssh.

□ Enable remote command execution using the rexec facility

☑ Enable remote command execution using the ssh facility

Figure 4-17 Remote Execution Options window

Once the rexec facility is enabled on the HMC, you can connect to it using the **rexec** command from a remote host. Upon the authentication, the command prompts you for the user name (hscroot) and the password; the information for the authentication is transmitted over the network without being encrypted. If necessary, you can create the $HOME/.netrc file on the remote host, which includes the remote host name (HMC's host name), remote user name (hscroot), and the password, in order to remote-login to the HMC without having a password prompt.

Therefore, it is discouraged to enable the rexec facility on your HMC.

For detailed information about accessing the HMC using the ssh facility, see 9.1, "Secure remote connection to the HMC" on page 176.

4.2.8 Configure Serial Adapter

The Configure Serial Adapter task is used to configure asynchronous adapters, FC 2943 and 2944, on the HMC. For the detailed information about the task, see Appendix A, "Configuring asynchronous adapters on the HMC" on page 295.

[7] The configured information can be viewed using the **lshmc** command and altered later using the **chhmc** command except for the /etc/hosts file management (see 9.3.1, "Commands to manage HMC itself" on page 184).

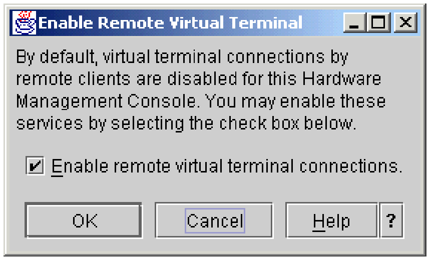
4.2.9 Enable/Disable Remote Virtual Terminal

The Enable/Disable Remote Virtual Terminal task is used to enable or disable remote virtual terminal access to the HMC from the remote Web-based System Manager client..

Note: The remote virtual terminal access is disabled by default.

To perform this task, do the following:

1. Expand the HMC Management folder, then select the System Configuration application in the Navigation area.
2. Select the Enable/Disable Remote Virtual Terminal task in the Contents area to open the Enable Remote Virtual Terminal window in Figure 4-18.
3. Select the check box in the window, then click **OK**.



By default, virtual terminal connections by remote clients are disabled for this Hardware Management Console. You may enable these services by selecting the check box below.

☑ Enable remote virtual terminal connections.

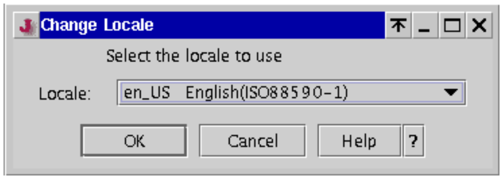
Figure 4-18 Enable Remote Virtual Terminal

4.2.10 Change Current Locale

The Change Current Locale task changes language settings on the HMC.

To perform this task, do the following:

1. Expand the HMC Management folder, then select the System Configuration application in the Navigation area.
2. Select the Change Current Locale task in the Contents area to open the Change Locale window shown in Figure 4-19 on page 98.
3. Select appropriate locale in the Locale field. Click **OK**.



Select the locale to use

Locale: en_US English(ISO88590-1)

Figure 4-19 Change Locale

Note: To take effect this setting change, the HMC must be rebooted.

5

Managing partition profile data on the HMC

This short chapter focuses on the following four operations provided by the HMC and the situations in which these operations should be performed:

Backup Reads the profile data from the CIM Object Manager on the HMC and writes it to a backup file on the HMC.

Restore Reads the profile data from the previously backed-up file on the HMC and loads this data to the NVRAM on the managed system. Once loaded successfully, the HMC reconstructs its copy on the CIM Object Manager. There are several options to tell the HMC which data is honored.

Initialize Initializes the profile data on the HMC and the NVRAM on the managed system.

Remove Removes the previously backed-up file on the HMC.

These operations can be selected from the **Selected** → **Profile Data** menu as shown in Figure 5-1 on page 101.

5.1 Managing profile data

The profile data for partitions of a managed system is stored in at least the following three locations at any given time:

- NVRAM of the managed system
- CIM Object Manager on the HMC
- Profile data backup file(s) under the /var/hsc/profile/MT-MDL*S/N directory on the HMC

Note: The data stored on the NVRAM acts as the primary copy. The information stored in the NVRAM is always honored, unless it is determined corrupted.

In addition to these three locations, if the Save Upgrade Data task is performed, then a *special disk partition*[1] on the HMC can be also used to store the profile data.

The HMC provides four operations, *backup*, *restore*, *initialize*, and *remove*, to manage profile data. To perform these operations, do the following:

1. Log in to the HMC using either the System Administrator, Advanced Operator, or Service Representative role.
2. In the Navigation area, select the **Server and Management** icon.
3. In the Contents area, select the managed system to perform the operation.
4. Choose **Selected** → **Profile Data**.
5. Select the appropriate operation in the submenu, as shown Figure 5-1 on page 101.

[1] The special disk partition is mounted and accessible only when the “Save Upgrade Data” task (see “Save Upgrade Data” on page 113) or the “Upgrade of the HMC software” operation is performed (see 6.2.3, “Upgrade install using the save upgrade data” on page 121).

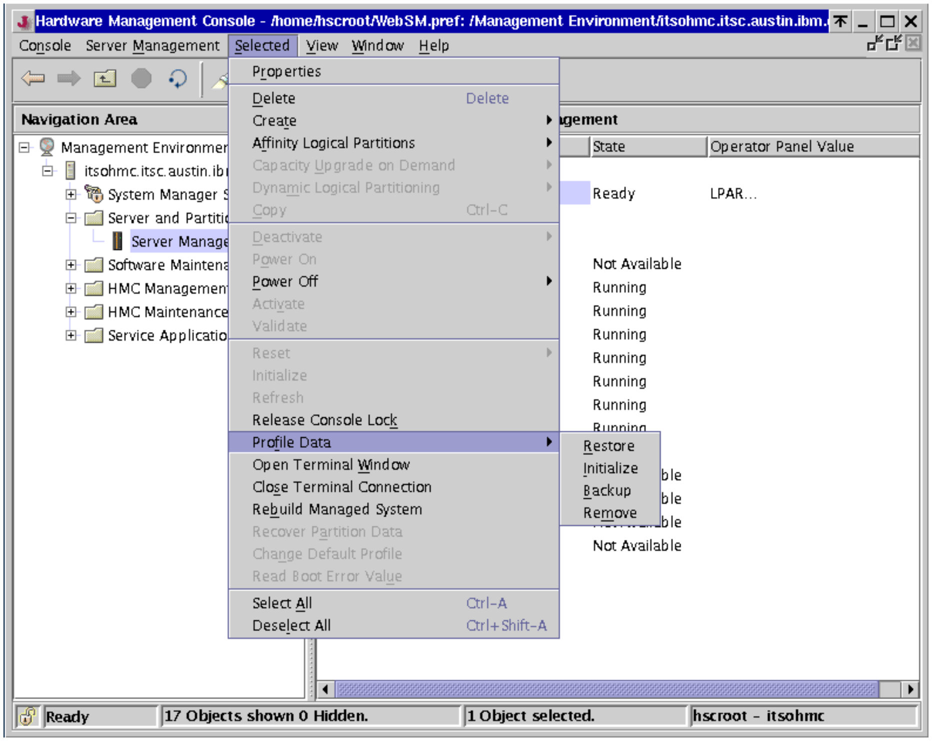


Figure 5-1 Profile Data submenus

Figure 5-2 illustrates the relationship of these locations and relevant tasks.

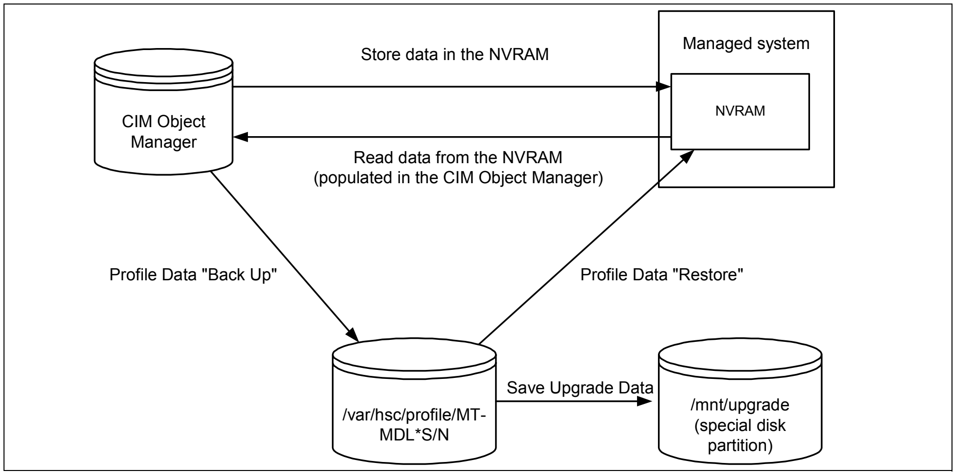

Store data in the NVRAM
Managed system
CIM Object Manager
NVRAM
Read data from the NVRAM (populated in the CIM Object Manager)
Profile Data "Back Up"
Profile Data "Restore"
Save Upgrade Data
/var/hsc/profile/MT-MDL*S/N
/mnt/upgrade (special disk partition)

Figure 5-2 Four partition data locations

The following list explains the relationship between the components and operations shown in the previous figure:

- If a user issues some requests that require a reference to the partitioning configuration data, the data will be read from the NVRAM on the managed system first, then populated in the CIM Object Manager on the HMC. The CIM Object Manager acts as a broker of this information to its clients: local and remote Web-based System Manager clients and HMC commands are the user interface to the CIM Object Manager clients.
- When changes are made to the partitioning configuration data of a managed system, changes are validated on the HMC first, then stored on the NVRAM of the managed system. For consistency between the data stored on the NVRAM and its copy on the HMC, a lock mechanism is used.
- The partitioning configuration data can be backed up if the backup[2] operation is performed. This operation reads all the data from the NVRAM and stores it in a file under the /var/hsc/profile/MT-MDL*SN directory. If multiple backup operations are performed, each backup file may contain different partitioning configuration data that reflects the data when the backup operation was performed.
- The default backup file, /var/hsc/profile/MT-MDL*SN/*backupFile*, always exists and gets updated whenever changes are made to the partitioning configuration. This file is automatically created when the HMC is first connected to its managed system and the data gets written to the file from the NVRAM. If the default backup file does not exist, it will be created with the data from the NVRAM upon the next HMC reboot.
- Upon the managed system's reboot, the HMC performs the following operations:

  a. It first verifies the check sum value of the default backup file and the data stored on the managed system's NVRAM.

  b. If the data stored on the NVRAM is determined corrupted, the HMC will display the *Recovery* state for this managed system (see Table 3-2 on page 64). The Recovery state indicates that either restore[3] or initialize[4] operation is required against the managed system.

  c. If the data stored on the NVRAM is determined not corrupted, the HMC reads the data from the managed system's NVRAM and populates it in the CIM Object Manager. The default backup file is also updated using this data.

  d. If the communication between the HMC and the service processor on the managed system did not successfully complete because of some

[2] See 5.1.1, "Back up profile data" on page 103

[3] See 5.1.2, "Restore profile data" on page 104.

[4] See 5.1.3, "Initialize profile data" on page 105.

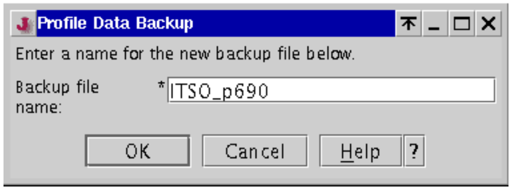
communication failure, the HMC will display the *Incomplete* state for this managed system (see Table 3-2 on page 64). The Incomplete state indicates that rebuild operation is required against the managed system.

- The partitioning configuration data can be restored from the backup file if the restore operation is performed. This operation first reads and verifies all of the data from the specified backup file, then loads the data into the NVRAM on the managed system. Once successfully loaded, the HMC reconstructs its copy on the CIM Object Manager from the NVRAM.

5.1.1 Back up profile data

To back up profile data[5], do the following:

1. In the Contents area, select the managed system.
2. From the menu bar, choose **Selected** → **Profile Data** → **Backup** to open the Profile Data Backup window shown in Figure 5-3.



Enter a name for the new backup file below.

Backup file name: *ITSO_p690

Figure 5-3 Profile Data Backup window

3. Type the file name in the Backup file name field, then click **OK**.

The backup file is saved in the /var/hsc/profiles/MT-MDL*S/N directory on the HMC, as shown in the following example:

```
[user1@remote_host]$ ssh -l hscroot itsohmc.itsc.austin.ibm.com
hscroot@itsohmc's password: XXXXXX
[hscroot@itsohmc]$ cd /var/hsc/profiles/7040-681*021768A
[hscroot@itsohmc 7040-681*021768A]$ ls -l
total 40
-rw-r--r--    1 root     root        20464 Nov 27 12:00 backupFile
-rw-r--r--    1 root     root        20464 Nov 27 12:18 ITSO_p690
```

MT, MDL, and S/N are the system machine type, model, and serial number.

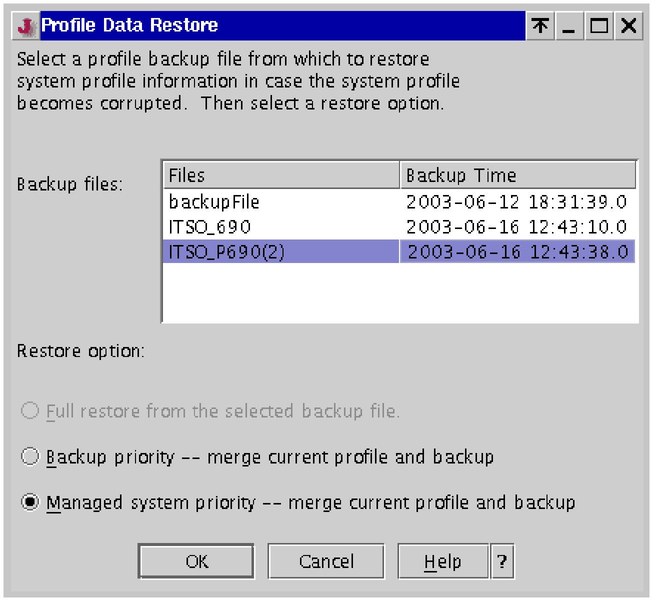
> **Note:** To delete created backup files, use the Delete option explained in 5.1.4, “Remove profile data” on page 105.

[5] The **bkprofdata** command can be also used to perform this operation (see “bkprofdata” on page 203).

5.1.2 Restore profile data

To restore profile data, do the following:[6]

1. In the Contents area, select the managed system.
2. From the menu bar, choose **Selected** → **Profile Data** → **Restore**. This opens the Profile Data Restore window shown in Figure 5-4.



Select a profile backup file from which to restore system profile information in case the system profile becomes corrupted. Then select a restore option.

Backup files:

Files	Backup Time
backupFile	2003-06-12 18:31:39.0
ITSO_690	2003-06-16 12:43:10.0
ITSO_P690(2)	2003-06-16 12:43:38.0

Restore option:

○ Full restore from the selected backup file.

○ Backup priority -- merge current profile and backup

● Managed system priority -- merge current profile and backup

Figure 5-4 Profile Data Restore window

3. Select the backup file name you want to restore from the list.
4. Select one of the following options:
   - Full restore from the selected backup file

     Restores all profile data using only your backup file. Profile modifications performed after the selected backup file was created will be lost.

     Note: Select this option for a managed system in the Recovery state.

   - Backup priority – merge current profile and backup

     Merges the stored backup with recent profile activity. If information conflicts, the stored backup data is restored over the recent profile activity.

[6] The `rstprofdata` command can be also used to perform this operation (see “rstprofdata” on page 204).

- Managed system priority – merge current profile and backup

  Merges recent profile activity with the stored backup. If information conflicts, the recent profile activity is restored over the stored backup data.

Click **OK**.

5.1.3 Initialize profile data

To initialize profile data, do the following:

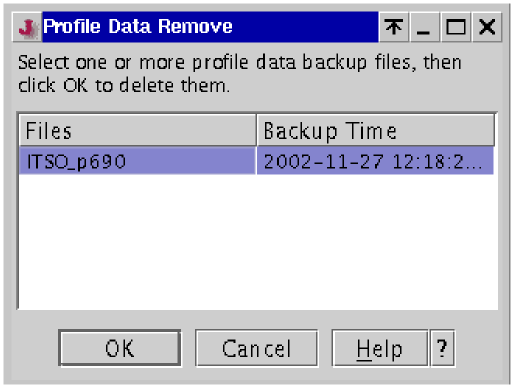
1. In the Contents area, select the managed system.
2. From the menu bar, choose **Selected** → **Profile Data** → **Initialize**.
3. A warning message window opens. If you are sure you want to initialize the profile data, click **Yes**.

Warning: This operation wipes out all partition profile data, not only from the CIM Object Manager on the HMC, but also from NVRAM on the managed system. Use this function with care.

5.1.4 Remove profile data

To remove profile data stored on the HMC, do the following:

1. In the Contents area, select the managed system.
2. From the menu bar, choose **Selected** → **Profile Data** → **Remove** to open the Profile Data Remove window shown in Figure 5-5.



Select one or more profile data backup files, then click OK to delete them.

Files	Backup Time
ITSO_p690	2002-11-27 12:18:2...

Figure 5-5 Profile Data Remove window

3. Select the backup file name you want to remove from the list, then click **OK**.

Note: This operation simply removes the specified backup file that was already created using the Backup profile data operation (see 5.1.1, “Back up profile data” on page 103). The removal of the backup file does not affect the partitioning configuration data currently in use on the managed system and its copy held by the CIM Object Manager on the HMC.

6

Managing software levels on the HMC

This chapter explains how to install, recover, and upgrade the HMC software in the following sections:

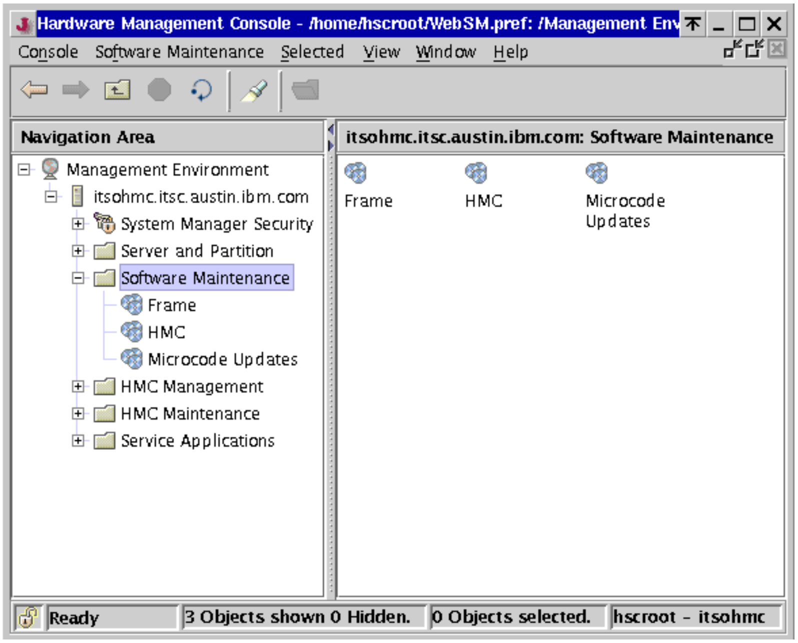
- “Software Maintenance” on page 108
- “Install, recover, and upgrade strategies” on page 118

For further information about these tasks, refer to the following publications:

- *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590
- *IBM Hardware Management Console for pSeries Maintenance Guide*, SA38-0603

6.1 Software Maintenance

As shown in Figure 6-1, the Software Maintenance folder contains the three applications listed in Table 6-1.



Ready | 3 Objects shown 0 Hidden. | 0 Objects selected. | hscroot - itsohmc

Figure 6-1 Software Maintenance

Table 6-1 Applications in the Software Maintenance folder

Application	Relevant section number
Frame	6.1.1
HMC	6.1.2
Microcode Updates	6.1.3

6.1.1 Frame

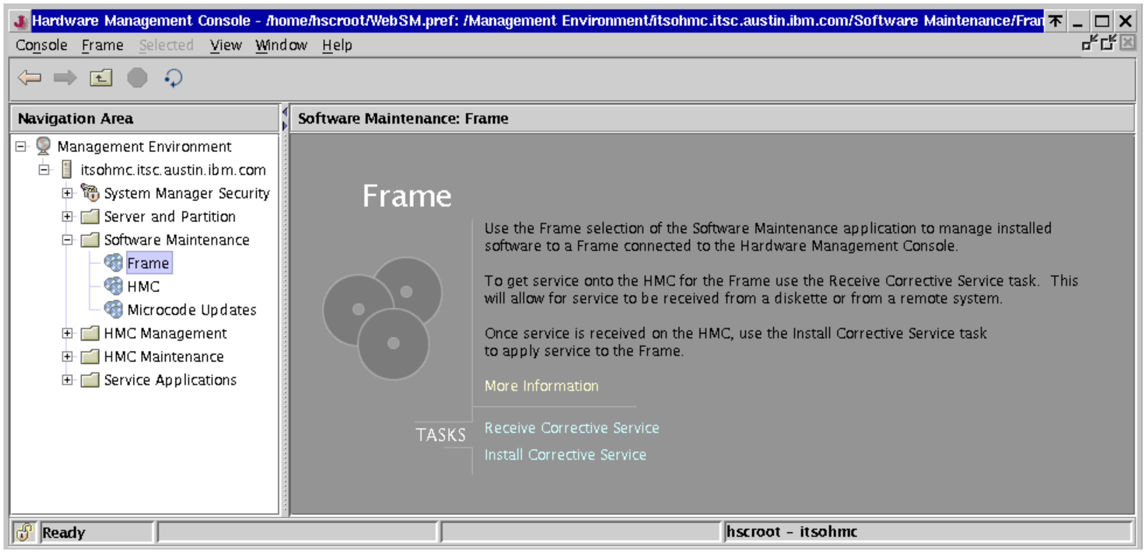
This application is provided to receive and install corrective service onto all of the hardware components, including multiple managed systems, accommodated in the 7040-W42 frame at one time. Therefore the effect of this application can be considered as if multiple Microcode Updates tasks are performed on those hardware components in a single operation.

Note: In order for this application to function, the BPA of the frame must be connected to one of the serial ports on the HMC using RS-422.

These tasks are provided in the Frame application, as shown in Figure 6.1.2:

- Receive Corrective Services
- Install Corrective Services

For further information about the use of this application, refer to the *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590.


Hardware Management Console - /home/hscroot/WebSM.pref: /Management Environment/itsohmc.itsc.austin.ibm.com/Software Maintenance/Fran
Console Frame Selected View Window Help
Navigation Area
Management Environment
itsohmc.itsc.austin.ibm.com
System Manager Security
Server and Partition
Software Maintenance
Frame
HMC
Microcode Updates
HMC Management
HMC Maintenance
Service Applications
Software Maintenance: Frame
Frame
More Information
TASKS
Receive Corrective Service
Install Corrective Service
Ready
hscroot - itsohmc

Use the Frame selection of the Software Maintenance application to manage installed software to a Frame connected to the Hardware Management Console.

To get service onto the HMC for the Frame use the Receive Corrective Service task. This will allow for service to be received from a diskette or from a remote system.

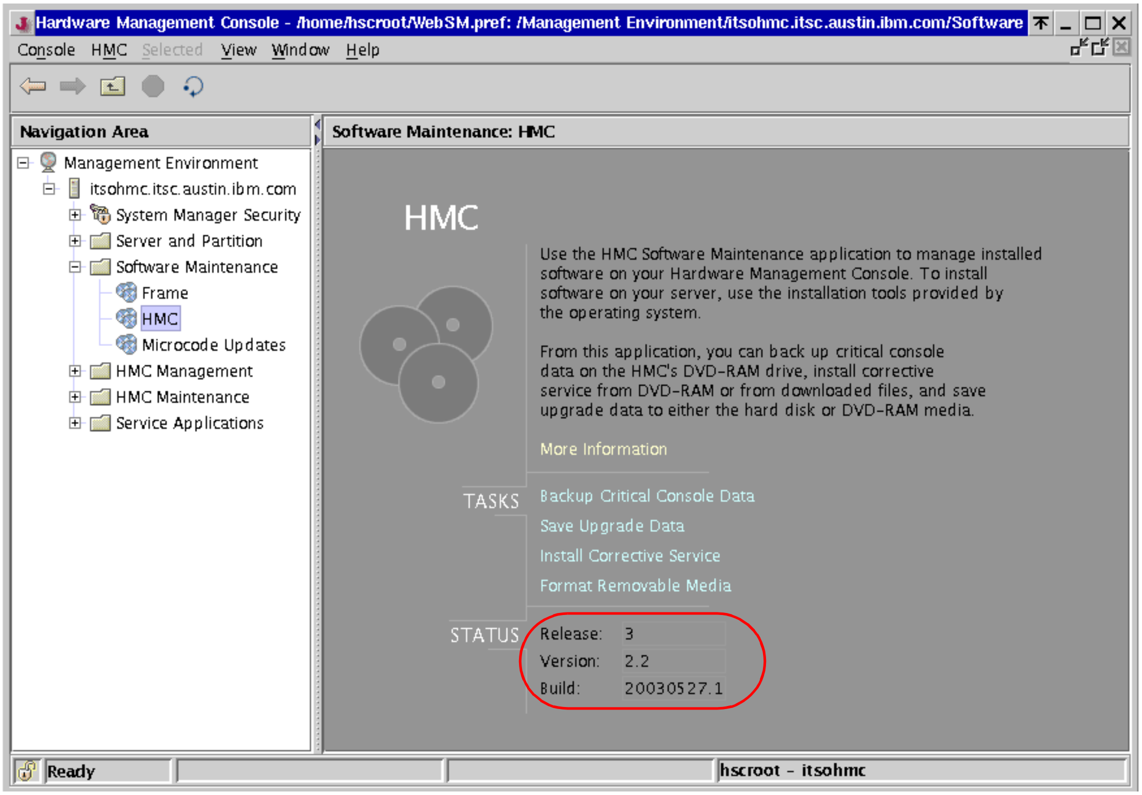
Once service is received on the HMC, use the Install Corrective Service task to apply service to the Frame.

Figure 6-2 Software Maintenance: Frame

6.1.2 HMC

The HMC application is used for creating backups, installing corrective service, and formatting removable media on the HMC through the following four tasks, as shown in Figure 6-3 on page 110.

- Backup Critical Console Data
- Save Upgrade Data
- Install Corrective Services
- Format Removable Media



Use the HMC Software Maintenance application to manage installed software on your Hardware Management Console. To install software on your server, use the installation tools provided by the operating system.

From this application, you can back up critical console data on the HMC's DVD-RAM drive, install corrective service from DVD-RAM or from downloaded files, and save upgrade data to either the hard disk or DVD-RAM media.

More Information

Backup Critical Console Data
Save Upgrade Data
Install Corrective Service
Format Removable Media

Release: 3
Version: 2.2
Build: 20030527.1

Figure 6-3 Software Maintenance: HMC

Difference between two backup tasks

The two backup-related tasks, Backup Critical Console Data and Save Upgrade Data, are provided for different purposes:

- Backup Critical Console Data

  Backs up all HMC configuration data to a DVD-RAM media, capturing any and all changes made to the HMC after initial installation from the recovery CD.

  The following data is included in the backup DVD-RAM media:

  – User configuration

  – User preferences, including each user’s home directory

  – HMC configuration files that record the following customizing:

    • TCP/IP

    • Rexec/ssh facility setting

    • Remote virtual terminal setting

    - Time zone setting
  - HMC log files located in the /var/log directory
  - Service functions settings, such as Inventory Scout, Service Agent, and Service Focal Point
  - Partition profile data backup

    > **Note:** The partition profile data must be backed up before performing the “Backup Critical Console Data” task as explained in 5.1.1, “Back up profile data” on page 103. The task simply backs up files in the /var/hsc/profiles/MT-MDL*S/N directory, if they already exist.

  This task should be performed each time configuration changes are made to the system or the HMC. You might even schedule the “Backup Critical Console Data” task explained in 4.2.6, “Scheduled Operations” on page 92.

  > **Note:**
  >
  > - The backup DVD-RAM created using this task is only used for the system recovery situation explained in 6.2.1, “Refresh Install using the recovery CD” on page 119. When updating from an HMC software level to another, the backup DVD-RAM media is not used.
  > - The DVD-RAM media has two sides. Each side should be considered as a separate media.
  > - Each side of a DVD-RAM media must be formatted beforehand. To format the media, see “Format Removable Media” on page 116.
  > - Each side of a DVD-RAM media can hold only one generation of the backup; if you performed this task multiple times, only the last backup would be preserved.

- Save Upgrade Data

  Creates several archive files for the following configuration information, then saves those archive files in the special disk partition on the HMC:

  - User configuration
  - User preferences, including each user’s home directory
  - HMC configuration files that record the following customizing:
    - TCP/IP
    - Rexec/ssh facility setting
    - Remote virtual terminal setting

      - Time zone setting
  - HMC log files located in the /var/log directory
  - Service functions settings, such as Inventory Scout, Service Agent, and Service Focal Point
  - Partition profile data backup

    > **Note:** The partition profile data must be backed up before performing the “Save Upgrade Data” task explained in 5.1.1, “Back up profile data” on page 103. The task simply backs up files in the /var/hsc/profiles/MT-MDL*S/N directory, if they already exist.

Perform this task just before the HMC software update operation only.

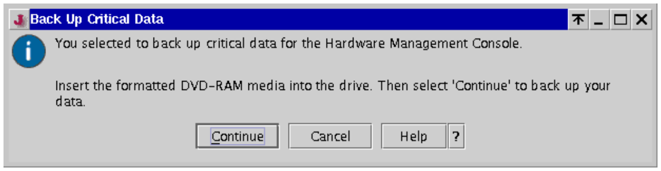
> **Note:**
>
> - The saved data in the special disk partition is used only when updating the HMC software level as explained in 6.2.3, “Upgrade install using the save upgrade data” on page 121. When recovering the HMC using the recovery CD, this data is not used.
> - If you format the disk drive on the HMC, the saved data in the special disk partition will be lost. This means that if you performed either of the following operations once, then the saved data would be lost:
>   - 6.2.1, “Refresh Install using the recovery CD” on page 119
>   - 6.2.2, “Recovery install using the critical console data backup” on page 120

Backup Critical Console Data

The Backup Critical Console Data task is used to back up the HMC configuration and profile data to the formatted DVD-RAM media. The backup DVD-RAM media is used only when recovering the HMC from the software or hardware problem.

To perform the Backup Critical Console Data task, do the following:

1. Expand the Software Maintenance folder, then select the HMC application in the Navigation area.
2. Select the Backup Critical Console Data task in the content area.
3. An information window opens that prompts you to insert a formatted DVD-RAM media into the drive, as shown in Figure 6-4 on page 113. Insert the media and click **Continue**.



You selected to back up critical data for the Hardware Management Console.

Insert the formatted DVD-RAM media into the drive. Then select 'Continue' to back up your data.

Figure 6-4 Backup Critical Console Data (insert DVD-RAM media)

4. When the task is complete, an information window opens with this message:

   ```
   HSCP0001 The Backup Critical Console Data request completed successfully.
   ```

5. Once confirmed, click **OK** to close the information window. Remove the media from the drive, if necessary.

Note: The task may take considerable time depending on the data on the HMC system. On our HMC, which is frequently reinstalled for test purposes, it usually takes up to 15 minutes.

Save Upgrade Data

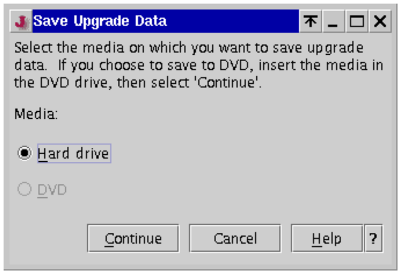
The Save Upgrade Data task is used to save the current HMC configuration in the special disk partition on the HMC. This task is used before you migrate the current HMC software level to the new version (for example, before migrating the level from Release 2 to Release 3).

Note: The special disk partition can hold only one generation of backup data. Every time you perform this task, previous backup will be overwritten by the latest backup.

To perform the Save Upgrade Data task, do the following:

1. Expand the Software Maintenance folder, then select the HMC application in the Navigation area.
2. Select the Save Upgrade Data task in the content area.
3. An information window opens that prompts you to select the media (Hard drive or DVD), as shown in Figure 6-5 on page 114. Click **Continue**.

   Note: The DVD media selection is available for the hscpe user only.


Save Upgrade Data

Select the media on which you want to save upgrade data. If you choose to save to DVD, insert the media in the DVD drive, then select 'Continue'.

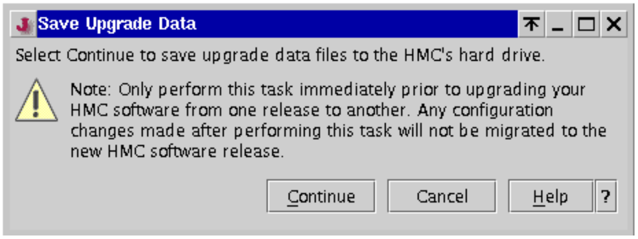
Media:

● Hard drive

○ DVD

Figure 6-5 Save Upgrade Data (Hard drive)

4. Another information window opens as shown in Figure 6-6. When ready, click **Continue**.


Save Upgrade Data

Select Continue to save upgrade data files to the HMC's hard drive.

Note: Only perform this task immediately prior to upgrading your HMC software from one release to another. Any configuration changes made after performing this task will not be migrated to the new HMC software release.

Figure 6-6 Save Upgrade Data (warning)

5. When the task is complete, an information window opens with this message:

```
HSCP0020 The Save Upgrade Data request completed successfully.
```

6. Click **OK** to confirm and close the information window.

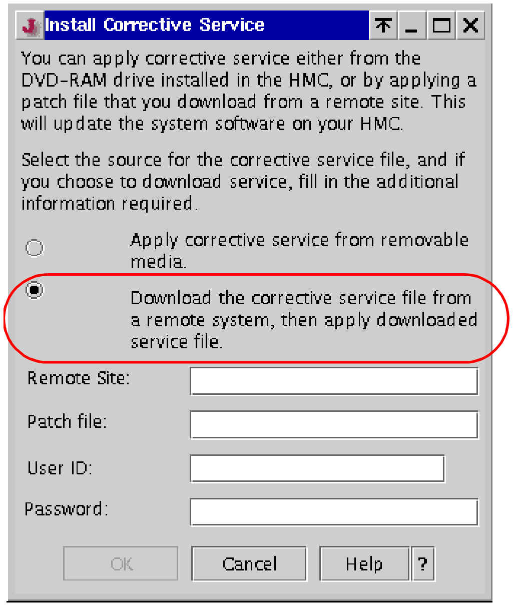
Install Corrective Services

The Install Corrective Services task updates software packages on the HMC in order to fix known problems or enhance functionality with the HMC software.

> **Note:** Use this task to update the HMC software level using the corrective service only. For example, update the level from Release 3, Version 2.0 to Release 3, Version 2.2.

To perform this task, do the following:

1. Expand the Software Maintenance folder, then select the HMC application in the Navigation area.
2. Select the Install Corrective Services task in the content area. This opens the Install Corrective Services window shown in Figure 6-7 on page 115.



You can apply corrective service either from the DVD-RAM drive installed in the HMC, or by applying a patch file that you download from a remote site. This will update the system software on your HMC.

Select the source for the corrective service file, and if you choose to download service, fill in the additional information required.

○ Apply corrective service from removable media.

● Download the corrective service file from a remote system, then apply downloaded service file.

Remote Site:	
Patch file:	
User ID:	
Password:	

Figure 6-7 Install Corrective Service window

3. If you want to download the fix from a remote site and have the necessary information from your support representative, select the highlighted option and complete the following fields, and then click **OK**:

   – Remote Site

   – Patch file

   – User ID

   – Password

   You can find information about the HMC corrective services at:

   http://techsupport.services.ibm.com/server/hmc

   For example, the HMC corrective service Release 3, Version 2.1 can be downloaded and installed onto the HMC using the following information:

Remote Site	ftp://techsupport.services.ibm.com
Patch file	/eserver/pseries/hmc/fixes/HMC_Update_R3V2.1.zip
User ID	anonymous
Password	Your e-mail address

> **Note:** If newer versions of the corrective service are released for Release 3, Version 2 in the future, this information might become obsolete.

4. If you cannot directly download the corrective services on your HMC from the Internet, you can install them by using the following method:
   a. Download the corrective service file on your PC.

   > **Note:** The downloaded corrective service file is an archive file using `tar` and `gzip`. Do not unarchive the file before burning the CD-R media.

   b. Burn the downloaded file on a CD-R media.
   c. Insert the media into the DVD-RAM drive on the HMC.
   d. Select the **Apply corrective service from removal media** option in the Install Corrective Service window. Click **OK**.

   After applying the corrective services, you must reboot the HMC manually.

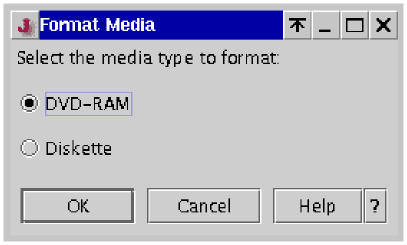
Format Removable Media

The Format Removable Media task enables you to format DVD-RAM or diskette media.

> **Note:** Previously stored data on the DVD-RAM or diskette media will be lost after it is formatted.

To perform this task, do the following:

5. Expand the Software Maintenance folder, then select the HMC application in the Navigation area.
6. Select the Format Removable Media task in the content area. This opens the Format Media window shown in Figure 6-8.


Format Media

Select the media type to format:

● DVD-RAM

○ Diskette

Figure 6-8 Format Media

7. Select the appropriate media type, insert the media into the drive on the HMC, then click **OK**. Another information window opens to confirm that the appropriate media is available. Click **OK**.
8. When the task is complete, an information window opens with this message:

   ```
   HSCP0010 The Format Removable Media request completed successfully.
   ```

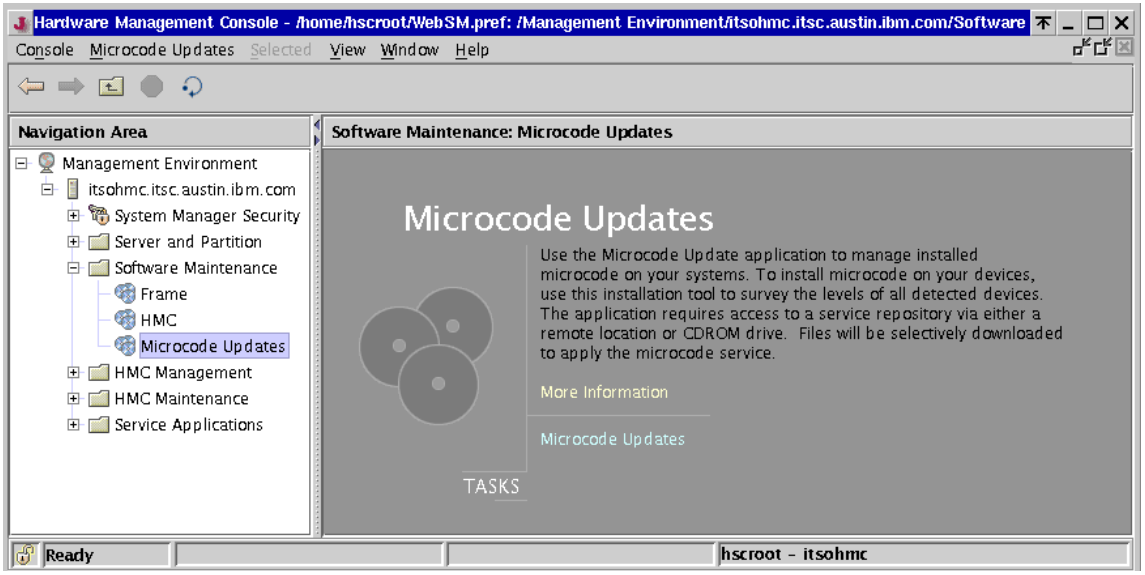
9. Click **OK** to confirm and close the information window. Remove the media from the drive, if necessary.

6.1.3 Microcode Updates

The Microcode Updates application[1] provides only one task, Microcode Updates (see Figure 6-9). This task is used for the following management purposes on the managed systems:

- Conduct microcode level surveys
- Install microcode updates

Note: The Microcode Updates task does not perform any management tasks against the HMC itself.



Use the Microcode Update application to manage installed microcode on your systems. To install microcode on your devices, use this installation tool to survey the levels of all detected devices. The application requires access to a service repository via either a remote location or CDROM drive. Files will be selectively downloaded to apply the microcode service.

Figure 6-9 Software Maintenance: Microcode Updates

[1] The Microcode Updates application is available on the HMC loaded with the software level Release 3, Version 2 and later.

Although the Microcode Updates application is provided in the Software Maintenance folder, we explain this application in 11.5, “Microcode Updates” on page 272 because it does not relate to any management tasks on the HMC itself.

6.2 Install, recover, and upgrade strategies

There are three operations for installing, recovering, or upgrading the HMC software:

- Refresh Install using the recovery CD

  Used to perform overwrite and install the newer version of HMC software on the HMC (path A in Figure 6-10 on page 119). If all customizing and partition configurations are properly recorded, this operation can be also used to recover from system failure. To record the information, see “Recording the current HMC configuration information” on page 122.

  > **Note:** This operation formats the disk drive on the HMC.

- Recovery install using the critical console data backup

  Recovers the HMC in case of system failure, such as disk drive replacement (path B in Figure 6-10 on page 119).

  You need to have the backup DVD-RAM media created beforehand with the “Backup Critical Console Data” task explained in “Backup Critical Console Data” on page 112.

  > **Note:** This operation formats the disk drive on the HMC.

- Upgrade install using the save upgrade data

  Used to update the HMC software from an older version to a newer one (path C in Figure 6-10 on page 119).

  You need to perform the “Save Upgrade Data” task beforehand, as explained in “Save Upgrade Data” on page 113.

  > **Note:** The disk drive on the HMC will not be formatted in this operation.

Figure 6-10 on page 119 illustrates the process flow of these operations.

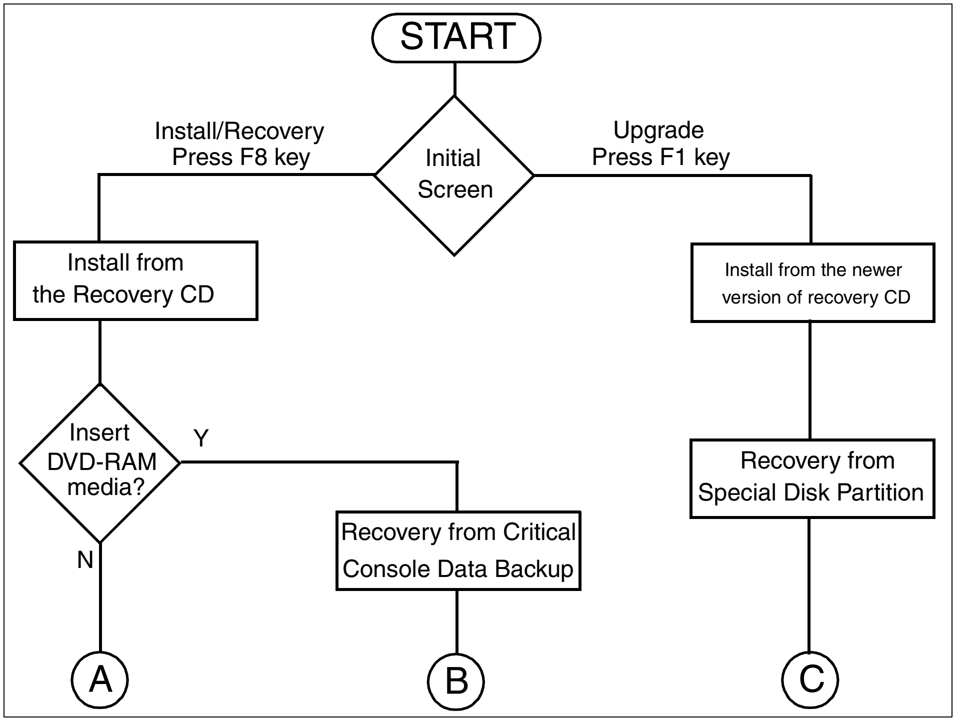


Figure 6-10 Install/Recovery or Upgrade selection

6.2.1 Refresh Install using the recovery CD

To refresh install the HMC software onto the HMC as indicated by A in Figure 6-10, do the following:

1. Shut down and power off the HMC.
2. Power on the HMC console and insert the HMC recovery CD media. The HMC should boot from the media and display the text shown in Example 6-1 on page 120.

Example 6-1 Initial selection screen on the HMC

```
YOU HAVE REQUESTED TO INSTALL/UPGRADE YOUR HMC HARD DISK FROM THE BASE
CODE CD-ROM.  PLEASE SELECT ONE OF THE BELOW OPTIONS (OR ESC TO EXIT):

WARNING: CONTINUING WITH THIS TASK WILL RESULT IN THE DESTRUCTION OF
         INFORMATION CURRENTLY ON YOUR HMC HARD DISK.

1 - INSTALL/RECOVERY:
  CHOOSE THIS OPTION WHEN YOU ARE INSTALLING FOR THE FIRST TIME OR IF
  YOU WISH TO RELOAD THE HMC HARD DISK USING THE BASE CODE CD-ROM.
  YOU WILL HAVE THE OPTION TO INSERT THE DVD-RAM MEDIA TO RESTORE
  PREVIOUSLY BACKED UP CRITICAL DATA.
 SELECT F8 TO CONTINUE WITH THIS PROCESS.

2 - UPGRADE:
  CHOOSE THIS OPTION WHEN YOU ARE UPGRADING YOUR HMC HARD DISK TO A NEW
  CODE LEVEL.  THIS OPTION WILL PRESERVE PREVIOUSLY SAVED UPGARDE DATA
  ON DISK, AND RESTORE THAT DATA AFTER THE UPGRADE HAS BEEN COMPLETED.
 SELECT F1 TO CONTINUE WITH THIS PROCESS.
```

3. Press F8 to select the “1 - Install/Recover” option.
4. When the following message is displayed, press F1 to confirm that you wish to continue:

   ```
   PRESS F1 TO CONTINUE WITH THE RESTORE / PRELOAD PROCESS.
   PRESS ESC TO EXIT THE PROCESS
   ```

5. When the installation from the CD media finishes, the following message displays to prompt you to insert the DVD-RAM media for the critical console data backup:

   ```
   REMOVE THE CD-ROM AND PLACE THE BACKUP DVD-RAM CARTRIDGE IN THE DRIVE.
   WHEN THE BACKUP DVD-RAM CARTRIDGE IS IN THE PLACE,
   PRESS ENTER AND THE HARDWARE MANAGEMENT CONSOLE WILL REBOOT.
   ```

6. Remove the CD media from the drive and do *not* insert the DVD-RAM media. Type Enter to reboot the HMC.
7. After the HMC reboot, the Kudzu screen is displayed to confirm the removal and addition of hardware resources on the HMC. Select the option as instructed in the screen.
8. In a few minutes, the HMC logon panel displays.

6.2.2 Recovery install using the critical console data backup

To recover install the HMC software onto your HMC as indicated by B in Figure 6-10 on page 119, do the following:

Note: For this operation, you must have the backup DVD-RAM media created using the “Backup Critical Console Data” task.

1. Shut down and power off the HMC.
2. Power on the HMC console and insert the HMC recovery CD media. The HMC should boot from the media and display the screen shown in Example 6-1 on page 120.
3. Press F8 to select the “1 - Install/Recover” option.
4. When the following message is displayed, press F1 to confirm that you wish to continue:

   ```
   PRESS F1 TO CONTINUE WITH THE RESTORE / PRELOAD PROCESS.
   PRESS ESC TO EXIT THE PROCESS
   ```

5. When the installation from the CD media finishes, the following message is displayed to prompt you to insert the DVD-RAM media for the critical console data backup:

   ```
   REMOVE THE CD-ROM AND PLACE THE BACKUP DVD-RAM CARTRIDGE IN THE DRIVE.
   WHEN THE BACKUP DVD-RAM CARTRIDGE IS IN THE PLACE,
   PRESS ENTER AND THE HARDWARE MANAGEMENT CONSOLE WILL REBOOT.
   ```

6. Remove the CD media from the drive and *insert* the DVD-RAM media. Type Enter to reboot the HMC.
7. After the HMC reboot, the Kudzu screen is displayed to confirm the removal and addition of hardware resources on the HMC. Select the option as instructed onscreen.
8. The HMC logon panel will be displayed in a couple of minutes.

6.2.3 Upgrade install using the save upgrade data

Note:

- You must perform the “Save Upgrade Data” task before for this operation.
- This operation can be only used when upgrading the software release from *N* to *N+1*, such as from the HMC software level Release 2 to Release 3. If you need to upgrade the HMC software more than one level, for example from Release 1 to Release 3, then you must record the current HMC configuration information, then install the newest HMC software level using the product recovery CD, then apply all recorded configuration information. To record the HMC configuration information, see “Recording the current HMC configuration information” on page 122.

To upgrade install the HMC software onto your HMC as indicated by C in Figure 6-10 on page 119, do the following:

1. Perform the Save Upgrade Data task on the HMC (see “Save Upgrade Data” on page 113).
2. Power off the HMC.
3. Power on the HMC console, and insert the HMC installation/update CD media. The HMC should boot from the CD and display the screen shown in Example 6-1 on page 120.
4. Press F1 to begin the upgrade process and F1 again to confirm that you wish to begin the migration.
5. When the HMC finishes installing the new software code it will prompt you to remove the HMC recovery media. Remove the CD, close the DVD tray, and type Enter to reboot the HMC.
6. After the HMC reboot, the Kudzu screen is displayed to confirm the removal and addition of hardware resources on the HMC. Select the option as instructed in the screen.
7. The HMC logon panel will be displayed in a couple of minutes.

To verify that the upgrade is successfully performed, do the following:

1. Expand the Software Maintenance folder then select HMC in the navigation area.
2. The HMC software level is shown highlighted in Figure 6-3 on page 110.

Recording the current HMC configuration information

To record the current HMC configuration information, do the following:

1. Expand the HMC Maintenance folder then click the System Configuration application in the Navigation area.
2. Select the Scheduled Operations task in the Content area. The Scheduled Operations window opens.
3. Select **Sort** → **By Object**.
4. Select each object. Record the following information:
   - Object Name
   - Schedule Date
   - Operation Time (displayed in 24-hour format)
   - Repetitive. If repetitive is YES, do the following:
     i. Select **View** → **Schedule Details**.
     ii. Record the interval information.

   iii. Close the Scheduled Operations window.

5. Repeat the previous step for each scheduled operation.
6. Close the Scheduled Operations window.
7. Expand the Server and Partition folder then click the Server Management application in the Navigation area.
8. Right-click the managed system in the Content area, then select **Profile Data** → **Backup**.
9. Type a backup file name and record this information.
10. Click **OK**.
11. Repeat steps 12 - 14 for each managed system.
12. Expand the Server and Partition folder then click the System Configuration application in the Navigation area.
13. Select the Enable/Disable Remote Command Execution task in the Content area.
14. Record the settings of the following options:
    - Enable remote command execution using the rexec facility
    - Enable remote command execution using the ssh facility
15. Select the Enable/Disable Remote Virtual Terminal task in the Content area.
16. Record the setting.

Note: Except for the recording of scheduled operations, you can use the steps explained in 10.2.12, “Record current HMC information before upgrade” on page 244 to record the current HMC configuration information.

7

Secure remote GUI access to the HMC

The HMC supports remote access to the graphical user interface from the Web-based System Manager client installed on the AIX, Linux, and Windows operating systems. However, care must be taken to secure the connection between the remote client and the HMC.

This chapter contains the following sections:

- “System Manager Security” on page 126
- “Remote client setup on a Windows system” on page 141
- “Remote client setup on a Linux system” on page 145
- “Remote access to the HMC graphical user interface” on page 148

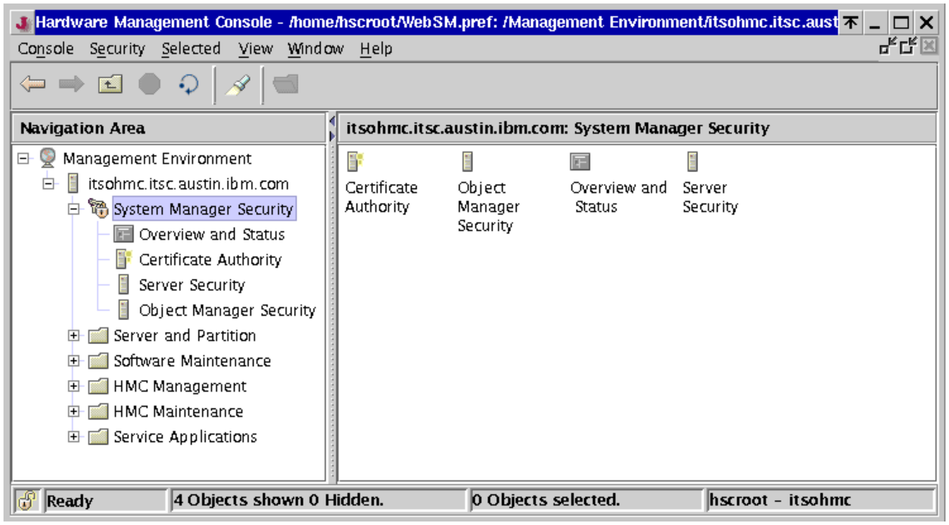
> **Note:** Several applications and tasks, such as System Manager Security, configuring asynchronous adapters, and Service Agent cannot be performed using the remote Web-based System Manager client.

For further information about the System Manager Security and the remote Web-based System Manager client, refer to *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590.

7.1 System Manager Security

The systems administrator has the option of configuring the HMC to use the Secure Sockets Layer (SSL) protocol when communicating with remote Web-based System Manager clients. This protocol provides server authentication, data encryption, and data integrity.

Configuration is accomplished by the applications in the System Manager Security folder, as shown in Figure 7-1.


Hardware Management Console - /home/hscroot/WebSM.pref: /Management Environment/itsohmc.itsc.aust

itsohmc.itsc.austin.ibm.com: System Manager Security

Ready | 4 Objects shown 0 Hidden. | 0 Objects selected. | hscroot - itsohmc

Figure 7-1 System Manager Security folder

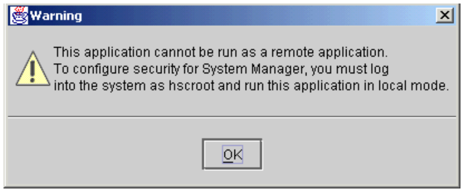
If the folder is selected, it contains the applications shown in Table 7-1 in the Navigation area.

Table 7-1 System Manager Security applications

Application	Relevant section number
Certificate Authority	7.1.2
Server Security	7.1.3
Overview and Status	7.1.4
Object Manager Security	7.1.5

Note: To use the applications, the user must be a member of the System Administrator role.

If you access applications in the System Manager Security folder from the remote Web-based System Manager client, you will be notified that the access is prohibited as shown in Figure 7-2.



This application cannot be run as a remote application.
To configure security for System Manager, you must log
into the system as hscroot and run this application in local mode.

Figure 7-2 Warning window

7.1.1 Configuration steps to set up secure system manager server

To set up the secure system manager server on your HMC, which means the Web-based System Manager server uses the private key ring file to establish the secure network connection using SSL, the following steps must be followed:

1. Configure Certificate Authority on your HMC.

   This step is done using the “Configure this system as a System Manager Certificate Authority” task (see “Configuring CA on your HMC” on page 129).

2. Generate a pair of private and public key ring files on your HMC.

   This step is done using the “Generate Servers’ Private Key Ring Files” task (see “Generating private key ring files for the HMC” on page 133).

3. Install the private key file on your HMC.

   This step is done using the “Install the private key ring file for this server” task (see “Install the private key ring file for this server” on page 137).

4. Select the security connection mode on your HMC.

   This step is done using the “Configure this system as a Secure System Manager Server” task (see “Configure this system as a Secure System Manager Server” on page 138).

5. Copy the public key file to the formatted diskette media.

   This step is done using the “Copy this Certificate Authority’s Public Key Ring File to diskette” task (see “Copy the public key ring file to diskette” on page 134).

6. Distribute the public key file to remote Web-based System Manager clients.

   This step is done using the diskette created in the previous step (see 7.4, “Remote access to the HMC graphical user interface” on page 148).

7.1.2 Certificate Authority

The Certificate Authority application contains the following seven tasks (see the content area shown in Figure 7-3 on page 129).

> **Note:** If a Certificate Authority (CA) is not configured on the HMC, all tasks except for the following are grayed out and not selectable until the CA is configured:
>
> - Configure this system as a System Manager Certificate Authority
> - Copy another Certificate Authority's Public Key Ring File from diskette

- Configure this system as a System Manager Certificate Authority

  Use this task to configure your HMC as a Certificate Authority (CA). Once CA is configured on your HMC, this task is grayed out and not selectable unless the "Unconfigure Certificate Authority" task is performed.

  See "Configuring CA on your HMC" on page 129 for how to use this task.

- Properties

  Use this task to display the current CA configuration on the HMC.

  See "Viewing security configuration properties" on page 132 for using this task.

- Unconfigure Certificate Authority

  Use this task to unconfigure the CA on your HMC.

- Generate Servers' Private Key Ring Files

  Use this task to generate a pair of private and public key ring files on your HMC. To perform this task, the CA must be configured on the HMC beforehand.

  See "Generating private key ring files for the HMC" on page 133 for how to use this task.

- Copy Servers' Private Key Ring Files to diskette

  Use this task to back up the generated private key ring file to diskette. Place the backup media in a safe place.

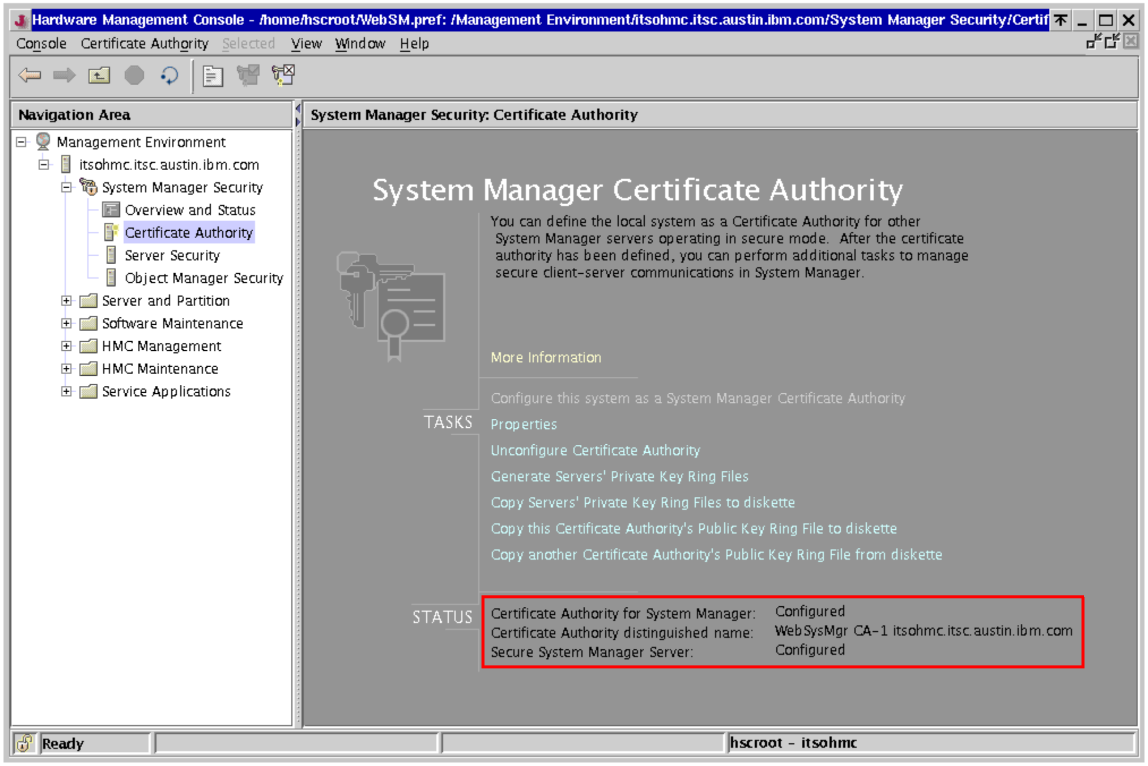
- Copy this Certificate Authority's Public Key Ring File to diskette

  Use this task to copy the generated public key ring file to diskette. The diskette is used for distributing the public key ring file to remote Web-based System Manager clients.

  See "Copy the public key ring file to diskette" on page 134 for how to use this task.

- Copy another Certificate Authority's Public Key Ring File from diskette

  Use this task if you need to access the other HMCs or AIX systems from the HMC to which you are currently logging in using SSL.



System Manager Certificate Authority

You can define the local system as a Certificate Authority for other System Manager servers operating in secure mode. After the certificate authority has been defined, you can perform additional tasks to manage secure client-server communications in System Manager.

More Information

Configure this system as a System Manager Certificate Authority
Properties
Unconfigure Certificate Authority
Generate Servers' Private Key Ring Files
Copy Servers' Private Key Ring Files to diskette
Copy this Certificate Authority's Public Key Ring File to diskette
Copy another Certificate Authority's Public Key Ring File from diskette

Certificate Authority for System Manager: Configured
Certificate Authority distinguished name: WebSysMgr CA-1 itsohmc.itsc.austin.ibm.com
Secure System Manager Server: Configured

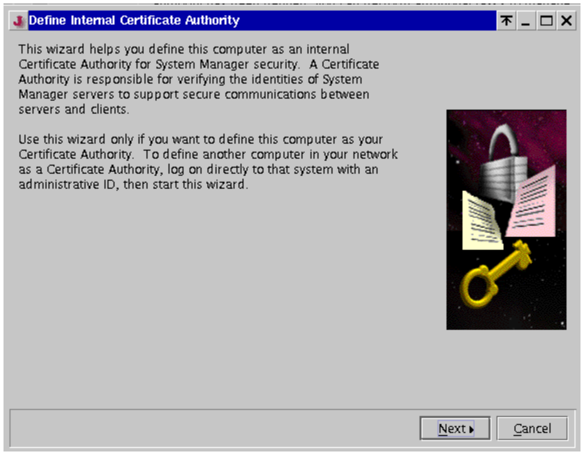
Figure 7-3 Certificate Authority (after being configured)

> **Note:** Before the Certificated Authority is configured, the three status lines highlighted in Figure 7-3 show `Not Configured`.

Configuring CA on your HMC

To configure CA on your HMC, do the following:

1. Expand the System Manager Security folder, then select the Certificate Authority application in the Navigation area.
2. Select the Configure this system as a System Manager Certificate Authority task.
3. The Define Internal Certificate Authority wizard window opens, as shown in Figure 7-4 on page 130. Click **Next**.

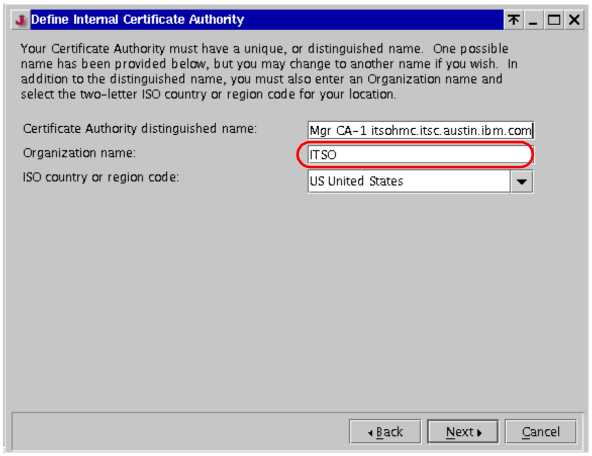


This wizard helps you define this computer as an internal Certificate Authority for System Manager security. A Certificate Authority is responsible for verifying the identities of System Manager servers to support secure communications between servers and clients.

Use this wizard only if you want to define this computer as your Certificate Authority. To define another computer in your network as a Certificate Authority, log on directly to that system with an administrative ID, then start this wizard.

Figure 7-4 Define Internal Certificate Authority wizard

4. The wizard prompts you to enter the organization name as highlighted in Figure 7-5. Type the appropriate organization name in the field and click **Next**.



Your Certificate Authority must have a unique, or distinguished name. One possible name has been provided below, but you may change to another name if you wish. In addition to the distinguished name, you must also enter an Organization name and select the two-letter ISO country or region code for your location.

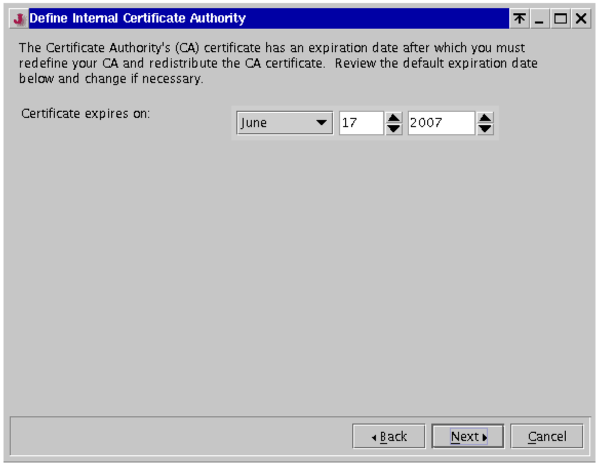
Certificate Authority distinguished name: Mgr CA-1 itsohmc.itsc.austin.ibm.com

Organization name: ITSO

ISO country or region code: US United States

Figure 7-5 Organization name

5. The wizard displays the expiration date of the certificate that you are going to create, as shown in Figure 7-6 on page 131. Verify the date (the default expiration period is set to four years), then click **Next**.

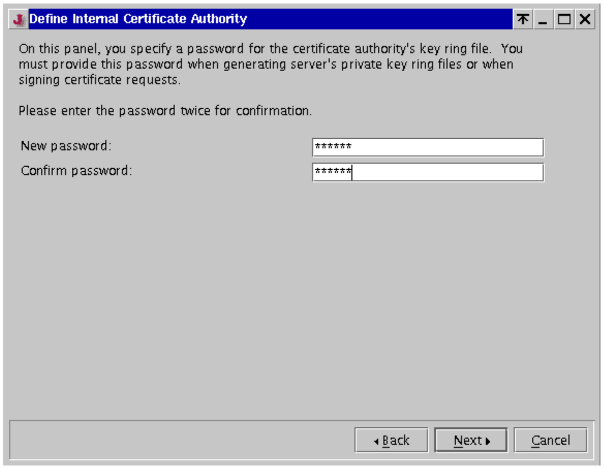

Define Internal Certificate Authority

The Certificate Authority's (CA) certificate has an expiration date after which you must redefine your CA and redistribute the CA certificate. Review the default expiration date below and change if necessary.

Certificate expires on: June 17 2007

Figure 7-6 Certificate expiration date

6. The wizard prompts you to enter the password for the CA’s key ring file as shown in Figure 7-7. Type the appropriate password twice, and click **Next**.


Define Internal Certificate Authority

On this panel, you specify a password for the certificate authority's key ring file. You must provide this password when generating server's private key ring files or when signing certificate requests.

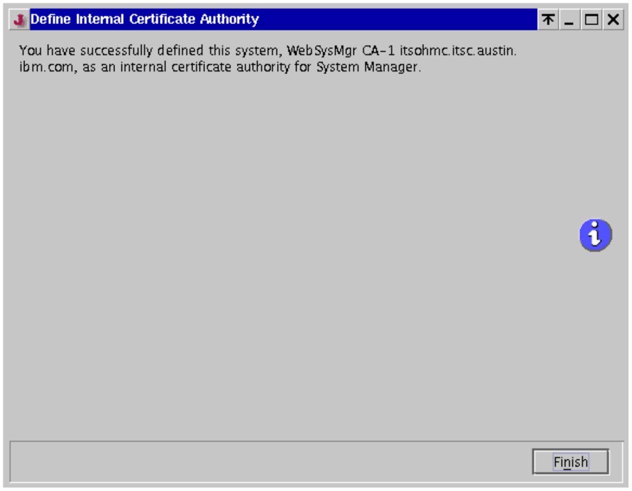
Please enter the password twice for confirmation.

New password: ******

Confirm password: ******

Figure 7-7 Entering password for the CA key ring file

7. The wizard shows the information message shown in Figure 7-8 on page 132. Click **Finish** to close the window.



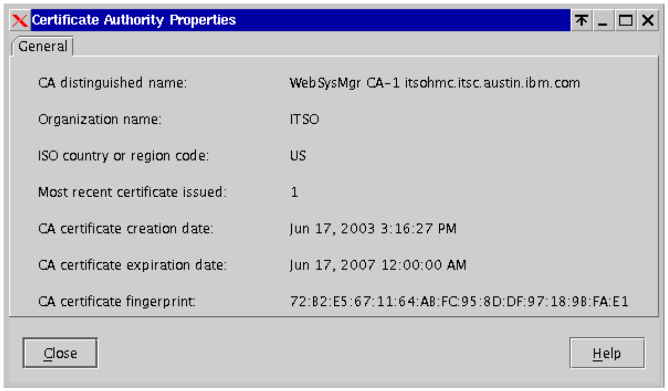
You have successfully defined this system, WebSysMgr CA-1 itsohmc.itsc.austin.ibm.com, as an internal certificate authority for System Manager.

Figure 7-8 CA configured message

Viewing security configuration properties

To confirm server security property, do the following:

1. Expand the System Manager Security folder, then select the Certificate Authority application in the Navigation area.
2. Select the Properties task. A window opens that prompts you to enter the password that was used for creating the private key on the HMC (see Figure 7-7 on page 131). Enter the password, then click **OK**.
3. When the password is verified, the System Security Properties window opens, as shown in Figure 7-9.



CA distinguished name:	WebSysMgr CA-1 itsohmc.itsc.austin.ibm.com
Organization name:	ITSO
ISO country or region code:	US
Most recent certificate issued:	1
CA certificate creation date:	Jun 17, 2003 3:16:27 PM
CA certificate expiration date:	Jun 17, 2007 12:00:00 AM
CA certificate fingerprint:	72:B2:E5:67:11:64:AB:FC:95:8D:DF:97:18:9B:FA:E1

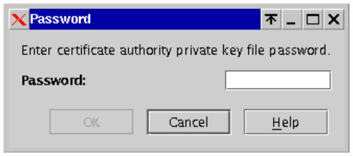
Figure 7-9 Certificate Authority Status

Generating private key ring files for the HMC

To generate private key ring files for the HMC, do the following:

> **Note:** Before selecting this task, a CA is must be configured on the HMC.

1. Expand the System Manager Security folder, then select the Certificate Authority application in the Navigation area.
2. Select the Generate Servers' Private Key Ring Files task.
3. The window shown in Figure 7-10 opens and prompts you to enter the password that was used for creating the private key on the HMC (see Figure 7-7 on page 131). Enter the password, then click **OK**.

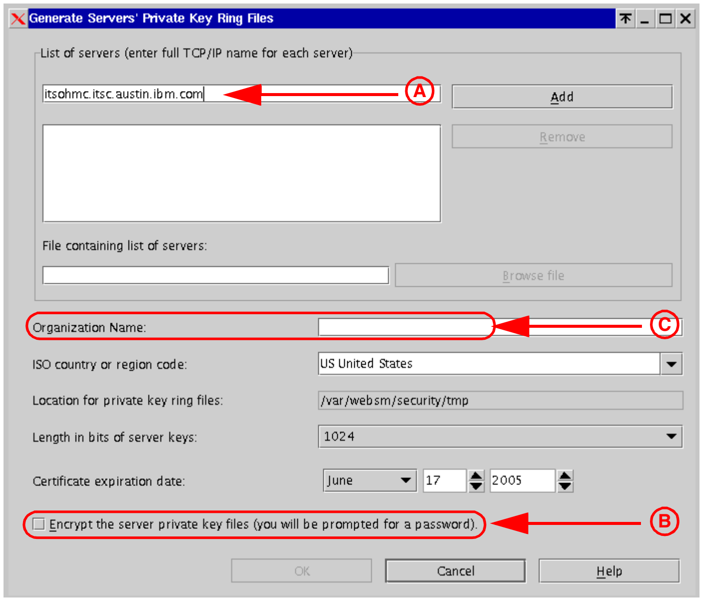


Enter certificate authority private key file password.

Password:

Figure 7-10 Entering certificate authority password

4. The window shown in Figure 7-11 opens. Verify whether the HMC host name is shown correctly in the field indicated by A in Figure 7-11, then click **Add**.



List of servers (enter full TCP/IP name for each server)

itsohmc.itsc.austin.ibm.com

File containing list of servers:

Organization Name:

ISO country or region code: US United States

Location for private key ring files: /var/websm/security/tmp

Length in bits of server keys: 1024

Certificate expiration date: June 17 2005

☐ Encrypt the server private key files (you will be prompted for a password).

Figure 7-11 Generate Servers' Private Key Ring Files

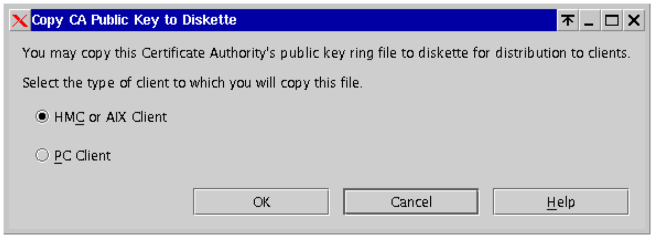
5. Select the check box indicated by B in Example 7-11 on page 133. Again, you will be prompted to enter the password that was used for creating the private key on the HMC. Enter the password twice.
6. Type the appropriate organization name in the field indicated by C in Figure 7-11 on page 133, then click **OK**.
7. An information window is displayed when the key generation has been completed. Click **OK** to close the information window.

Copy the public key ring file to diskette

To copy the public key ring file to the formatted diskette media on the HMC, do the following:

> **Note:** Before selecting this task, the pair of private and public key ring files must be generated on the HMC.

1. Expand the System Manager Security folder, then select the Certificate Authority application in the Navigation area.
2. Select the Copy this Certificate Authority’s Public Key Ring File to diskette task.



Copy CA Public Key to Diskette

You may copy this Certificate Authority's public key ring file to diskette for distribution to clients.

Select the type of client to which you will copy this file.

● HMC or AIX Client

○ PC Client

Figure 7-12 Copy CA Public Key to Diskette

3. The Copy CA Public Key to Diskette window shown in Figure 7-12 opens.
   - If you are going to use the diskette to distribute the public key ring file for remote Web-based System Manager clients on HMC or AIX systems, insert a diskette media. The media does not have to be formatted.
   - If you are going to use the diskette to distribute the public key ring file for remote Web-based System Manager clients on Windows-based PC systems, insert the formatted diskette media.

     To format the diskette media, see “Format Removable Media” on page 116.
4. When you have inserted the diskette media, choose the appropriate selection in Figure 7-12, then click **OK**.

5. An information window is displayed when the copy has been completed. Click **OK** to close the information window.

The public key ring file, SM.pubkr, is now copied from the System Manager Certificate Authority menu to a diskette.

- If you selected “HMC or AIX Client” in step 3, the diskette contains only one file, SM.pubkr, in the tar archive format.
- If you selected “PC Client” in step 3, the diskette contains only one file, SM.pubkr, in the DOS format.

> **Important:** Do not copy the public key file to a network-accessible place, such as on an anonymous ftp server. If a malicious user steals the file, the security mechanism provided by HMC does not block the access from this user.

7.1.3 Server Security

The Server Security application contains the following three tasks (see the Content area shown in Figure 7-13 on page 136).

- View properties for this server

  Use this task to view the security configuration properties on your HMC. See “Viewing security configuration properties” on page 136 to use this task.

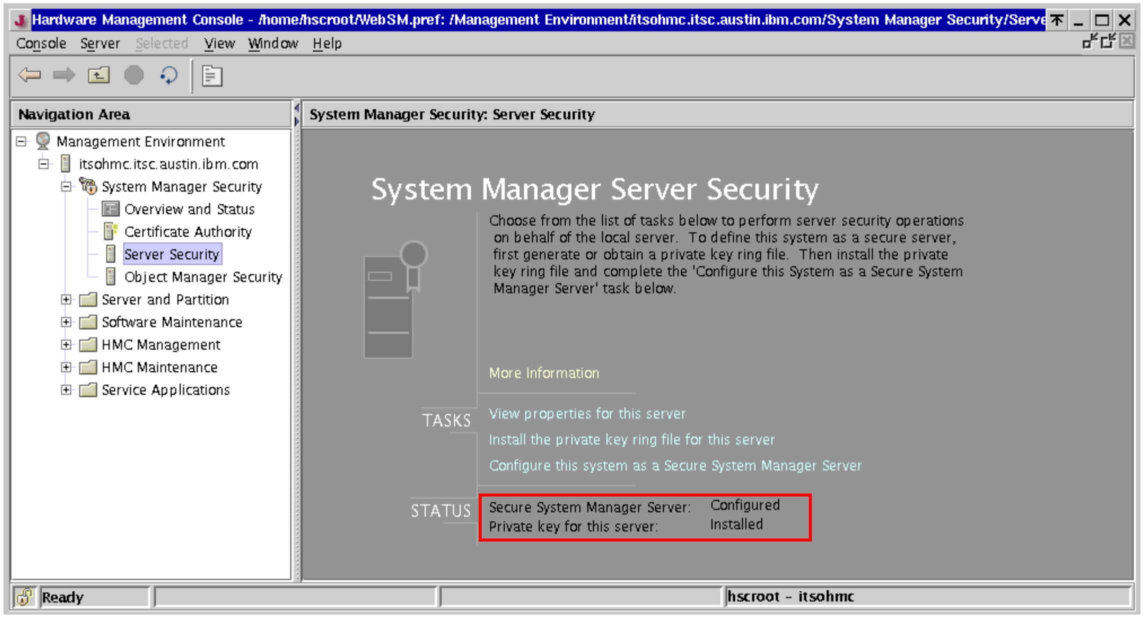
- Install the private key ring file for this server

  Use this task to install the private key ring file on your HMC. See “Install the private key ring file for this server” on page 137 to use this task.

- Configure this system as a Secure System Manager Server

  Use this task to configure the Web-based System Manager server to use the private key ring file to establish a secure network connection using SSL.

  See “Configure this system as a Secure System Manager Server” on page 138 to use this task.



System Manager Server Security

Choose from the list of tasks below to perform server security operations on behalf of the local server. To define this system as a secure server, first generate or obtain a private key ring file. Then install the private key ring file and complete the 'Configure this System as a Secure System Manager Server' task below.

More Information

TASKS

View properties for this server

Install the private key ring file for this server

Configure this system as a Secure System Manager Server

STATUS

Secure System Manager Server: Configured

Private key for this server: Installed

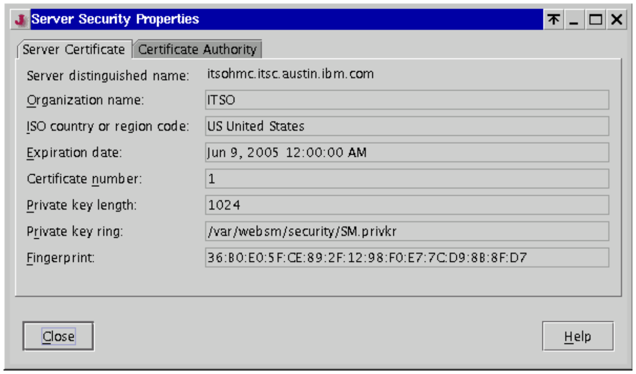
Figure 7-13 Server Security (after being configured)

> **Note:** Before the Server Security is configured, the two status lines highlighted in Figure 7-13 show `Not Configured` and `Not installed` respectively.

Viewing security configuration properties

To confirm server security property, do the following:

1. Expand the System Manager Security folder, then select the Server Security application in the Navigation area.
2. Select the View properties for this server task. The System Security Properties window opens as shown in Figure 7-14 on page 137.



Server distinguished name: itsohmc.itsc.austin.ibm.com

Organization name: ITSO

ISO country or region code: US United States

Expiration date: Jun 9, 2005 12:00:00 AM

Certificate number: 1

Private key length: 1024

Private key ring: /var/websm/security/SM.privkr

Fingerprint: 36:B0:E0:5F:CE:89:2F:12:98:F0:E7:7C:D9:8B:8F:D7

Figure 7-14 Server Security Properties (Server Certificate)

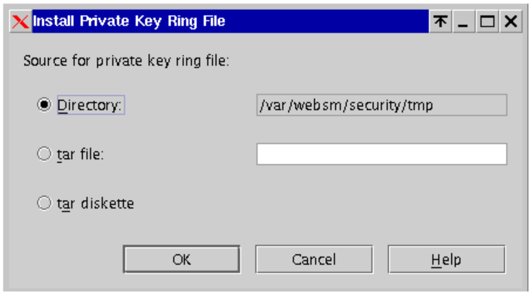
3. Once you have confirmed the properties, click **Close** to close the window.

Install the private key ring file for this server

> **Note:** Before selecting this task, the pair of private and public key ring files must be generated on the HMC.

To install the private key ring file on the HMC, do the following:

1. Expand the System Manager Security folder, then select the Server Security application in the Navigation area.



Source for private key ring file:

● Directory: /var/websm/security/tmp

○ tar file:

○ tar diskette

Figure 7-15 Install Private Key Ring file

2. Select the Install the private key ring file for this server task. The Install Private Key Ring File window opens as shown in Figure 7-15.

   – If you have just generated the pair of private and public key ring files on your HMC ("Generating private key ring files for the HMC" on page 133), select the Directory option, then click **OK**.

- If the private key ring file is stored in a tar archive on the HMC, select the tar file option, and click **OK**. Specify the file name location.
- If you have the backup diskette media that stores the server private key ring file[1], select the tar diskette option, and click **OK**.

3. A window shown in Figure 7-10 on page 133 opens that prompts you to enter a password that was used for creating the private key on the HMC (see Figure 7-7 on page 131). Enter the password, then click **OK**.
4. An information window is displayed once the server configuration has been completed. Click **OK** to close the information window.

Configure this system as a Secure System Manager Server

Note: Before selecting this task, the private key ring file must be installed on the HMC.

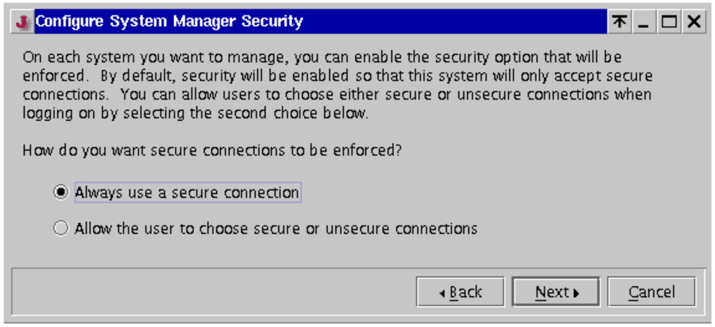
To configure your HMC as a secure system manager server, do the following:

1. Expand the System Manager Security folder, then select the Server Security application in the Navigation area.
2. Select the Configure this system as a Secure System Manager Server task.
3. The Configure System Manager Security wizard window opens. Click **Next**.
4. The wizard prompts you to select either of the following options, as shown in Figure 7-16 on page 139:
   - Always use a secure connection

     Select this option if you wish to disallow unsecure connection from remote Web-based System Manager clients to the HMC.
   - Allow the user to chose secure or unsecure connections

     Select this option if you have decided to let users select either secure or unsecure connection from their from remote Web-based System Manager clients to the HMC.

[1] You can back up the server private key file using the “Copy Servers’ Private Key Ring Files to diskette” task provided in the Certificate Authority application.



On each system you want to manage, you can enable the security option that will be enforced. By default, security will be enabled so that this system will only accept secure connections. You can allow users to choose either secure or unsecure connections when logging on by selecting the second choice below.

How do you want secure connections to be enforced?

● Always use a secure connection

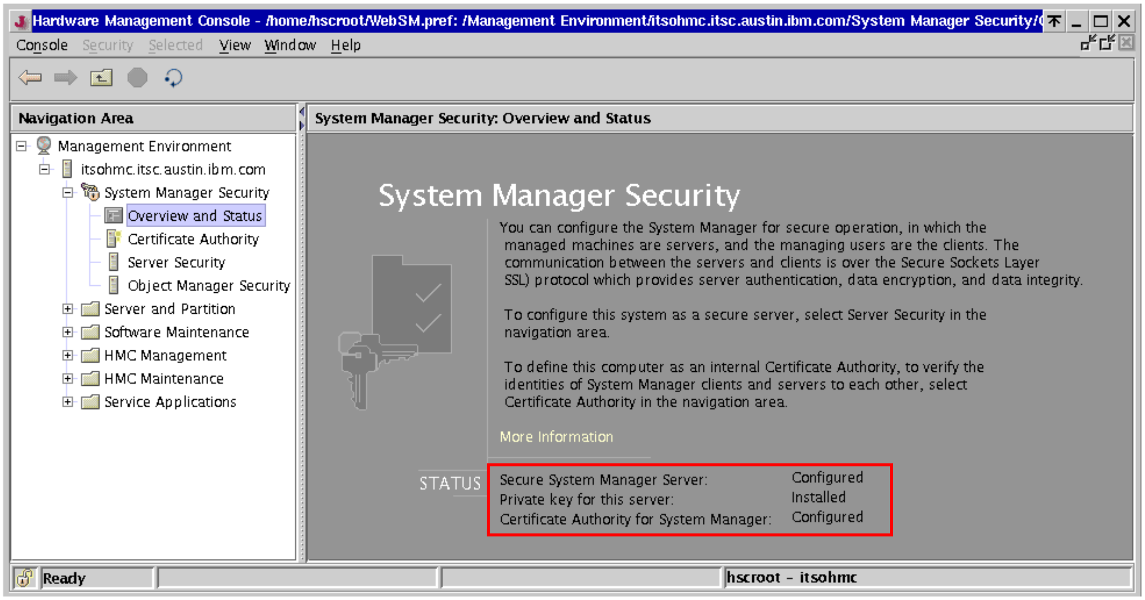
○ Allow the user to choose secure or unsecure connections

Figure 7-16 Configure System Manager Security

5. Select the appropriate option depending on the security requirement in your network environment, and click **Next**.
6. An information window is displayed when the security configuration change has completed. Click **OK** to close the information window.

7.1.4 Overview and Status

The Overview and Status application does not contain any task.s. If the application is selected, it simply displays the current security configuration as highlighted in Figure 7-17.



System Manager Security

You can configure the System Manager for secure operation, in which the managed machines are servers, and the managing users are the clients. The communication between the servers and clients is over the Secure Sockets Layer SSL) protocol which provides server authentication, data encryption, and data integrity.

To configure this system as a secure server, select Server Security in the navigation area.

To define this computer as an internal Certificate Authority, to verify the identities of System Manager clients and servers to each other, select Certificate Authority in the navigation area.

STATUS

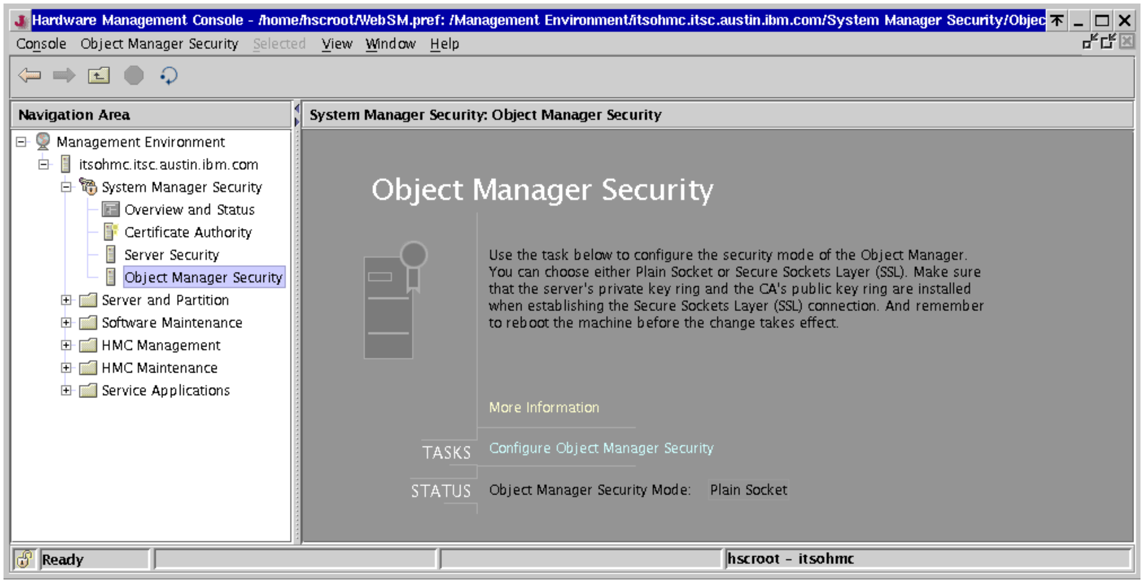
Secure System Manager Server:	Configured
Private key for this server:	Installed
Certificate Authority for System Manager:	Configured

Figure 7-17 Overview and Status (after being configured)

Note: Before configuration, the three status lines highlighted in Figure 7-17 on page 139 show `Not Configured`, `Not Installed`, and `Not Configured`.

7.1.5 Object Manager Security

The Object Manager Security application contains only one task, Configure Object Manager Security, which is used to select the Object Manager security mode between the HMC and a CSM[2] managing server (see Figure 7-18).

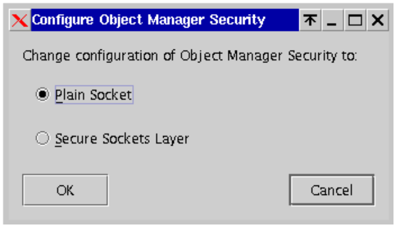


Use the task below to configure the security mode of the Object Manager. You can choose either Plain Socket or Secure Sockets Layer (SSL). Make sure that the server's private key ring and the CA's public key ring are installed when establishing the Secure Sockets Layer (SSL) connection. And remember to reboot the machine before the change takes effect.

Object Manager Security Mode: Plain Socket

Figure 7-18 Object Manager Security

If the task is selected, another window shown in Figure 7-19 opens to select the Object Manager security mode. Select one of the security modes, then click **OK** to close the window.



Change configuration of Object Manager Security to:

● Plain Socket

○ Secure Sockets Layer

Figure 7-19 Configure Object Manager Security

[2] Cluster Systems Management

Note: After changing the security mode, the HMC must be rebooted for the change to take effect.

For further information about CSM, refer to the following publications:

- *IBM Cluster Systems Management for AIX 5L, Planning and Installation Guide*, SA22-7919
- *IBM Cluster Systems Management for AIX 5L, Administration Guide*, SA22-7918

7.2 Remote client setup on a Windows system

The remote Web-based System Manager client[3] can be installed from the HMC by accessing specific URLs[4] using a Web browser on your Windows-based PC.

If you are planning to use the remote client on a PC with Microsoft Windows installed, the OS must be one of the following operating systems:

- Microsoft Windows NT
- Microsoft Windows 2000
- Microsoft Windows XP

In addition, the PC should have the following hardware resources:

- 150 MB of free disk space on the default drive for temporary use during the installation procedure
- 150 MB of free disk space on the drive that you plan to use to install the remote client
- PC processor speed of at least 800 MHz
- A minimum of 256 MB of memory (512 MB recommended)

It is strongly recommended that you configure a secure network connection between your remote clients and the HMC using the SSL protocol. To configure the security configuration on the HMC, see 7.1.1, “Configuration steps to set up secure system manager server” on page 127.

Note: To use SSL with the remote client, you must install the remote client security package in addition to the Web-based System Manager client.

[3] The Web-based System Manager client package contains the Java runtime environment.

[4] While the web server process is always running on the HMC, access to the TCP port 80 is denied in all cases except for access to the specific URLs.

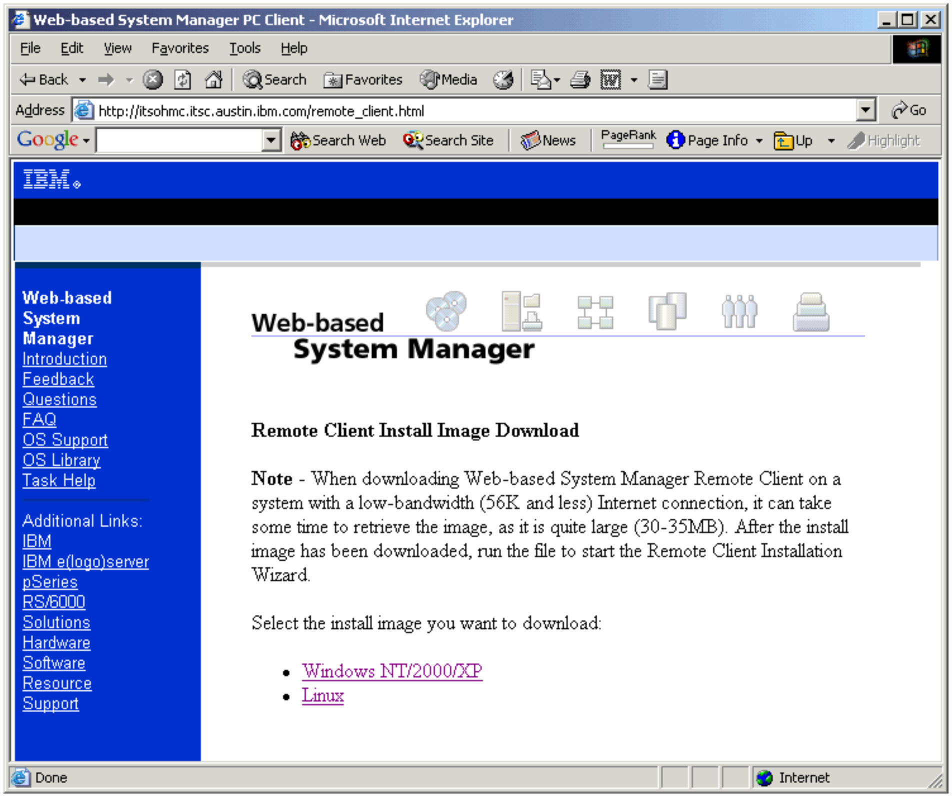
7.2.1 Install a remote client on a Windows system

To install a remote client on a Microsoft Windows system:

1. Uninstall any previous version of Web-based System Manager remote client. For more information, see 7.2.2, “Uninstall a remote client from a Windows system” on page 143.
2. Type the following address in your machine’s Web browser:

   ```
   http://host_name/remote_client.html
   ```

   Where *host_name* is the host name of the HMC. You will see the remote client install image download page as shown in Figure 7-20.


Web-based System Manager PC Client - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://itsohmc.itsc.austin.ibm.com/remote_client.html
Go
Google Search Web Search Site News PageRank Page Info Up Highlight
IBM.
Web-based System Manager
Introduction
Feedback
Questions
FAQ
OS Support
OS Library
Task Help
Additional Links:
IBM
IBM e(logo)server
pSeries
RS/6000
Solutions
Hardware
Software
Resource
Support
Web-based System Manager
Done
Internet

Remote Client Install Image Download

Note - When downloading Web-based System Manager Remote Client on a system with a low-bandwidth (56K and less) Internet connection, it can take some time to retrieve the image, as it is quite large (30-35MB). After the install image has been downloaded, run the file to start the Remote Client Installation Wizard.

Select the install image you want to download:

- Windows NT/2000/XP
- Linux

Figure 7-20 Remote client install image download

3. Click the **Windows NT/2000/XP** link shown in Figure 7-20 to download the setup.exe file to your machine.
4. Run the setup.exe file to begin the installation process.
5. When the Remote Client Installer panel opens, click **Next** to continue.

6. To install using the default location, click **Next**. Otherwise, type the desired location and click **Next**.
7. A confirmation panel opens, showing you the installation location, the package being installed, and the approximate size of the installation package. Click **Next** to start the installation. If any of the information shown is incorrect, click **Back** to make corrections.
8. A status panel displays a message that says that the installation completed successfully or error messages if errors occurred during the installation. Click **Finish** to close the panel.

7.2.2 Uninstall a remote client from a Windows system

To uninstall a remote client from a Microsoft Windows system, do the following:

1. From the taskbar, select **Start** → **Settings** → **Control Panel**.
2. In the Control Panel, double-click the **Add/Remove Programs** icon. Select **Web-based System Manager Remote Client** from the list of programs on the Install/Uninstall tab, then click **Add/Remove** to start the Uninstall wizard.
3. Click **Next** in the initial panel.
4. Click **Next** in the Confirmation panel to uninstall the remote client.

   A status panel opens showing either that the uninstallation completed successfully or error messages if errors occurred during the uninstallation. Click **Finish** to close the panel.

7.2.3 Install remote client security on a Windows system

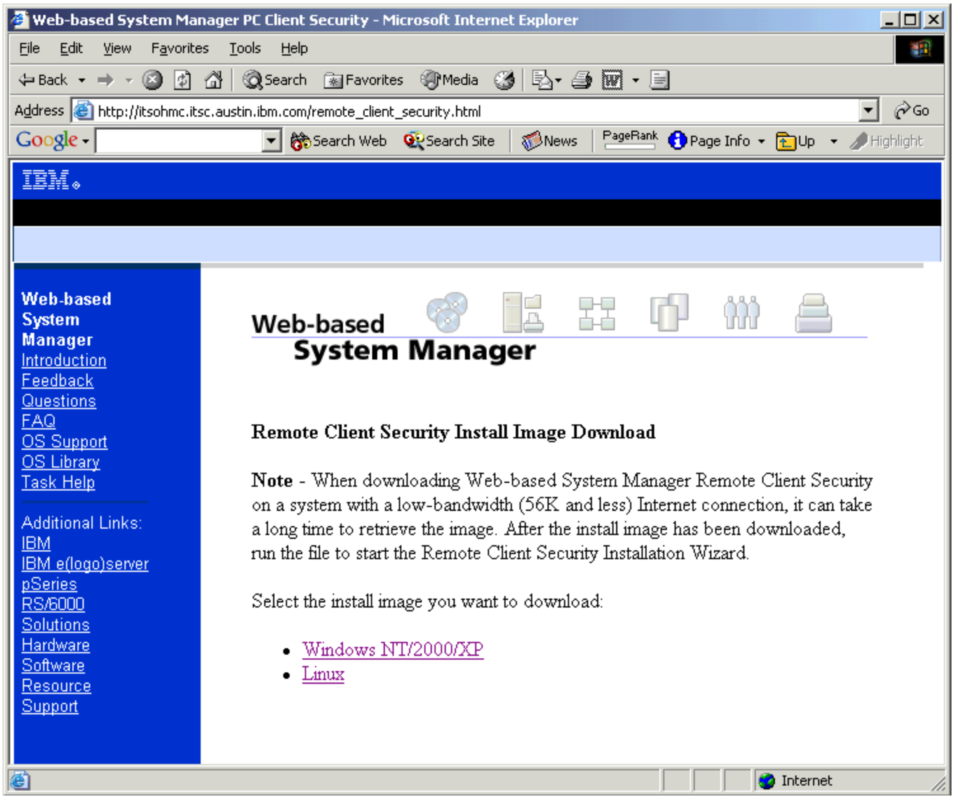
Note: The Web-based System Manager client must be installed before installing remote client security.

To install remote client security on the Microsoft Windows system, do the following:

1. Type the following Web address into your machine's Web browser:

   ```
   http://host_name/remote_client_security.html
   ```

   Where *host_name* is the host name of the HMC. You will see the remote client security install image download page, as shown in Figure 7-21 on page 144.


Web-based System Manager PC Client Security - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://itsohmc.itsc.austin.ibm.com/remote_client_security.html
Go
Google Search Web Search Site News PageRank Page Info Up Highlight
IBM
Web-based System Manager
Introduction
Feedback
Questions
FAQ
OS Support
OS Library
Task Help
Additional Links:
IBM
IBM e(logo)server
pSeries
RS/6000
Solutions
Hardware
Software
Resource
Support
Web-based System Manager
Internet

Remote Client Security Install Image Download

Note - When downloading Web-based System Manager Remote Client Security on a system with a low-bandwidth (56K and less) Internet connection, it can take a long time to retrieve the image. After the install image has been downloaded, run the file to start the Remote Client Security Installation Wizard.

Select the install image you want to download:

- Windows NT/2000/XP
- Linux

Figure 7-21 Remote client security install image download

2. Click the **Windows NT/2000/XP** link shown in Figure 7-21 to download the setupsec.exe file to your machine.
3. Run the setupsec.exe file to begin the installation process.
4. When the Remote Client Security Installer panel opens, click **Next** to continue.
5. To install using the default location, click **Next**. Otherwise, type the desired location and click **Next**.

> **Note:** The location you select in this step must be the same location you selected in 7.2.1, “Install a remote client on a Windows system” on page 142.

6. A confirmation panel opens showing the installation location, the package being installed, and the approximate size of the installation package. Click

Next to start the installation. If any of the information shown is incorrect, click b to make corrections.

A status panel displays a message that says that the installation completed successfully or showing error messages if an error occurred during the installation. Click **Finish** to close the panel.

7.2.4 Uninstall remote client security from a Windows system

To uninstall remote client from a Microsoft Windows system, do the following:

1. From the taskbar, select **Start** → **Settings** → **Control Panel**.
2. In Control Panel, double-click the **Add/Remove Programs** icon.
3. Select **Remote Client Security** from the list of programs on the Install/Uninstall tab, then click **Add/Remove** to start the Uninstall wizard.
4. Click **Next** in the initial panel.
5. Click **Next** in the Confirmation panel to uninstall remote client security.

   A status panel opens showing either that the installation completed successfully or any messages if errors occurred during the installation. Click **Finish** to close the panel.

7.3 Remote client setup on a Linux system

The remote Web-based System Manager client[5] can be installed from the HMC by accessing specific URLs[6] using a Web browser on your Linux-based PC.

If you are planning to use the remote client on a PC installed with Linux, one of the following operating systems must be installed on your PC:

- Red Hat Release 7.2
- Red Hat Release 7.3

In addition, the PC should have the following hardware resources:

- 150 MB of free disk space on the default drive for temporary use during the installation procedure
- 150 MB of free disk space on the drive that you plan to use to install the remote client
- PC processor speed of at least 800 MHz

[5] The Web-based System Manager client package contains the Java runtime environment.

[6] While the Web server process is always running on the HMC, access to the TCP port 80 is denied in all cases except for access to the specific URLs.

- A minimum of 256 MB of memory (512 MB recommended)

It is strongly recommended to configure a secure network connection between your remote clients and the HMC using the SSL protocol. To configure the security configuration on the HMC, see 7.1, “System Manager Security” on page 126.

> **Note:** To use SSL with the remote client, you must install the remote client security package in addition to the Web-based System Manager client.

7.3.1 Install a remote client on a Linux system

To install a remote client on a Linux system, do the following:

1. Uninstall any previous version of the remote client on your machine. For more information, see 7.3.2, “Uninstall a remote client from a Linux system” on page 147.
2. Type the following address in your machine’s Web browser:

   ```
   http://host_name/remote_client.html
   ```

   Where *host_name* is the host name of the HMC. You will see the remote client install image download page as shown in Figure 7-20 on page 142.

3. Click the **Linux** link shown in Figure 7-20 on page 142 to download the wsmlinuxclient.exe file to your machine.
4. Run the wsmlinuxclient.exe file to begin the installation process. If the file does not run, modify the permissions on the file so that you have execute permissions. At a command prompt, type the following:

   ```
   # chmod 755 wsmlinuxclient.exe
   ```

5. When the Remote Client Installer panel opens, click **Next** to continue.
6. To install using the default location, click **Next**. Otherwise, type the desired location and click **Next**.
7. A confirmation panel opens showing the installation location, the package being installed, and the approximate size of the installation package. Click **Next** to start the installation. If any of the information shown is incorrect, click **Back** to make corrections.

   A status panel displays either a message that says that the installation completed successfully or error messages if errors occurred during the installation. Click **Finish** to close the panel.

Note: If changes do not take effect immediately, either log out of your current session and log in again, or read the /etc/profile file again by issuing:

```
# . /etc/profile
```

7.3.2 Uninstall a remote client from a Linux system

To uninstall a remote client from a Linux system, run the following command:

```
installdir/_uninst/uninstall
```

Where installdir is the name of the directory in which your remote client resides.

7.3.3 Install remote client security on a Linux system

To install remote client security on a Linux system, do the following:

Note: The Web-based System Manager client must be installed before installing the remote client security.

1. Uninstall any previous version of remote client security on your machine. For more information, see 7.3.2, “Uninstall a remote client from a Linux system” on page 147.
2. Type the following address in your machine’s Web browser:

   ```
   http://host_name/remote_client_security.html
   ```

   Where *host_name* is the host name of the HMC.
3. Click the **Linux** link shown in Figure 7-21 on page 144 to download the setupsecl.exe file to your machine.
4. Run the setupsecl.exe file to begin the installation process. If the file does not run, modify the permissions on the file so that you have execute permissions. At a command prompt, type the following:

   ```
   chmod 755 setupsecl.exe
   ```
5. When the Remote Client Security Installer panel opens, click **Next** to continue.
6. To install using the default location, click **Next**. Otherwise, type the desired location and click **Next**.

   Note: Be sure that the location you designate is the same location you selected in 7.3.1, “Install a remote client on a Linux system” on page 146.

7. A confirmation panel opens showing the installation location, the package being installed, and the approximate size of the installation package. Click **Next** to start the installation. If any of the information shown is incorrect, click **Back** to make corrections.

   A status panel displays a message that either says that the installation completed successfully or shows error messages if errors occurred during the installation. Click **Finish** to close the panel.

   Note: If changes do not take effect immediately, either log out of your current session and log in again, or read the /etc/profile file by issuing:

   ```
   # . /etc/profile
   ```

7.3.4 Uninstall remote client security from a Linux system

To uninstall the remote client security from a Linux system, run the following command:

```
installdir/_uninstssl/uninstallssl
```

Where installdir is the name of the directory in which your remote client resides.

7.4 Remote access to the HMC graphical user interface

This section explains how to use the remote client on Windows and AIX systems to remotely access the HMC graphical user interface.

To secure the connection between client and server, you should configure the secure communication using the HMC System Manager Security application on the HMC (see 7.1, “System Manager Security” on page 126). It provides the Secure Socket Layer (SSL) encrypted communication path between the client and the server.

Note: While using the remote Web-based System Manager client, the menu (**Help** → **About**) tells you the software version of the Web-based System Manager client software you are using currently, not the software release level on the HMC. To use the remote Web-based System Manager client to confirm the software release level on the HMC, select **Software Maintenance** → **HMC** (see Figure 6-3 on page 110).

7.4.1 Using the remote client on Windows systems

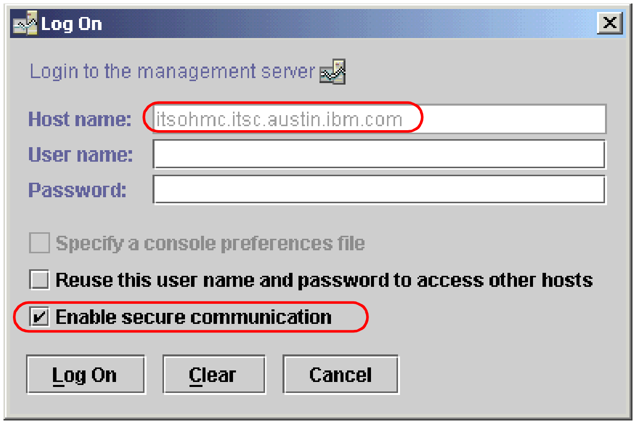
To access the remote HMC using the Web-based System Manager client installed on Windows systems, do the following:

1. To connect to the HMC using SSL, copy the public key ring file (SM.pubkr) into the C:\Program Files\WebSM\codebase directory using the diskette media.

> **Note:** The public key ring file must be created and copied to the diskette media on the HMC beforehand (see “Copy the public key ring file to diskette” on page 134.

2. Invoke the Web-based System Manager client application by double-clicking the following icon on the desktop.

If the Web-based System Manager client application is successfully invoked, you will see the Log On dialog box shown in Figure 7-22.



Login to the management server

Host name: itsohmc.itsc.austin.ibm.com

User name:

Password:

□ Specify a console preferences file

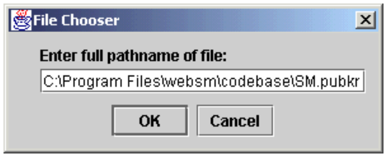
□ Reuse this user name and password to access other hosts

☑ Enable secure communication

Figure 7-22 Web-based Sysyem Manager Windows client Log On dialog box

3. Enter the host name or the IP address in the text field highlighted in Figure 7-22, and press the Tab key to move the cursor to the User name field.

4. Select the “Enable secure communication” check box in Figure 7-22 on page 149, if you wish to connect to the HMC using SSL. This check box is selectable only if the following are satisfied:
   - The target HMC is configured for the SSL communication.
   - The remote client security package is already installed on your client workstation.
5. After the host name has been validated, enter the user name (hscroot) and password in the Log On dialog box. Click **Log On**.
6. If you select the “Enable secure communication” check box the first time, you are prompted to specify the public key ring file path name as in Figure 7-23.


File Chooser

Enter full pathname of file:

C:\Program Files\websm\codebase\SM.pubkr

Figure 7-23 File Chooser dialogue box

Note: This dialog appears only in the first SSL connection attempt to the HMC.

When the user name and password you supplied is authenticated by the HMC, the connection is established successfully. You see the HMC graphical user interface in the Web-based System Manager client application with the HMC host name displayed in the window title, Navigation area, and the status bar, as highlighted in Figure 7-24 on page 151.

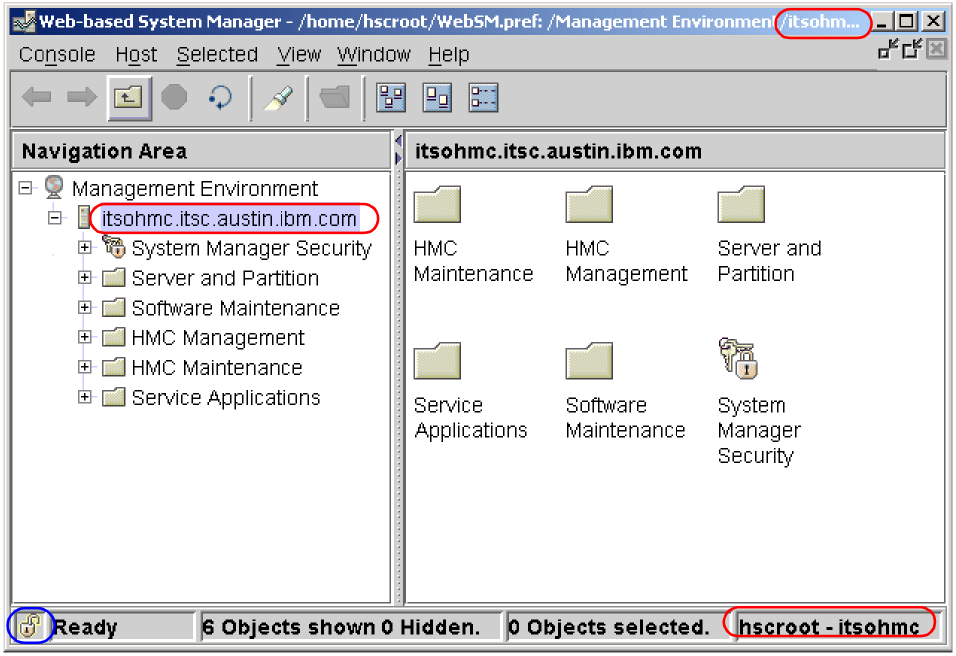


Figure 7-24 Web-based System Manager Windows client managing the HMC

If you have connected with SSL, the padlock icon at the bottom-left corner in Figure 7-24 will be *locked* as shown in Figure 7-25.

Figure 7-25 The locked keypad icon (SSL connection)

7.4.2 Using the remote client on AIX systems

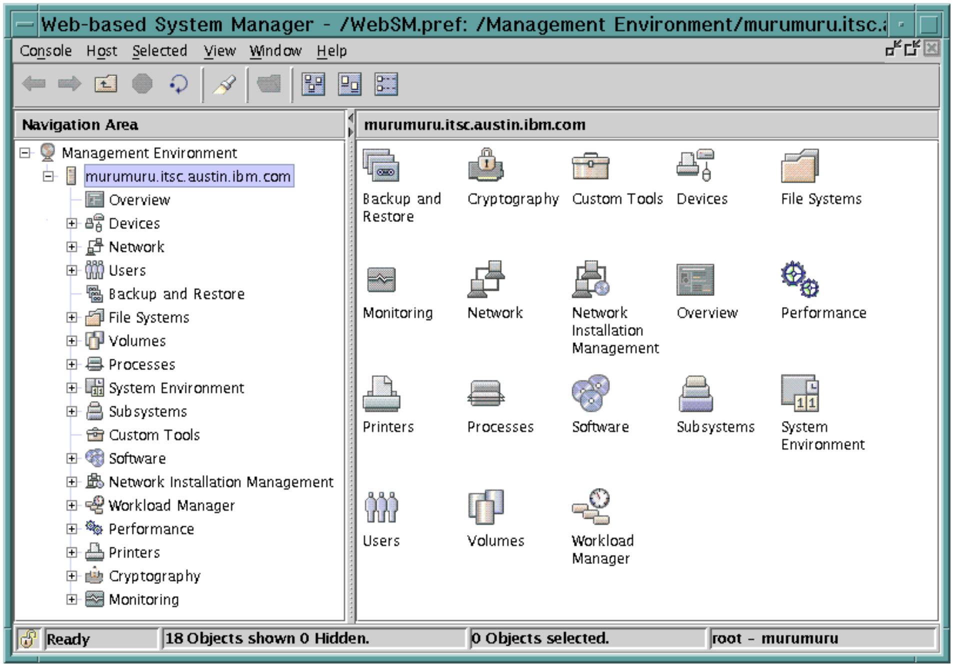
On AIX, if the system is equipped with a graphics adapter, the Web-based System Manager is installed by default. For information about the configuration of Web-based System Manager, refer to *AIX 5L Version 5.2 System Management Guide: AIX 5L Version 5.2 Web-based System Manager Administration Guide*.

Note:

- To use the Web-based System Manager client installed on an AIX system, the X window process must be running on the system.
- The step in this section does not explain how to configure and use the Web-based System Manager with SSL on AIX.

To access the remote HMC using the Web-based System Manager client installed on AIX systems, do the following:

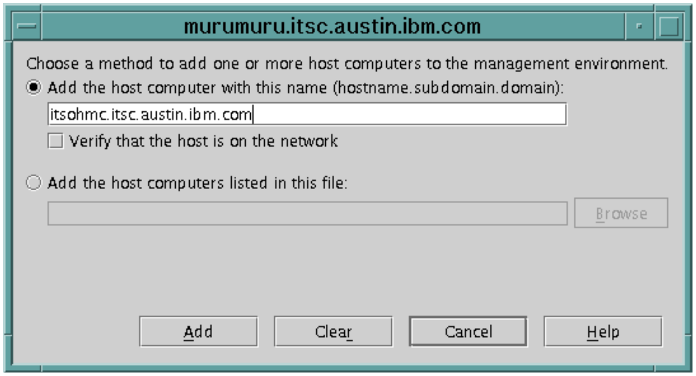
1. Type **wsm** at the command prompt to launch the Web-based System Manager managing the AIX system, as shown in Figure 7-26.



Ready | 18 Objects shown 0 Hidden. | 0 Objects selected. | root - murumuru

Figure 7-26 Web-based System Manager on AIX 5L Version 5.2

2. Select **Console** → **Add** → **Hosts…** from the menu bar to open the dialog box shown in Figure 7-27.



Choose a method to add one or more host computers to the management environment.

● Add the host computer with this name (hostname.subdomain.domain):

itsohmc.itsc.austin.ibm.com

□ Verify that the host is on the network

○ Add the host computers listed in this file:

Figure 7-27 Add a host dialog box

3. Type the HMC host name or IP address in the text field. Click **Add**.
4. The added HMC will be shown in the Navigation Area of Web-based System Manager as shown in Figure 7-28.

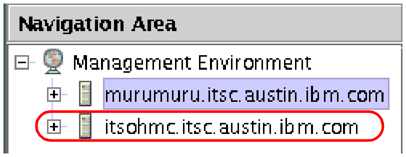
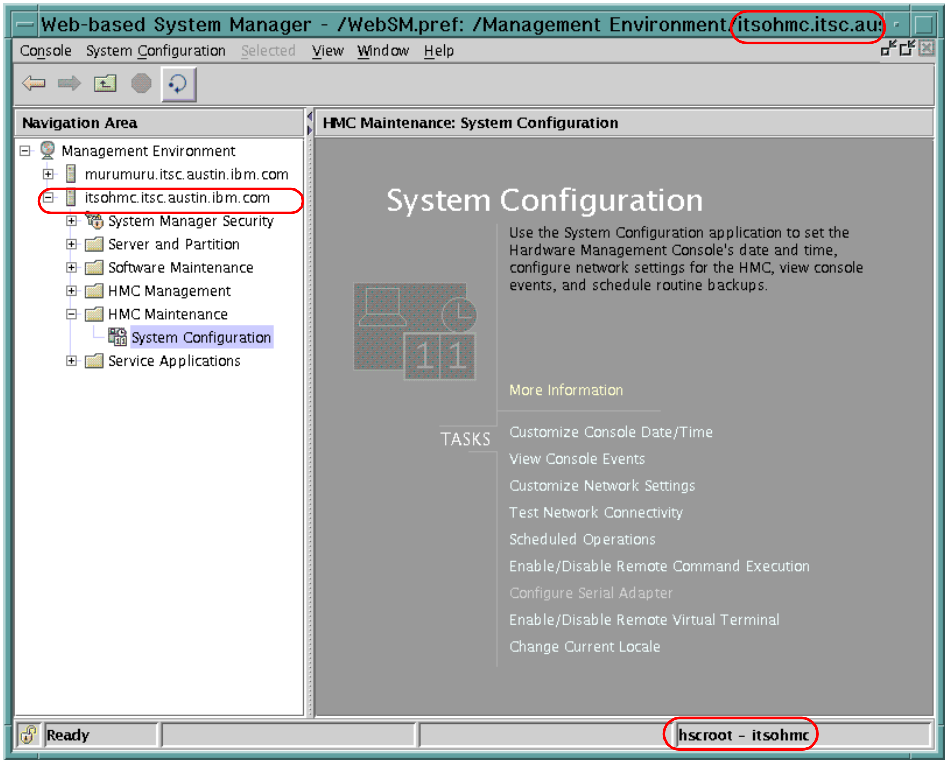


Figure 7-28 Remote HMC is shown in the Navigation Area

5. Click the icon representing the HMC to open the Log On dialog box.
6. Enter the host name or the IP address in the text field.
7. After the host name has been validated, enter the **User name** (hscroot) and **Password** in the Log On dialog box. Click **Log On**.

When the user name and password you supplied is authenticated by the HMC, the connection is established successfully and you see the HMC graphical user interface in the Web-based System Manager client application shown in Figure 7-29 on page 154. The HMC host name will be displayed in the window title, Navigation area, and the status bar, as highlighted in Figure 7-29 on page 154.



Use the System Configuration application to set the Hardware Management Console's date and time, configure network settings for the HMC, view console events, and schedule routine backups.

Figure 7-29 Managing HMC from the Web-based System Manager on AIX

Using command line options of wsm

The **wsm** command on AIX has the following command line syntax:

```
$ wsm -?
USAGE: wsm      [-host    <host name of managing machine>]
                [-port    <inetd port>]
                [-profile <pathname of wconsole.pref file>]
                [-user    <login name>]
```

Therefore, you can quickly connect to the HMC if you invoke this command:

```
$ wsm -host host_name -user hscroot
```

Use your HMC’s host name or IP address for *host_name*.

8

Secure networking in a partitioned environment

This chapter discusses how to plan and implement a secure network in a partitioned environment where your HMC and managed systems are installed. It includes the following sections:

> **Note:** Throughout this chapter, the host name resolution for the network interfaces of the HMC and partition follows the network planning rules explained in Appendix , “Trouble-free network planning rules” on page 312.

8.1 Networking in a partitioned environment

Unlike the IBM RS/6000® SP™ control workstation, an HMC does not have to be in the same broadcast domain as the partitions that it manages. This is because the HMC, as opposed to the control workstation, does not participate in the network boot process.[1]

An HMC does not even have to be on the same network segment as a partition that it manages, as long as they can reach each other via IP routing. A partition must be IP-accessible for the following functions to be supported:

- DLPAR operations

  For detailed information about the DLPAR operations, refer to *The Complete Partitioning Guide for IBM @server pSeries Servers*, SG24-7039.

- Service functions, such as Service Focal Point and Inventory Scout

  See Chapter 11, "Service functions on the HMC" on page 247.

These operations and services rely on the secure and reliable connection channel, which is established and provided by Resource Monitoring and Control (RMC) over the TCP/IP network between the HMC and partitions.

The HMC performs many of its management functions using the serial network connecting it to the service processors on its managed systems. This usually means that the HMC is physically located within 15 meters (50 feet) of the servers it manages. Most often, the HMC will be located in a machine room, possibly with restricted access. This can make systems management at the HMC itself somewhat inconvenient.

Note: If the distance solution (see "Distance solution" on page 29) is used, the distance from the HMC to the managed system can be extended up to 315 meters (1050 feet).

The physical placement of the HMC becomes irrelevant if the systems administrator is using a remote user interfaces, such as the Web-based System Manager client (see Chapter 7, "Secure remote GUI access to the HMC" on page 125) or the secure shell (see 9.1, "Secure remote connection to the HMC" on page 176). In the following sections, we describe how to implement a secure network configuration in a partitioned environment.

[1] The network boot process using the BOOTP protocol is used when AIX is installed over the network using Network Installation Manager (NIM).

8.2 Network paths in a partitioned environment

There are many possible network configurations in a partitioned environment, but in our discussion we focus on those shown in Table 8-1 and address their various security requirements.

Table 8-1 Network paths in a partitioned environment

Path name (notation in Figure 8-1)	Relevant section number
HMC to partitions (A)	8.2.1
Administrative workstation to HMC (B)	8.2.2
Administrative workstation to partition (C)	8.2.3
HMC access to the enterprise network (D)	8.2.4
Partition access to the enterprise network (E)	Note
Note: A customer will need to determine how much access is appropriate between a partition and a corporate enterprise network or the Internet. However, that topic and the network connection shown as E in Figure 8-1 is not discussed in this book.	

The administrative workstation is defined as a workstation that is installed with both the secure shell and remote Web-based System Manager clients. The operating system[2] of the administrative workstation can be AIX, Linux, or Microsoft Windows.

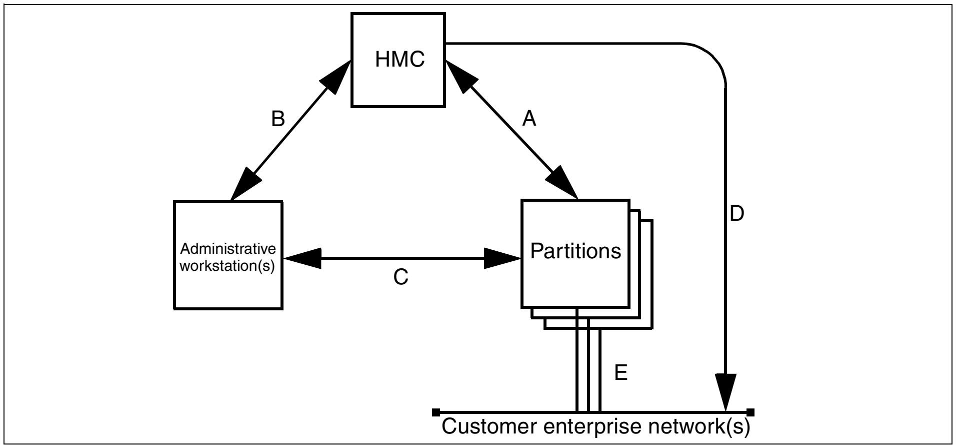


Figure 8-1 Network paths in a partitioned environment

[2] See Chapter 7, "Secure remote GUI access to the HMC" on page 125, for the operating systems that support the remote Web-based System Manager client.

8.2.1 HMC to partitions

The network connectivity allowed between an HMC and its managed partitions is a customer decision, but it is desirable to have network access restricted for most production partitions. Port filtering through an IP router is one way to restrict network access between those partitions and the HMC to protect it against attack. At a minimum, for DLPAR operations and Service Applications to work, bidirectional TCP and UDP traffic must be open on port 657. If there are security concerns, all other TCP and UDP traffic could be disallowed without affecting the HMC's function.

Table 8-2 shows the ports that should be open on the network path indicated by A in Figure 8-1 on page 157.

> **Note:** We are assuming that remote access to partitions for the system administration purpose will be made from the administrative workstation, not from the HMC as we will explain in 8.2.3, "Administrative workstation to partition" on page 161.

Table 8-2 Required TCP and UDP ports (HMC to partitions)

From	Source port number/protocol	To host	Destination port number/protocol	Application
HMC	657/TCP	Partitions	657/TCP	Resource Monitoring and Control[1]
HMC	657/UDP	Partitions	657/UDP	Resource Monitoring and Control
Partitions	657/TCP	HMC	657/TCP	Resource Monitoring and Control[1]
Partitions	657/UDP	HMC	657/UDP	Resource Monitoring and Control
HMC	1024-65535/ TCP	Partitions	808/TCP	Inventory Scout[2]

The following notes apply to Table 8-2:

1. If the HMC software Release 3, Version 2 or later is used, the HMC tries to establish a Resource Monitoring and Control connection path with AIX partitions using the UDP 657 port. If the target AIX partition does not support the UDP 657 port, the TCP 657 port is used. Resource Monitoring and Control support UDP 657 on the following operating systems and software release levels:
   - AIX 5L Version 5.1 with 5100-03 Recommended Maintenance Level and later

- AIX 5L Version 5.2 with 5200-01 Recommended Maintenance Level and later
- If the HMC software Release 3, Version 1 and earlier is used, the HMC always uses TCP 657 port to communicate with AIX partitions

2. On systems installed with earlier software levels, Inventory Scout required that TCP port 808 be open. If an AIX partition supports the Inventory Scout automatic configuration, then the TCP port 808 does not have to be open (see 11.2.1, "Inventory Scout Configuration" on page 250 for the required software levels to support the Inventory Scout automatic configuration).

> **Note:** It is recommended that the latest maintenance level be applied for each AIX version being used in a partition.

8.2.2 Administrative workstation to HMC

The HMC supports the following three remote access methods:

Access from remote Web-based System Manager clients

As explained in 7.4, "Remote access to the HMC graphical user interface" on page 148, remote Web-based System Manager clients can connect to the HMC. The connection process is explained as follows:

1. On the HMC, the Web-based System Manager server process (wsmserver) listens on TCP port 9090 for a connection request from a remote client.
2. Before establishing a session, wsmserver opens two TCP ports, one for receiving and another for sending data between the client and itself. The source TCP ports on the client are randomly selected.

   On the HMC loaded with the software level Release 3 Version 2 and later, only 10 ports within the port range of 30000-30009 are used for wsmserver, therefore the number of concurrent remote client sessions is limited to five.[3]

> **Note:** The same process is performed regardless of the use of the SSL protocol.

Remote access to the virtual terminal

You can access the virtual terminal from the remote Web-based System Manager client, if it is enabled as explained in 4.2.9, "Enable/Disable Remote Virtual Terminal" on page 97.

[3] If HMC software earlier than Release 3 Version 2 is being used, this restriction does not apply.

Although it is convenient for the system administration purpose, we have decided to not enable this method to implement a secure network configuration in a partitioned environment, since a typed user password is transmitted over the network without being encrypted.

Remote access using either rexec or ssh facility

You can access the command line interface from remote clients using either the rexec facility or the ssh facility, if it is enabled as explained in 4.2.7, "Enable/Disable Remote Command Execution" on page 95.

- The rexec facility

  Because the rexec facility transmits data unencrypted over the network and its authentication mechanism is widely considered weak, we have decided not to enable this facility.

- The ssh facility

  If enabled, the sshd daemon process listens on TCP port 22 on the HMC. See 9.1, "Secure remote connection to the HMC" on page 176 for detailed information.

Table 8-3 shows the ports that should be open on the network path indicated by B in Figure 8-1 on page 157.

Table 8-3 Required TCP ports (Administrative workstation to HMC)

From	Source port number/protocol	To	Destination port number/protocol	Application
Admin WS	1024-65535 /TCP	HMC	22/TCP	secure shell
Admin WS	1024-65535 /TCP	HMC	9090/TCP	Web-based System Manager initial connection
Admin WS	1024-65535 /TCP	HMC	30000-30009/TCP	Web-based System Manager communication
Admin WS	1024-65535 /TCP	HMC	80/TCP	Web server

Note: The web server process running on the HMC refuses all the connection requests except for the specific URLs to be used for the Web-based System Manager client image download purpose. To confirm these URLs, see the following sections:

- 7.2, "Remote client setup on a Windows system" on page 141
- 7.3, "Remote client setup on a Linux system" on page 145

8.2.3 Administrative workstation to partition

In our secure network planning, it is assumed that all remote access to partitions for system administration purposes are made from an administrative workstation. An administrative workstation is a separate computer system other than the HMC or partitions installed in a partitioned environment. Although the administrative workstation can be placed on the same network segment as the HMC, it should be placed on a separate network segment to have more secure network configuration.

The system administration tasks on AIX partitions include the following:

- Hardware problem determination, diagnostics
- Software maintenance
- User management
- Necessary user intervention before and after the DLPAR operation for I/O resources

To satisfy the requirement, the following remote access methods should be enabled on AIX partitions from the administrative workstation:

- Secure shell
- Remote Web-based System Manager access

> **Note:** It is recommended that you configure the secure system manager on AIX partitions.

Table 8-4 shows the TCP ports that should be open on the network path indicated by C in Figure 8-1 on page 157.

Table 8-4 TCP ports (an administrative workstation to a partition)

From	Source port number/protocol	To	Destination port number/protocol	Application
Admin WS	1024-65535 /TCP	HMC	22/TCP	Secure shell
Admin WS	1024-65535 /TCP	HMC	9090/TCP	Web-based System Manager initial connection
Admin WS	1024-65535 /TCP	HMC	30000-30009/TCP	Web-based System Manager communication

Note: For some application requirements on the administrative workstation and AIX partitions, more ports should be open. For example, if the CSM management server is defined on the administrative workstation and AIX partitions are participated in the same management domain, the TCP and UDP ports 657 must be open on the network path between them.

Specifying a port range for remote WebSM access on AIX

Unlike the HMC, the Web-based System Manager server process (wsmserver) on AIX partitions has no default port range restrictions. To enable wsmserver on an AIX partition, type the following command as the root user:

```
/usr/websm/bin/wsmserver -enable
```

To specify the connection port range, find the following line in /etc/inetd.conf on the partition:

```
wsmserver stream tcp nowait root /usr/websm/bin/wsmserver wsmserver -start
```

Append the options highlighted in the following example, replacing *range_start* and *range_end* with the appropriate port numbers:

```
wsmserver stream tcp nowait root /usr/websm/bin/wsmserver wsmserver -start
-portstart range_start -portend range_end
```

Note: These two example lines must be a single line in the /etc/inetd.conf file.

After saving this file, issue **refresh -s inetd** on the partition.

By making this change, more secure port filtering rules can be implemented as explained in 8.2.2, “Administrative workstation to HMC” on page 159.

For further information about the configuration of the Web-based System Manager server process, refer to *AIX 5L Version 5.2 System Management Guide: AIX 5L Version 5.2 Web-based System Manager Administration Guide*.

8.2.4 HMC access to the enterprise network

It becomes necessary occasionally for the HMC to access the Internet to obtain corrective service and microcode updates. If the HMC does not have direct access, it needs to access a server on the corporate backbone that can be used to stage these updates before loading them on the HMC. These updates can be obtained from IBM Web sites by either HTTP or FTP. While the HMC cannot be an FTP server, it can be an FTP client. [4]

[4] Firewalls or application proxy gateways are most likely deployed between the enterprise network and the Internet. The security of the enterprise network is not discussed in this book.

HMC software includes a Web browser that can be launched from the HMC console by clicking a button in the task bar located at the bottom of screen. However, only registered Web addresses provided by IBM for technical support can be accessed using the browser.

8.3 Providing security to the HMC and partitions

Our security objectives in the partitioned environment are twofold:

- Protecting the HMC itself
- Protecting partitions in a secure zone from those that are less secure

These objects can be achieved using either port filtering (see 8.4, “A sample implementation of port filtering rules” on page 167), or vendor-specific advanced VLAN technologies (see Appendix , “Vendor-specific VLAN technologies (Cisco)” on page 326).

8.3.1 Securing the HMC

The HMC is designed to be a dedicate system — an appliance — for the control of managed systems. The software installed on HMC is based on the Linux operating system, but it has been customized to increase security and discourage uses other than those intended.

As explained in 8.2.2, “Administrative workstation to HMC” on page 159, there are a few accessible services available on the HMC. Popular services on UNIX-based operating systems, such as telnet, FTP, SMTP, and rsh, are disabled on the HMC.

No additional third-party applications should be installed on the HMC. Neither should systems administrators store scripts on the HMC, as they could be lost during software maintenance.

Because of its central role in managing multiple partitions, it is imperative that the HMC remain secure.

Controlling access on the HMC

Functions on the HMC are performed by the hscroot user or one created with the System Administrator role.[5] Although the root user exists on the HMC, its uses are restricted to certain problem determination, system security, and code maintenance purposes.

[5] See 4.1.1, “User role descriptions” on page 77 for the detailed information about roles on the HMC.

No one may log in remotely to the HMC using the root user ID, either through the Web-based System Manager or the secure shell. In order to log in as root, a user would have to be at the HMC console. However, a remote user could become root after logging in as hscroot and supplying the necessary passwords. For this reason, the hscroot and root passwords should be very closely guarded.

In some companies, concern over root access has led to the installation of third-party programs that monitor root logins and audit activity. IBM does not support such programs; be sure they do not interfere with HMC functioning. If a customer installs such a security application, IBM software support may require that it be deinstalled before doing troubleshooting and problem determination.

Secure remote access facilities

If the secure shell and the secure Web-based System Manager are used, data crossing the network from the HMC will be encrypted and secure. This will protect against unauthorized snooping by other users on the network.

However, it is advisable to disable the remote virtual terminal facility, even from the secure Web-based System Manager clients. This is because text entered in the virtual terminal windows is not encrypted.

Protecting the HMC from malicious attacks

In addition to closely managing passwords and providing physical security for the HMC, specific steps can be taken to protect it in a networked environment. As shown in Figure 8-2 on page 165, the HMC must be protected from malicious users' attacks, while it must provide the minimum network services explained in 8.2.1, "HMC to partitions" on page 158 and 8.2.2, "Administrative workstation to HMC" on page 159.

The most obvious solution is to put an IP router with port filtering on each network path, as explained in 8.2, "Network paths in a partitioned environment" on page 157.

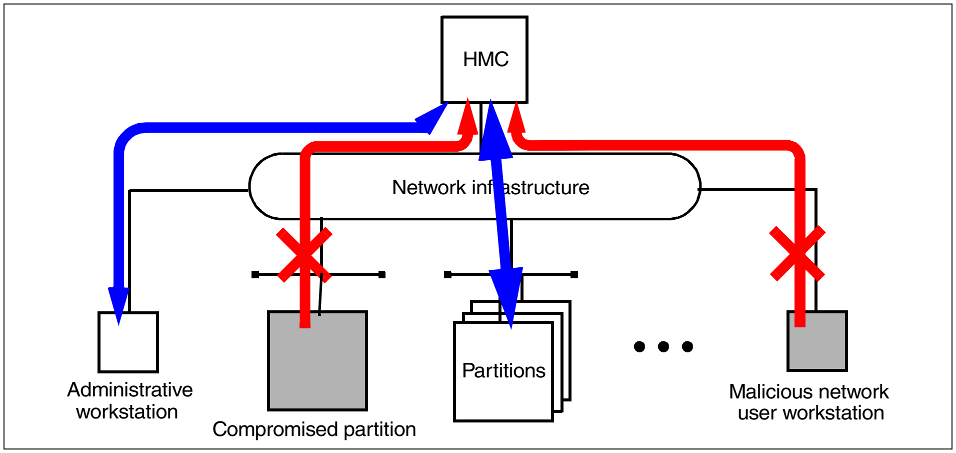

HMC
Network infrastructure
Administrative workstation
Compromised partition
Partitions
Malicious network user workstation

Figure 8-2 Possible attacks from compromised partitions or rogue users

8.3.2 Separating partitions from the others

If all partitions on the same managed system share the same network, this means there is only one security zone. This network environment is not desirable for protecting partitions from others.

Therefore, partitions on the same managed system sometimes must be placed in different security zones, as shown in Figure 8-3 on page 166. For example, one partition might be accessible on the Internet, while another is a back-end database server. The latter should be protected, even if security on the former gets compromised.

The solution is to put the partitions on different security zones and ensure that they are all reachable from the HMC via an IP router with port filtering capability.

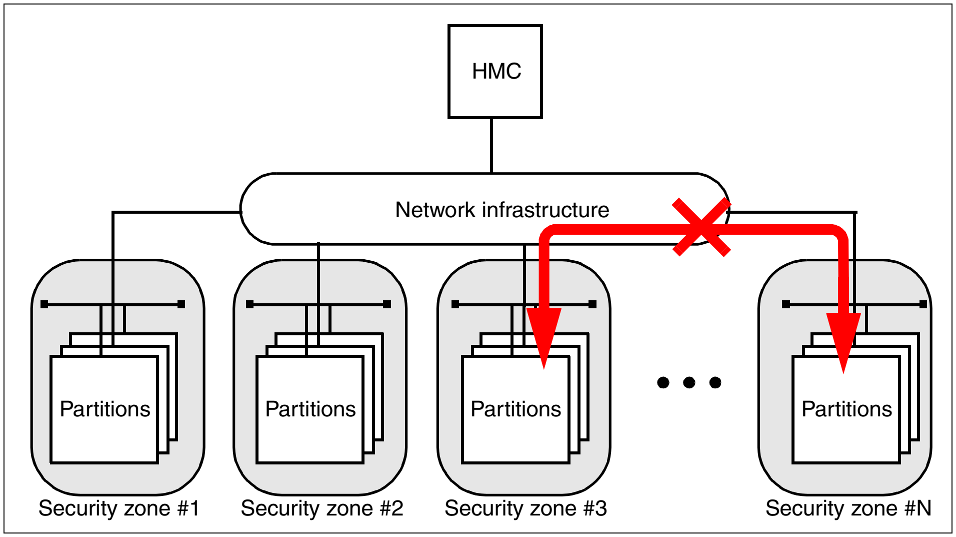


Figure 8-3 Multiple security zones for partitions

Using the second Ethernet interface on the HMC

Because the HMC supports two Ethernet interfaces, it is possible to have two network segments to separate partitions, as shown in Figure 8-4.

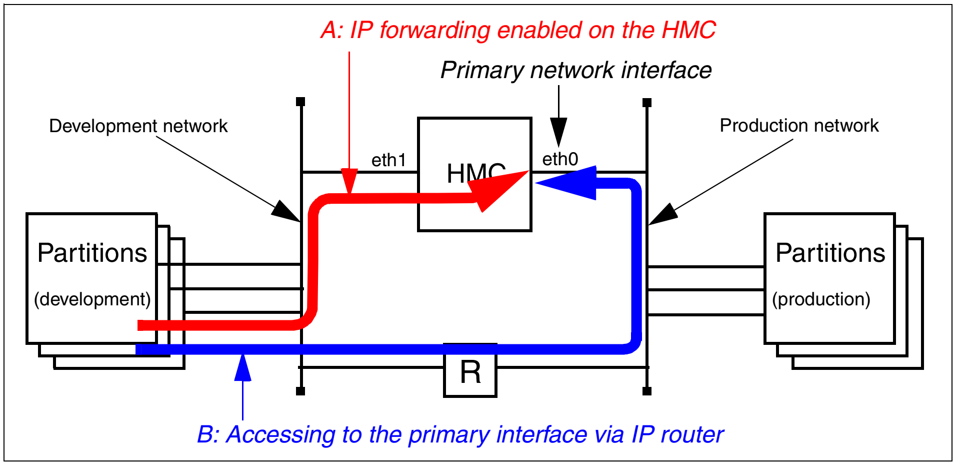

A: IP forwarding enabled on the HMC
Primary network interface
Development network
Production network
eth1
HMC
eth0
Partitions
(development)
Partitions
(production)
R
B: Accessing to the primary interface via IP router

Figure 8-4 Primary network interface must be IP-reachable from all partitions

Note: the primary network interface shown in Figure 8-4 is determined by the Host Name field in the Hosts tab of the “Network Configuration” application (see Figure 4-8 on page 87).

However, the primary network interface on the HMC must be IP accessible from all partitions regardless of the subnet on which they are connected. This can be achieved by either allowing IP forwarding on the HMC[6] (shown as A in Figure 8-4 on page 166), or by having an IP router between two segments (B).

Unfortunately, the first method (A) does not provide secure separation between the two segments because the HMC does not have the port filtering capability.

In the second method (B), using the port filtering rule explained in 8.2.1, “HMC to partitions” on page 158, the two segments are considered securely separated.

8.4 A sample implementation of port filtering rules

Many IP router and firewall devices on the market implement port filtering. We use a PC workstation loaded with the Red Hat Linux Version 7.3 for the port filtering test in a partitioned environment because the port filtering mechanism provided by the current Linux, called IP tables, is the best way to illustrate how the port filtering rules should be defined.

On the Linux kernel release 2.4.X, IP tables are built on IP chains, the original Linux firewall facility. The **`ipchains`** command establishes a chain consisting of a series of processing steps that incoming or outgoing packets must traverse.

The main IP chains are INPUT, FORWARD, and OUTPUT. The IP tables facility has six chains organized in three tables; the **`iptables`** command is used to set port filtering rules.[7] We will discuss only one of those, the filter table, in this book. Of special interest to us is the FORWARD chain, because it is used to send IP packets from one network to another.

For an extensive explanation about the IP tables, refer to the following:

- The netfilter Web site:

  `http://www.netfilter.org/`

- *Red Hat Linux Firewalls* by Bill McCarty; John Wiley & Sons, 2002, ISBN 0764524631*.*

Note: The Linux PC workstation used for the port filtering between networks is hereafter referred to the *firewall system* throughout this chapter.

[6] To enable IP forwarding on the HMC, select the **IP Forwarding Enabled** check box in the Network Configuration application shown in Figure 4-6 on page 84.

[7] To execute the **`iptables`** command, the root authority is required.

8.4.1 Between the HMC and partitions

To show how IP filtering can be set up between the HMC and partitions, we have configured a sample network configuration, as shown in Figure 8-5.

Two security zones are implemented in this configuration. Security zone #2 is separated from Security zone #1 and the HMC by a firewall. The firewall has two network interfaces, eth0 and eth1, on both network segments 9.3.4.0/23 and 10.0.1.0/24.[8]

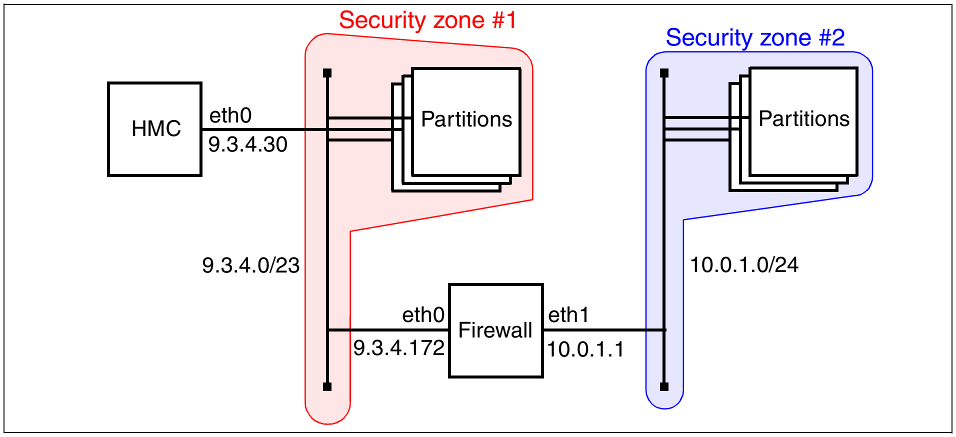


Figure 8-5 Sample firewall placement (1)

To create this network configuration, we did the following:

1. Create the /etc/hosts file on the HMC and propagate it to all partitions for consistent host name resolution.
2. Set a network route on the HMC so that it can reach the network 10.0.1.0/24 through the firewall. Example 8-1 shows the **netstat -rn** command output on the HMC (the emphasized line is added using the routing tab of the Network Configuration application shown in Figure 4-10 on page 89).

Example 8-1 netstat -rn output on the HMC

```
$ netstat -rn
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
10.0.1.0        9.3.4.172       255.255.255.0   UG       40 0          0 eth0
9.3.4.0         0.0.0.0         255.255.254.0   U        40 0          0 eth0
127.0.0.0       0.0.0.0         255.0.0.0       U        40 0          0 lo
0.0.0.0         9.3.4.41        0.0.0.0         UG       40 0          0 eth0
```

[8] The network address representation 9.3.4.0/23 means the network address 9.3.4.0 with the 23-bit subnet mask.

3. Set a host type network route on the partitions in Security zone #2 so that they can reach the HMC through the firewall. Example 8-2 shows the **netstat -rn** command output on one of the partitions on Security zone #2. (The emphasized line is the added host route entry.)

Example 8-2 netstat -rn output on a partition in security zone #2

```
# netstat -rn
Routing tables
Destination      Gateway           Flags   Refs     Use  If   PMTU Exp Groups

Route Tree for Protocol Family 2 (Internet):
9.3.4.30         10.0.1.1          UGH       1       20  en0     -   -
10.0.1/24        10.0.1.8          U         1     1115  en0     -   -
127/8            127.0.0.1         U         5    27604  lo0     -   -

Route Tree for Protocol Family 24 (Internet v6):
::1              ::1               UH        0        0  lo0 16896   -
```

4. Enable IP forwarding on the firewall by inserting the following line in the /etc/sysctl.conf file and then rebooting the system:

   ```
   net.ipv4.ip_foward = 1
   ```

   Note: the /etc/sysctl.conf file is read by the **sysctl** command upon reboot on the Linux operating system.

5. Issue the following set of commands to set up necessary port filtering on the firewall. These commands can be included in the /etc/sysconfig/firewall file in order to execute upon the firewall reboot.

   a. The following commands clear any existing port filtering rules and to set the default rule action to allow packets to pass:

   ```
   iptables -F
   iptables -X
   iptables -P INPUT ACCEPT
   iptables -P OUTPUT ACCEPT
   iptables -P FORWARD ACCEPT
   ```

   b. The following command blocks all packets from the hosts on the 10.0.1.0 network from being forwarded outside that network:

   ```
   iptables -A FORWARD -i eth1 -s 10.0.1.0/24 -j REJECT
   ```

   This effectively isolates the partitions on Security zone #2 from both the HMC and other partitions on Security zone #1. However, it also cuts off the RMC communication between the HMC and those partitions, which is required for DLPAR operations and service functions.

c. To address the RMC requirement, the following commands must be executed:

```
iptables -A FORWARD -i eth1 -p tcp --sport 657 -s 10.0.1.0/24 -j ACCEPT
iptables -A FORWARD -i eth1 -p udp --sport 657 -s 10.0.1.0/24 -j ACCEPT
```

This firewall configuration blocks all the traffic between the HMC and the partitions on the security zone #2, except for the RMC connection. The HMC cannot even receive ICMP echo replies if it sends ICMP echo requests to the partitions using the **ping** command.

8.4.2 Between the administrative workstation and HMC

To show how IP filtering can be set up between the administrative workstation and HMC, we have configured the sample network configuration in Figure 8-6.

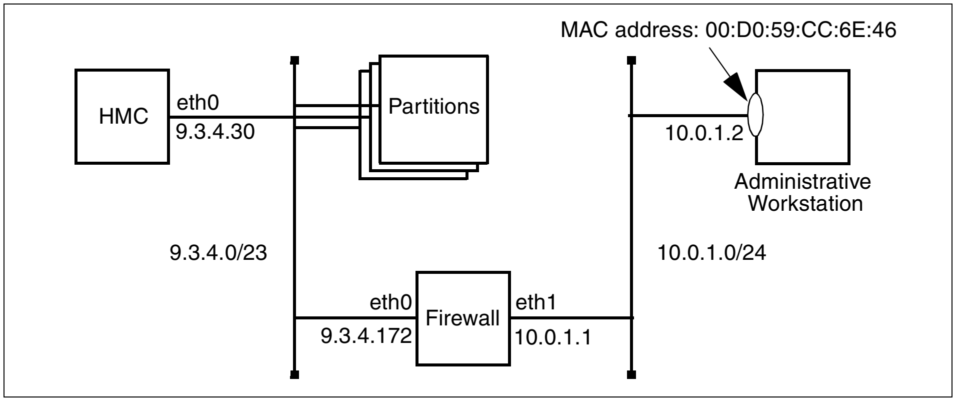


Figure 8-6 Sample firewall placement (2)

The 10.0.1.0/24 network, where the administrative workstation is connected, is separated from the 9.3.4.0/23 network, where the HMC and partitions are hooked up, by the firewall. The firewall has two network interfaces, eth0 and eth1, on network segments 9.3.4.0/23 and 10.0.1.0/24 respectively.

The administrative workstation needs to access the HMC via the secure shell and the Web-based System Manager.

Note: The MAC address of the administrative workstation is also used in order to restrict the access to the 9.3.4.0/23 network.

To configure this network, we have set up the following:

1. Repeat steps 1, 2, and 4 explained in 8.4.1, “Between the HMC and partitions” on page 168.

2. Issue the following a set of commands to set up necessary port filtering on the firewall. These commands can be included in the /etc/sysconfig/firewall file in order to execute upon the firewall reboot.

   a. Execute the following command on the firewall in order to open the appropriate port to allow secure shell traffic between the administrative workstation and HMC:

      ```
      iptables -A FORWARD -i eth1 -p tcp --dport 22 -s 10.0.1.2 \
          --sport 1024:65535 -j ACCEPT
      ```

      The destination port for the secure shell on the HMC is port 22, and that the request can come from any port in the range 1024 to 65535 on the administrative workstation. The IP address of the administrative workstation is 10.0.1.2. This rule allows a secure shell session from the workstation to the HMC.

      Note: The port filtering rules above do not allow the administrative workstation to access the HMC via the remote Web-based System Manager.

   b. Execute the following command on the firewall in order to open the appropriate ports to allow Web-based System Manager traffic between the administrative workstation and HMC:

      ```
      iptables -A FORWARD -i eth1 -p tcp -s 10.0.1.2 -d 9.3.4.30 -j ACCEPT
      ```

      Note: The current IP tables implementation on the Linux operating system does not allow you to specify a port number larger than 65535. Therefore, this configuration, unfortunately, allows all TCP connection requests from the source IP address 10.0.1.2 to the destination IP address 9.3.4.30. However, it is possible to restrict this access using the other IP filtering function implementations on some IP router and firewall products currently available in the market.

   c. Execute the following command on the firewall in order to block all connection requests to the IP address 9.3.4.30, except for the IP packets sent from the MAC address 00:D0:59:CC:6E:46, which is the MAC address of the Ethernet adapter on the administrative workstation in our test environment:

      ```
      iptables -A FORWARD -i eth1 -m --mac-source 00:D0:59:CC:6E:46 \
          -d 9.3.4.30 -j ACCEPT
      ```

This firewall configuration blocks all traffic from the 10.0.1.0/24 network to the the HMC, except for the TCP connection requests from the administrative workstation.

8.4.3 Between the administrative workstation and partitions

To demonstrate IP filtering between an administrative workstation and production partitions, we again used the network described in Figure 8-6 on page 170. This configuration illustrates the ability of a systems administrator to perform work on production systems located on the other side of a firewall.

Note that it is important for a systems administrator to have access to a production partition, not only for day-to-day administration but also to facilitate moving PCI adapters using dynamic logical partitioning. The two preferred access methods are the secure shell and the Web-based System Manager.

To configure this access, we did the following:

1. Repeat steps 1, 2, and 4 explained in 8.4.1, “Between the HMC and partitions” on page 168.
2. Assuming the production partition had an IP address of 9.3.4.117, this rule would enable both the secure shell and the Web-based System Manager:

   ```
   iptables -A FORWARD -i eth1 -p tcp -s 10.0.1.0 -d 9.3.4.117 -j ACCEPT
   ```

Note: Before the Web-based System Manager could be started on the partition, the **wsmserver** commands referenced in 8.2.3, “Administrative workstation to partition” on page 161 have to be issued.

8.5 Service Agent and security concerns

The Service Agent application that runs on the HMC is an integral part of the IBM service strategy for partitioning-capable pSeries server. One of the most valuable features of Service Agent is its ability to call IBM Service and report hardware failures, often providing specifics as to which Field Replaceable Unit needs to be installed by the IBM service representatives.

Despite the value of this capability, some customers are wary of configuring a modem in a server room. If they have several HMCs supporting multiple managed systems, the concern spreads to having several modems and the need to support multiple phone lines.

These concerns are summarized into the following questions:

- Could an enterprise’ proprietary data be transferred over the dial-up connection?

  The answer is *No*.

  The data sent to IBM by Service Agent contains no customer proprietary information. It reports the date and time of specific hardware errors on specific servers, and it includes diagnostic information that can be used to fix a hardware problem. It is used to identify a part that needs to be replaced.

- Can the modem be used to dial into the HMC and therefore provide an entry point to the customer's networks?

  The answer is *No*.

  Service Agent uses the modem in dial-out mode only. Confirmation that a message has been received by IBM comes through a phone call to a customer contact specified in Service Agent. The 7852-400 modem[9] supplied by IBM is configured for dial-out only by flipping a switch located at the front of modem. Also, the serial port used by Service Agent does not have a getty process running on it, so there can be no inbound connection.

The detailed information about how to configure Service Agent is provided in Chapter 12, "Sample Service Agent configurations on the HMC" on page 281.

8.5.1 Firewall and Service Agent

An HMC can be configured to run Service Agent in client or server (gateway) mode. The HMC with the modem attached is the gateway system. One that forwards its service events over the network to a gateway machine is a client.

The gateway HMC has the dialer configured and runs the Electronic Server System (ESS) process. ESS runs only on the gateway. It handles all requests for data input and retrieval from the centralized database. The On Demand Server (ODS) process runs on all HMCs running Service Agent, and it handles all Service Agent communication activities for that host. ODS sends data to the ESS process as necessary.

ESS listens on the TCP port 1199 for incoming communication requests. When a remote ODS has contacted ESS and is authenticated, ESS tells a new port number to ODS in order to establish the session between the ESS and that remote ODS. The new port number is unpredictable and chosen above port number 1024 on both the source and destination nodes.

Therefore, if you have multiple HMCs and one serves as a gateway, those HMCs should not be separated by firewalls.[10]

[9] IBM does not supply modems for the pSeries 615 models 6C3 and 6E3, pSeries 630 models 6C4 and 6E4, and pSeries 650 Model 6M2.

[10] This limiitation is anticipated to be relaxed in future HMC software releases.

To configure the Service Agent in this client/server configuration on multiple HMCs, see the following sections:

- 11.3.3, “Change Service Agent mode (server/client)” on page 257
- 12.5, “Define Service Agent clients on a gateway server” on page 292

9

HMC command line interface

This chapter provides information about using the command line interface on the IBM Hardware Management Console for pSeries (HMC). The command line interface is especially useful in the following two situations:

- Consistent results are required.

  If you have to administer several managed systems, you can achieve consistent results by using the command line interface. The command sequence can be stored in scripts and executed remotely.

- Automated operations are required.

  After you have developed a consistent way to manage your managed systems, you can automate the operations by invoking the scripts from batch processing applications, such as the cron daemon, from other systems.

> **Note:** Avoid copying any files onto the HMC other than those detailed in IBM publications, as this can interfere with problem determination by IBM support personnel. Therefore, from remote systems, all supported commands should be executed via either the rexec or ssh facility. We suggest you store such files as administrative scripts on systems other than the HMC.

For further information about the command line interface on the HMC, refer to *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590.

9.1 Secure remote connection to the HMC

HMCs typically are placed inside the machine room where managed systems are located, so you might not be allowed to physically access the HMC. In this case, you can remotely access it using either the remote Web-based System Manager client (see Chapter 7, “Secure remote GUI access to the HMC” on page 125) or the remote command line interface. The HMC supports two facilities, secure shell (ssh) and rexec, to execute commands remotely.

> **Note:** As explained in 4.2.7, “Enable/Disable Remote Command Execution” on page 95, either ssh or rexec facility must be explicitly enabled on the HMC beforehand in order to remotely execute commands.

Throughout this book, we assume that you use OpenSSH to securely connect between AIX systems (including partitions) and the HMC. You have two ways to remotely execute the command line interface on the HMC using OpenSSH:

- Execute commands remotely.

  The following sample shows that the **/opt/hsc/bin/lshmc -r** command is remotely executed using the **ssh** command. In this example, a remote user on a remote AIX system is executing the **/opt/hsc/bin/lshmc -r** command as the hscroot user on the HMC (itsohmc). You will be prompted to enter the login password of the hscroot user, and then the command will list the status of the remote command execution configuration:[1]

  ```
  $ ssh hscroot@itsohmc /opt/hsc/bin/lshmc -r
  hscroot@itsohmc's password: XXXXXX
  Remote Command Execution Configuration:
  Remote command execution using the rexec facility:  disabled
  Remote command execution using the ssh facility:    enabled
  ```

- Execute commands after logging in to the HMC.

  The following sample shows that the **lshmc -r** command is executed on the HMC after logging in to the HMC as the hscroot user:

  ```
  $ ssh hscroot@itsohmc
  hscroot@itsohmc's password: XXXXXX
  Last login: Mon May 26 14:32:13 2003 from lpar03.itsc.austin.ibm.com
  [hscroot@itsohmc hscroot]$ lshmc -r
  Remote Command Execution Configuration:
  Remote command execution using the rexec facility:  disabled
  Remote command execution using the ssh facility:    enabled
  ```

[1] This configuration can also be verified and changed using the graphical user interface on the HMC (see 4.2.7, “Enable/Disable Remote Command Execution” on page 95).

9.1.1 Setting up OpenSSH on AIX

To use OpenSSH on AIX, the tasks described in this section must be performed.

> **Note:** Starting in April 2002, IBM offers OpenSSH in the updated Bonus Pack CD-ROM media as several AIX standard install packages (installp format) on AIX 5L Version 5.1 and later.
>
> The OpenSSH program contained in the Bonus Pack CD-ROM media is offered *as is* and is licensed under the terms and conditions of the IBM International Program License Agreement (IPLA) for Non-Warranted Programs.

For further information about setting up OpenSSH on AIX, refer to *Chapter 4: Secure network connection on AIX* in *Managing AIX Server Farms*, SG24-6606.

Installing OpenSSH packages

OpenSSH is offered as several AIX standard installp packages in the Bonus Pack CD-ROM media or in several RPM format packages provided in the AIX toolbox for Linux applications.

You can also download the latest OpenSSH packages from the *OpenSSH on AIX* site, found at:

http://oss.software.ibm.com/developerworks/projects/opensshi

To install OpenSSH on AIX 5L Version 5.2:

1. Use SMIT to install the openssl package from the AIX toolbox for Linux CD. Install the openssl package first as it is a prerequisite for OpenSSH.
2. Verify that openssl is installed:

   ```
   # rpm -qa|grep openssl
   openssl-0.9.6e-2
   ```

3. Use SMIT to install the following filesets:
   - openssh.base.client
   - openssh.base.server
   - openssh.license
   - openssh.msg.en_US
4. Verify that all filesets are installed, as shown in Example 9-1 on page 178.

*Example 9-1 lslpp -L openssh.**

```
# lslpp -L openssh.*
  Fileset                      Level  State  Type  Description (Uninstaller)
  ----------------------------------------------------------------------------
  openssh.base.client     3.4.0.5200    C     F    Open Secure Shell Commands
  openssh.base.server     3.4.0.5200    C     F    Open Secure Shell Server
  openssh.license         3.4.0.5200    C     F    Open Secure Shell License
  openssh.msg.en_US       3.4.0.5200    C     F    Open Secure Shell Messages -
                                                   U.S. English
```

Configure the OpenSSH client

To configure the OpenSSH client on AIX systems, the steps explained in this section must be performed. The following configuration is used:

OpenSSH client system host name: `murumuru.itsc.austin.ibm.com`
User name on the client: `koa`
OpenSSH server system host name (HMC): `itsohmc.itsc.austin.ibm.com`
User name on the server: `hscroot`

1. Log in to the client system as the user to use ssh:

```
AIX Version 5
(C) Copyrights by IBM and by others 1982, 2002.
login: koa
koa's Password: XXXXXX
```

2. Generate the user public and private key files:

```
/home/koa ) ssh-keygen -t dsa
Generating public/private dsa key pair.
Enter file in which to save the key (/home/koa/.ssh/id_dsa):
Enter passphrase (empty for no passphrase): YYYYYY
Enter same passphrase again: YYYYYY
Your identification has been saved in /home/koa/.ssh/id_dsa.
Your public key has been saved in /home/koa/.ssh/id_dsa.pub.
The key fingerprint is:
cf:3a:6a:e8:d0:14:5a:a4:8d:55:7e:98:c0:78:b7:d7
koa@murumuru.itsc.austin.ibm.com
/home/koa ) ls -al .ssh
total 7
drwx------   2 koa      staff          512 Jun 19 17:26 .
drwxr-xr-x   3 koa      staff          512 Jun 19 17:22 ..
-rw-------   1 koa      staff          744 Jun 19 17:26 id_dsa
-rw-r--r--   1 koa      staff          622 Jun 19 17:26 id_dsa.pub
-rw-r--r--   1 koa      staff          226 Jun 19 17:22 known_hosts
```

> **Note:** Do not forget the pass phrase; otherwise you must generate new key files and distribute the public key file again.

3. Confirm whether there is a public key ring file (authorized_keys2[2]) in the .ssh directory under the remote user's home directory on the HMC:

   ```
   /home/koa ) ssh hscroot@itsohmc ls -l .ssh
   hscroot@itsohmc's password: XXXXXX
   ```

   If the file exists, the command returns output similar to the following example:

   ```
   total 24
   -rw-r--r--    1 hscroot  HSC_Sys_     2352 Jul 30 14:49 authorized_keys2
   -rw-------    1 hscroot  HSC_Sys_      736 Jun  2 06:41 id_dsa
   -rw-r--r--    1 hscroot  HSC_Sys_      625 Jun  2 06:41 id_dsa.pub
   -rw-r--r--    1 hscroot  HSC_Sys_     7372 Jun 17 16:38 known_hosts
   ```

   Then proceed to the next step. Otherwise, do the following and skip to step 7:

   ```
   /home/koa ) cp .ssh/id_dsa.pub /tmp/authorized_keys2
   ```

4. Copy the public key file on the HMC to the local host:

   ```
   /home/koa ) scp -p hscroot@itsohmc:/home/hscroot/.ssh/authorized_keys2 /tmp
   hscroot@itsohmc's password: XXXXXX
   authorized_keys2      100% |*****************************|  2352
   00:00
   ```

5. Concatenate the local user's public key file to the one you have just copied:

   ```
   /home/koa ) cat .ssh/id_dsa.pub >> /tmp/authorized_keys2
   ```

   Note: You must use >> instead of > for the concatenation.

6. If the remote user already has the .ssh directory under his home directory, skip to the next step. Otherwise create the .ssh directory under his home directory:

   ```
   /home/koa ) ssh hscroot@itsohmc ls -ld .ssh
   hscroot@itsohmc's password: XXXXXX
   drwx------    2 hscroot  HSC_Sys_     4096 Jun  9 10:32 .ssh
   ```

7. Copy back the public key ring file iton the .ssh directory under the remote user's home directory on the HMC:

   ```
   /home/koa ) scp -p /tmp/authorized_keys2 hscroot@itsohmc:/home/hscroot/.ssh
   hscroot@itsohmc's password: XXXXXX
   authorized_keys2      100% |*****************************|  2974
   00:00
   ```

When your public key file is appended to the hscroot user's public key ring file (authorized_keys2), enter your pass phrase instead of the login password in order to log in to the HMC using OpenSSH.

[2] The authorized_keys2 public key ring file can store the public keys generated by both RSA and DSA in the protocol version 2, while authorized_keys can only store the keys generated by DSA.

Configure OpenSSH server

To access to an AIX 5L Version 5.2 system using OpenSSH, in other words, to configure an AIX system as an OpenSSH server, the PAM[3] configuration file /etc/pam.conf[4] (see Example 9-2) must be created on the AIX system.

Example 9-2 /etc/pam.conf on AIX 5L Version 5.2

```
#
# PAM configuration for OpenSSH
#
sshd    auth            required        /usr/lib/security/pam_aix
OTHER   auth            required        /usr/lib/security/pam_aix

sshd    account         required        /usr/lib/security/pam_aix
OTHER   account         required        /usr/lib/security/pam_aix

sshd    password        required        /usr/lib/security/pam_aix
OTHER   password        required        /usr/lib/security/pam_aix

sshd    session         required        /usr/lib/security/pam_aix
OTHER   session         required        /usr/lib/security/pam_aix
```

The /etc/pam.conf file must have the following permission mode:

```
# ls -l /etc/pam.conf
-rw-r--r--   1 root     system          473 May 14 2003  /etc/pam.conf
```

9.2 Syntax and common HMC command line flags

This section covers the syntax used to describe the HMC commands and some of the commonly used command line flags shared by many HMC commands.

To explain the common syntax, we use the **lshwres** command[5] as an example:

```
lshwres -m <managed-system> -r {ALL|cpu|mem|slot|led}
    [-p <partition-name>| --all] [-y <led-type>] [-F <format>] [--help]
```

The following conventions are used:

- Items representing variables that must be replaced by a value are enclosed in brackets: <>. For example, <partition-name> specifies that this is a variable that should be replaced by a partition name.
- Items that are not enclosed in brackets must be entered literally.

[3] Pluggable Authentication Module

[4] The /etc/pam.conf file does not exist by default.

[5] The **lshwres** command is explained in “lshwres” on page 206.

- Parameters enclosed in square brackets, [], are optional.
- Parameters enclosed in braces, {}, are required.
- A vertical bar signifies that you choose only one parameter. For example, {ALL | cpu | mem | slot | led} indicates that you have to choose one of these: ALL, cpu, mem, slot, or led.

Besides the syntax, you must also pay attention to:

- You must insert a blank between the flag and the parameter. The following sample shows that, without a blank between the flag, -r, and the parameter, ALL, the command will fail:

```
$ lssyscfg -r ALL
Name             FrameNum  IsReal  PortNums  Frame Type
7040-61R*021767A  0         No                2
...
... omitted lines ...
...
$ lssyscfg -rALL
Access denied. Please check to see you have included all required
parameters particularly the managed system and partition parameters. Please
try again.
```

- If, before sending to it HMC for final execution, the supplied parameter or value contains spaces or other special characters that may be interpreted by the local shell, it should be enclosed in double quotes or in some other way prevent the shell misinterpretation.

9.2.1 The -m flag

The -m flag specifies the managed system on which you wish to perform operations. Although this flag can be seen as an unnecessary flag in a simple, but typical, configuration where only one managed system is connected to an HMC, it is required to explicitly specify the target managed system, because multiple managed systems can be connected to a single HMC.

The -m flag must be used with either of the following arguments:

- The managed system name

  In our example, ITSO_p690 is the managed system name. Therefore, the flag can be specified as -m ITSO_p690.

  To confirm the managed system name, see 10.1.1, “What is the managed system name?” on page 218.

- The machine type, model, and serial number of the managed system in the form of MT-MDL*S/N

  In our example the argument is expressed as 7040-681*021768A, where:

  - **7040** is the machine type (MT) of our test system.
  - **681** is the model number (MDL) of our test system.
  - **021768A** is the serial number (S/N) of our test system.

  Therefore, the flag also can be specified as -m 7040-681*021768A.

  To confirm this information, see 10.1.2, "What is my managed system's MT-MDL*S/N?" on page 219.

9.2.2 The -r flag

The -r flag specifies the *resource* of the managed system on which you wish to perform operations. Depending on the context in which the command is used, the -r flag can be specified with the following arguments:

cpu	CPU
mem	Memory
slot	Adapter slot
led	LED[6]
alpar	Affinity partition
lpar	Logical partition
prof	Partition profile
sysprof	System profile
sys	Managed system
frame	Frame[7]
ALL	Specifies all possible types of the resources

9.2.3 The -n flag

The -n flag specifies the *name* of the specific object on which you wish to perform operations.

In the listing context (e.g. `ls`*`XXXX`* command), the --all flag can also be used in place of -n to specify that all objects are to be listed.

9.2.4 The -o flag

The -o flag specifies the *operation* that we want to perform on the resource. For example, when you wish to perform dynamic logical partitioning (DLPAR)

[6] We also must use the -y flag to specify whether it is the system attention LED or identify LED.

[7] See 10.1.3, "What is my frame name?" on page 219

operations using the `chhwres` command, one of the following arguments must be specified:

-o a Add a resource.
-o r Remove a resource.
-o m Move a resource.
-o s Set a value[8].

When it is used with the `chsysstate` command, one of the following arguments must be specified:

-o on Power on the managed system or activate a partition.

-o off Power off the managed system or perform a hard reset on a partition.

-o reset Reset the managed system (works only in Full System Partition) or perform a soft reset on a partition.

-o osreset Reboot a partition.

-o osshutdown Shut down a partition.

-o rebuild Rebuild the managed system.

9.2.5 The -p flag

The -p flag specifies the *partition* on which you wish to perform the operation. For the DLPAR move operation, the -p flag specifies the *source partition*.

9.2.6 The -f flag

The -f flag is generally used to specify a *file name*.

When the flag is used with the `bkprofdata` or `rstprofdata` command, it specifies the profile data file name to be used as the output or input for the backup and restore operation, respectively.

When the flag is used with the `mksyscfg` or `chsyscfg` command, it specifies the configuration data file name to be used as the input for the operation.

9.2.7 The -F flag

The -F flag specifies which *formatted fields* will be used when displaying the output from the `ls`***`XXXX`*** command.

[8] The set operation can be used only with the LED resource.

For example, the following use of the -F flag instructs the **lshwres** command to display the partition_name, min, allocated, and max fields only.

```
$ lshwres -m ITSO_p690 -r cpu --all -F partition_name:min:allocated:max
```

9.2.8 The --help flag

The --help flag is used to display the syntax and sample use of the command.

9.3 HMC commands

In this section, we have classified the supported HMC commands from the system administrators' view into the groups shown in Table 9-1.

Table 9-1 Command groups

Command classification	Relevant section number
Commands to manage HMC itself	9.3.1
Commands to manage users on the HMC	9.3.2
Commands for CUoD	9.3.3
Commands to manage system configuration	9.3.4
Commands to back up and restore partition profile data	9.3.5
Commands to manage hardware resources	9.3.6
Commands for virtual terminals	9.3.7
Commands used in recovery situations	9.3.8
Commands used for other purposes	9.3.9

Unless otherwise specified, all commands used in the examples sections are issued by the hscroot user on the HMC.

9.3.1 Commands to manage HMC itself

The following commands are used to manage HMC itself. This group of commands interacts only with the HMC so the -m flag, which is used to specify the managed system, is not needed:

`lshmc` Lists the HMC network or remote command configuration. It also can be used to show VPD data for the HMC.

chhmc Changes the HMC network configuration or enables/disables the remote command.

hmcshutdown Shuts down or reboots the HMC.

lshmc

This command is used to list HMC network configuration, remote command configuration, and VPD data.

Syntax

```
lshmc [-n][-r][-v][-F <format>][--help]
```

-n Lists HMC network configuration.

-r Lists HMC remote command configuration.

-v Lists HMC VPD data.

-F Specifies the formatted fields to list. Valid values are hostname, domain, nameserver, domainsuffix, gateway, ipaddr, networkmask, rexec, and ssh.

Example

To list the HMC network configuration:

```
$ lshmc -n
Network Configuration:
Host Name:                         itsohmc.itsc.austin.ibm.com
TCP/IP Interface 0 Address:        9.3.4.30
TCP/IP Interface 0 Network Mask:   255.255.254.0
Default Gateway:                   9.3.4.41
Domain Name:                       itsc.austin.ibm.com
DNS Server Search Order:           9.3.4.2
Domain Suffix Search Order:        itsc.austin.ibm.com
                                   austin.ibm.com
```

To list the HMC remote command configuration:

```
$ lshmc -r
Remote Command Execution Configuration:
Remote command execution using the rexec facility:  disabled
Remote command execution using the ssh facility:    enabled
```

To list the VPD information for the HMC:

```
$ lshmc -v
Vital Product Data Information:
*FC ????????
*VC 20.0
*N2 Mon Jun 09 10:09:02 EDT 2003
*FC ????????
```

```
*DS pSeries Hardware Management Console
*TM 6578-D5U
*SE 233DX2C
*MN IBM
*PN S38DEX62ECA
*SZ 525402112
*OS Linux 2.4.18-27.7.x
*NA 9.3.4.30
*FC ????????
*DS Platform Firmware
*RM R3V2.2
```

The highlighted fields shown in this output mean:

6576-D5U	The machine type and model for the HMC
233DX2C	The serial number of the HMC
IBM	Manufactured by IBM
S38DEX62ECA	The motherboard serial number
525402112	Equipped memory size in bytes (512 MB)
2.4.18-27.7.x	The Linux operating system level on the HMC
9.3.4.30	The IP address of the HMC
R3V2.2	The HMC software level (Release 3, Version 2.2)

chhmc

This command is used to change the HMC network configuration or to enable and disable remote command execution.

Important: After you change the HMC host name or IP address, be sure that other necessary changes also are made to other related subsystems such as RMC, Service Agent, Service Focal Point, and so on.

Syntax

```
chhmc -c {network|ssh|rexec} -s {enable|disable|add|modify|remove}
    [-i {eth0|eth1} -a <IP-address> -nm <network-mask>]
    [-d <domain-name>]
    [-h <hostname>]
    [-g <gateway>]
    [-ns <DNS-server>]
    [-ds <domain-suffix>]
    [--help]
```

-c Specifies the type of configuration to modify.

-s Specifies the new state of configuration. When the type is ssh or rexec, the valid values are enable and disable. When the type is network, the valid values are add, modify, and remove. Add and remove are valid only when specifying -ns or -ds.

-i Specifies the interface to configure.

-a Specifies the IP address. Can be used only with -i flag.

-nm Specifies the network mask. Can be used only with -i flag.

-d Specifies the domain name. Can be used only with -s modify.

-h Specifies the new host name. Can be used only with -s modify.

-g Specifies the gateway IP address or host name. Can be used only with -s modify.

-ns Specifies the DNS server. Can be used only with -s add or -s remove.

-ds Specifies the domain suffix. Can be used only with -s add or -s remove.

Example

To add another DNS server of IP address 1.1.1.1:

```
$ lshmc -n
Network Configuration:
Host Name:                        itsohmc.itsc.austin.ibm.com
TCP/IP Interface 0 Address:       9.3.4.30
TCP/IP Interface 0 Network Mask:  255.255.254.0
TCP/IP Interface 1 Address:       10.0.1.1
TCP/IP Interface 1 Network Mask:  255.255.255.0
Default Gateway:                  9.3.4.41
Domain Name:                      itsc.austin.ibm.com
DNS Server Search Order:          9.3.4.2
Domain Suffix Search Order:       itsc.austin.ibm.com
                                  austin.ibm.com
$ chhmc -c network -s add -ns 1.1.1.1
$ lshmc -n
Network Configuration:
Host Name:                        itsohmc.itsc.austin.ibm.com
TCP/IP Interface 0 Address:       9.3.4.30
TCP/IP Interface 0 Network Mask:  255.255.254.0
TCP/IP Interface 1 Address:       10.0.1.1
TCP/IP Interface 1 Network Mask:  255.255.255.0
Default Gateway:                  9.3.4.41
Domain Name:                      itsc.austin.ibm.com
DNS Server Search Order:          9.3.4.2
                                  1.1.1.1
Domain Suffix Search Order:       itsc.austin.ibm.com
                                  austin.ibm.com
```

To add another domain suffix search order th.ibm.com:

```
$ lshmc -n
Network Configuration:
Host Name:                        itsohmc.itsc.austin.ibm.com
TCP/IP Interface 0 Address:       9.3.4.30
TCP/IP Interface 0 Network Mask:  255.255.254.0
TCP/IP Interface 1 Address:       10.0.1.1
TCP/IP Interface 1 Network Mask:  255.255.255.0
Default Gateway:                  9.3.4.41
Domain Name:                      itsc.austin.ibm.com
DNS Server Search Order:          9.3.4.2
Domain Suffix Search Order:       itsc.austin.ibm.com
                                  austin.ibm.com
$ chhmc -c network -s add -ds th.ibm.com
$ lshmc -n
Network Configuration:
Host Name:                        itsohmc.itsc.austin.ibm.com
TCP/IP Interface 0 Address:       9.3.4.30
TCP/IP Interface 0 Network Mask:  255.255.254.0
TCP/IP Interface 1 Address:       10.0.1.1
TCP/IP Interface 1 Network Mask:  255.255.255.0
Default Gateway:                  9.3.4.41
Domain Name:                      itsc.austin.ibm.com
DNS Server Search Order:          9.3.4.2
Domain Suffix Search Order:       itsc.austin.ibm.com
                                  austin.ibm.com
                                  th.ibm.com
```

To change the gateway to king.th.ibm.com:

```
$ lshmc -n
Network Configuration:
Host Name:                        itsohmc.itsc.austin.ibm.com
TCP/IP Interface 0 Address:       9.3.4.30
TCP/IP Interface 0 Network Mask:  255.255.254.0
TCP/IP Interface 1 Address:       10.0.1.1
TCP/IP Interface 1 Network Mask:  255.255.255.0
Default Gateway:                  9.3.4.41
Domain Name:                      itsc.austin.ibm.com
DNS Server Search Order:          9.3.4.2
Domain Suffix Search Order:       itsc.austin.ibm.com
                                  austin.ibm.com
                                  th.ibm.com
$ chhmc -c network -s modify -g king.th.ibm.com
$ lshmc -n
Network Configuration:
Host Name:                        itsohmc.itsc.austin.ibm.com
TCP/IP Interface 0 Address:       9.3.4.30
TCP/IP Interface 0 Network Mask:  255.255.254.0
```

```
TCP/IP Interface 1 Address:       10.0.1.1
TCP/IP Interface 1 Network Mask:  255.255.255.0
Default Gateway:                  king.th.ibm.com
Domain Name:                      itsc.austin.ibm.com
DNS Server Search Order:          9.3.4.2
Domain Suffix Search Order:       itsc.austin.ibm.com
                                  austin.ibm.com
                                  th.ibm.com
```

To disable the rexec facility:

```
$ lshmc -r
Remote Command Execution Configuration:
Remote command execution using the rexec facility:  enabled
Remote command execution using the ssh facility:    enabled
$ chhmc -c rexec -s disable
$ lshmc -r
Remote Command Execution Configuration:
Remote command execution using the rexec facility:  disabled
Remote command execution using the ssh facility:    enabled
```

To enable the ssh facility:

```
$ lshmc -r
Remote Command Execution Configuration:
Remote command execution using the rexec facility:  disabled
Remote command execution using the ssh facility:    disabled
$ chhmc -c ssh -s enable
$ lshmc -r
Remote Command Execution Configuration:
Remote command execution using the rexec facility:  disabled
Remote command execution using the ssh facility:    enabled
```

Additional information

When you enable the ssh facility, the main sshd daemon process starts to accept the connection via the TCP port 22. For each ssh client connecting in, a new sshd process is spawned to service the client.

When you disable the ssh facility, the main sshd daemon is terminated, without terminating all other child sshd daemon processes. As each ssh client starts to log out, these processes will go away eventually. During that period, no new ssh client connections will be allowed.

However, if you do not wait, but try to disable the ssh facility twice from the same ssh session, the sshd daemon process that serves that client will be also terminated, therefore immediately terminating the current ssh session.

hmcshutdown

This command is used to shut down or reboot the HMC. Before it is shut down, console surveillance will be disabled. Console surveillance is the process by which the service processor continuously monitors for the presence of the HMC. If the HMC goes down unexpectedly while the surveillance policy flag is set, the system attention light is turned on; disabling this flag prevents this light from being turned on during graceful shutdown.

> **Note:** Do not use the **`/sbin/shutdown`** command to shut down or reboot the HMC, because it does not disable console surveillance. If you use the graphical user interface to shut down or reboot the HMC, console surveillance is turned off automatically.

Syntax

```
hmcshutdown -t {<minutes>|now} [-r][--help]
```

-t Specifies the number of minutes to wait before shutdown. Adding `now` begins shutdown immediately (same as using -t 0).

-r Reboots the HMC.

Example

To reboot HMC in one minute:

```
$ hmcshutdown -t 1 -r

Broadcast message from root Mon Jun  9 12:31:36 2003...

The system is going DOWN for reboot in 1 minute !!

Broadcast message from root Mon Jun  9 12:32:36 2003...

The system is going down for reboot NOW !!
```

To halt HMC immediately:

```
$ hmcshutdown -t now
$
Broadcast message from root Mon Jun  9 12:55:00 2003...

The system is going down for system halt NOW !!
```

9.3.2 Commands to manage users on the HMC

The following commands are used to manage users on the HMC. This group of commands operates on the user data in the HMC so the -m flag, which is used to specify the managed system, is not needed:

lshmcusr Lists the property (name, role and description) of HMC user(s).

mkhmcusr Creates an HMC user.

chhmcusr Changes the name, role, description, or password of an HMC user.

rmhmcusr Removes an HMC user.

lshmcusr

This command is used to list the property of the HMC user specified by the -u flag.

Syntax

```
lshmcusr -u {<user-name>|ALL} [-F format][--help]
```

-u Specifies the user to be listed. Use -u ALL to list all users.

-F Specifies the formatted fields to list. Valid values are name, access, and description.

Example

```
$ lshmcusr -u hscroot
User Name  Roles                 Full Name
hscroot    System Administrator  HSC Super User

$ lshmcusr -u ALL
User Name  Roles                   Full Name
stu4       User Administrator      Student_4
hscroot    System Administrator    HSC Super User
stu3       System Administrator    Student_3
stu5       Service Representative  Student_5
stu1       Operator                Student_1
stu2       Advanced Operator       Student_2
stu6       Viewer                  Student_6
```

mkhmcusr

This command is used to create an HMC user.

syntax

```
mkhmcusr -u <user-name> -a <access-name> [-d <description>][--help]
```

-u Specifies the user to be created.

-a Specifies the access group name. Valid values are viewer, op, advop, usradmin, sysadmin, and svcrep.

-d Specifies the description associated with the user.

Example

To add the hscpe user with the **mkhmcusr** command, do the following:

```
$ lshmcusr -u hscpe
User hscpe does not exist or is not an HMC user.  Please retry the command.
$ mkhmcusr -u hscpe -a svcrep -d "IBM Service Representatives userid"
Enter the new password for user hscpe: XXXXXX
Retype the new password for user hscpe: XXXXXX
$ lshmcusr -u hscpe
User Name  Roles                   Full Name
hscpe      Service Representative  IBM Service Representatives userid
```

As highlighted in the example output, you type the password for the hscpe user twice. If you need to add many HMC users, see 10.2.10, “Automate adding users to HMC” on page 234.

chhmcusr

This command is used to change the name, role, description, or password of an HMC user.

Syntax

```
chhmcusr -u <user-name> -t {name|access|desc|passwd} -v <new-value> [--help]
```

-u Specifies the user to be modified.

-t Specifies the property to change:

- **name** Changes the user name.
- **access** Changes the user role.
- **desc** Changes the user description.
- **passwd** Changes the user password.

-v Specifies the value. The valid values for access are viewer, op, advop, usradmin, sysadmin, and svcrep. When changing the password, if no value is specified, the command prompts the user to enter the password.

Example

To rename user *leaf* to *leaves*:

```
$ lshmcusr -u leaf
User Name  Roles   Full Name
leaf       Viewer  Leaf user
$ chhmcusr -u leaf -t name -v leaves
$ lshmcusr -u leaf
User leaf does not exist or is not an HMC user.  Please retry the command.
$ lshmcusr -u leaves
User Name  Roles   Full Name
leaves     Viewer  Leaf user
```

To change the description for user leaves:

```
$ chhmcusr -u leaves -t desc -v "leaves user..."
$ lshmcusr -u leaves
User Name  Roles   Full Name
leaves     Viewer  leaves user...
```

To change the access group for user leaves:

```
$ chhmcusr -u leaves -t access -v sysadmin
$ lshmcusr -u leaves
User Name  Roles                 Full Name
leaves     System Administrator  leaves user...
```

To change the password for user leaves to leaves2root:

```
$ chhmcusr -u leaves -t passwd -v leaves2root
```

rmhmcusr

This command is used to remove an HMC user.

Syntax

```
rmhmcusr -u <user-name> [--help]
```

-u Specifies the HMC user to be removed.

Example

```
$ lshmcusr -u leaves
User Name  Roles                 Full Name
leaves     System Administrator  leaves user...
$ rmhmcusr -u leaves
$ lshmcusr -u leaves
User leaves does not exist or is not an HMC user.  Please retry the command.
```

9.3.3 Commands for CUoD

The following commands are used to manage Capacity Upgrade on Demand (CUoD) operations on the HMC:

lscuod Lists the information related to CUoD.

chcuod Changes a CUoD attribute.

For further information about CUoD, refer to *IBM @server pSeries 670 and pSeries 690 System Handbook*, SG24-7040.

lscuod

This command is used to list the information related to CUoD.

Syntax

```
lscuod -m <managed-system> -r {cpu|mem} -t {reg|order} [-F <format>][--help]
```

-m Specifies the managed system.

-r Specifies the resource to query the information.

-t Specifies the type of listing to display. Valid values are reg (regular CUoD resource information) and order (for CUoD resource order information).

Example

- If your system is not processor CUoD-capable:

```
$ lscuod -m ITSO_p690 -r cpu -t reg
The managed system is not CUoD capable at the present time.
```

- If your system is not memory CUoD-capable:

```
$ lscuod -m ITSO_p690 -r mem -t reg
The managed system is not CUoD capable at the present time.
```

Additional information

Your system can be any of the following:

- Processor and memory CUoD-capable
- Processor CUoD-capable but memory CUoD-incapable
- Memory CUoD-capable but CPU CUoD-incapable
- Processor and memory CUoD-incapable

chcuod

This command is used to activate the key for CUoD, or to enable/disable Trial CoD[9].

[9] Trial Capacity on Demand

Syntax

```
chcuod -m <managed-system> -o {e|d|s} -k <activation-key> -r {cpu|mem}
    -q <quantity> [--help]
```

-m Specifies the managed system.

-o Specifies the operation to perform:

- **e** Enables Trial CoD.
- **d** Disables Trial CoD.
- **s** Sets activation key.

-k Specifies the activation key for the managed system.

-r Specifies the resource to query the information.

-q Specifies the quantity of processors or memory to enable Trial CoD. For memory, the unit used is GB, not LMB.

9.3.4 Commands to manage system configuration

The following commands are used to manage the system configuration (frame, managed system, partition, and partition profiles):

lssyscfg	Lists the hardware resource configuration.
mksyscfg	Creates the hardware resource configuration.
chsyscfg	Changes the hardware resource configuration.
rmsyscfg	Removes the hardware resource configuration.

lssyscfg

This command is used to list the attributes of the frame, managed system, affinity partition, partition, system profile, and profile.

Syntax

```
lssyscfg -r {ALL|frame|sys|alpar|lpar|prof|sysprof} {-n <object-name>|--all}
    [-m <managed-system>][-p <partition-name>][-F <format>|-z][--help]
```

-r Specifies the resource type to query.

-n Specifies the name of the object. Use --all to query all objects of that type.

-m Specifies the managed system.

-p Specifies the partition name. Use only with -r prof.

-F Specifies the formatted fields to list. Valid values are: affinity_capability, boot_mode, cage_number, cec_capability, cuod_capability, csp_surveillance_policy, csp_version, default_profile, desired_cpu, desired_io, desired_mem, lmb_size, maximum_cpu, maximum_mem, minimum_cpu, minimum_mem, mode, model, name, op_panel_value, op_panel_window_count, partition_profile, power_off_policy, required_io, runtime_capability, serial_number, service_authority, sfp_surveillance, small_rmo, sni_config_mode, sni_device_id, sni_windows, state, and type.

-z Mutually exclusive with the -F flag; if this flag is specified, attributes will be displayed per line in the form attr=value.

Example

- To list all frames, see Example 10-4 on page 219.
- To list all managed systems, see Example 10-2 on page 218.
- To list the detail of a managed system, see Example 9-3.

Example 9-3 List the detailed information of managed systems

```
$ lssyscfg -r sys --all -z
name=ITSO_p690
state=Ready
model=7040-681
serial_number=021768A
affinity_capability=6
cec_capability=195
runtime_capability=24
cuod_capability=0
power_off_policy=false
cage_number=
csp_surveillance_policy=20
csp_version=V4.0
mode=255
lmb_size=256
op_panel_value=LPAR...
```

In Example 9-3, `affinity_capability` equals `6` (2 + 4), which means that ITSO_p690 is both 4-way and 8-way ALPAR capable, as explained in Table 9-2.

Table 9-2 Values for affinity_capability

Value	Meaning
null	ALPAR incapable
2	4-way ALPAR capable
4	8-way ALPAR capable

In Example 9-3 on page 196, `cec_capability` equals `195` (1 + 2 + 64 + 128), meaning that ITSO_p690 is Multi interface version capable, External BPA communication possible, LPAR capable, and SMP capable, as explained in Table 9-3.

Table 9-3 Values for cec_capability

Value	Meaning
1	SMP capable
2	LPAR capable
4	NUMA capable
64	External BPA communication possible
128	Multi interface version capable

In Example 9-3 on page 196, `runtime_capability=24` (8 + 16) indicates that ITSO_p690 is ALPAR- and DLPAR-capable, as explained in Table 9-4.

Table 9-4 Values for runtime_capability

Value	Meaning
8	ALAPR-capable
16	DLPAR-capable
32	Message-passing-capable
64	CUoD-capable

In Example 9-3 on page 196, `mode=255` indicates that ITSO_p690 is partitioned, as explained in Table 9-5.

Table 9-5 Values for mode

Value	Meaning
0	The managed system is running Full System Partition.
255	The managed system is partitioned.

- To list all affinity partitions, see Example 10-6 on page 220.
- To list all partitions, see Example 10-7 on page 221.

- To list all system profiles:

```
$ lssyscfg -r sysprof -m ITSO_p690 --all
Name                   Profile
Up5200-01Before5100-04  aix51_64/lpar01, aix52_64/lpar05, aix51_64/lpar02,
aix52_64/lpar04, aix52_64/lpar08, aix52_64/lpar03, aix52_64/lpar06,
aix52_64/lpar07
```

- To list all profiles for the partition lpar05:

```
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all
Name      BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
aix52_64  1         2           2048        6       8192    1       2048
SMS       3         2           8           8       16      1       4
```

Table 9-6 shows the meaning of the BootMode column.

Table 9-6 Values for BootMode

Value	Meaning
1	Power on normal
2	Power on diagnostic default boot list
3	Power on SMS
4	Power on open firmware OK prompt
5	Power on diagnostic stored boot list

mksyscfg

This command is used to create affinity partition, partition, system profile, and profile. You can create them by either specifying the attributes in a configuration file specified with the -f flag, or on the command line specified with the -i flag.

Syntax

```
mksyscfg -r {alpar|lpar|prof|sysprof} -m <managed-system>
    [-p <partition-name>]
    {-f <config-file> | -i <attr1=value1> <atr2=value2> ...}
    [--help]
```

-r Specifies the resource type to create.

-m Specifies the managed system.

-p Specifies the partition name. Use only with -r prof.

-f Specifies the file containing the configuration information.

-i Specifies the value of each parameter directly on the command line; for example, -i name=NightProfile.

- To create affinity partitions:
  - You must create an input configuration file.
  - Use a partition_type attribute as the first line of the file:
    - partition_type=2 creates a 4-way affinity partition
    - partition_type=3 creates a 8-way affinity partition
  - Use *<RECSP>* as a record separator between each partition.
  - The minimum required attributes are name and profile_name.

  Other attributes that can be specified are: desired_io, required_io, service_authority (0-off, 1-on), sfp_surveillance (0-off, 1-on), sni_config_mode, sni_windows, sni_device_id, small_rmo (1-off, 2-on), and boot_mode (norm, dd, sms, of, ds).

  Note: A partitioning-capable pSeries server can have only one set of affinity partitions at any given time.

- To create a partition, the minimum required attributes are name, profile_name, minimum_cpu, desired_cpu, maximum_cpu, minimum_mem, desired_mem, and maximum_mem.

  Other attributes that can be specified are: desired_io, required_io, service_authority (0-off 1-on), sfp_surveillance (0-off, 1-on), sni_config_mode, sni_device_id, sni_windows, small_rmo (1-off, 2-on), and boot_mode (norm, dd, sms, of, ds).

- To create a system profile, the minimum required attributes are name, partitions, and profile_names.
- To create a profile, the minimum required attributes are name, minimum_cpu, desired_cpu, maximum_cpu, minimum_mem, desired_mem, and maximum_mem.

  Other attributes that can be specified are: desired_io, required_io, service_authority (0-off 1-on), sfp_surveillance (0-off 1-on), sni_config_mode, sni_device_id, sni_windows, sni_windows, sni_device_id, small_rmo (1-off, 2-on), and boot_mode (norm, dd, sms, of, ds).

Note: The minimum required attributes are the minimum that you must specify in order for the command to work. However, you will not be able to activate and boot the partition if you do not specify any I/O slot that contains a bootable disk. Therefore, most likely you should specify the boot disk adapter, such as: required_io='U1.9-P1/Z1'…

Example

To create system profile Up5200-01Before5100-04:

```
$ cat /tmp/mksysprof.Up5200-01Before5100-04
name=Up5200-01Before5100-04
partitions=lpar05,lpar06,lpar07,lpar08,lpar04,lpar03,lpar02,lpar01
profile_names=aix52_64,aix52_64,aix52_64,aix52_64,aix52_64,aix52_64,aix51_64,ai
x51_64
$ mksyscfg -r sysprof -m ITSO_p690 -f /tmp/mksysprof.Up5200-01Before5100-04
$ lssyscfg -r sysprof -m ITSO_p690 --all
Name                    Profile
Up5200-01Before5100-04  aix51_64/lpar01, aix52_64/lpar05, aix51_64/lpar02,
aix52_64/lpar04, aix52_64/lpar08, aix52_64/lpar03, aix52_64/lpar06,
aix52_64/lpar07
```

See other examples using the **mksyscfg** command to create affinity partitions, partitions, and profiles in 10.2, “Basic command line samples” on page 227.

chsyscfg

This command is used to change the attribute of the affinity partition, partition, system profile, and profile.

Syntax

```
chsyscfg -r {alpar|lpar|prof|sysprof} -n <object-name> -m <managed-system>
    [-p <partition-name>]
    [-f <config-file> | -i <attr1=value1> <atr2=value2> ...]
    [--help]
```

-r Specifies the resource type of the object to change.

-n Specifies the object to change.

-m Specifies the managed system.

-p Specifies the partition name. Use only with -r prof.

-f Specifies the file containing the configuration information. See the attributes that can be specified in the syntax section of the **mksyscfg** command above.

-i Specifies the value of each parameter directly on the command line, for example, -i name=NightProfile. See the attributes that can be specified in the syntax section of the **mksyscfg** command above.

Example

To change profile SMS for the lpar05 partition to boot in the SMS mode and to set min:required:max memory values to 4:8:16 LMBs:

```
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all
```

```
Name      BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
aix52_64  1         2           2048        6       8192    1       2048
SMS       1         2           2           8       8       1       1
$ chsyscfg -r prof -m ITSO_p690 -p lpar05 -n SMS -i boot_mode=sms minimum_mem=4
desired_mem=8 maximum_mem=16
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all
Name      BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
aix52_64  1         2           2048        6       8192    1       2048
SMS       3         2           8           8       16      1       4
```

Note: An LMB (logical memory block) is a minimum memory size that is allocatable to a partition. On the current partitioning-capable pSeries servers, an LMB is 256 MB.

To change the name of the SMS profile to SMS_prof:

```
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all
Name      BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
SMS       3         2           8           8       16      1       4
aix52_64  1         2           2048        6       8192    1       2048
$ chsyscfg -r prof -m ITSO_p690 -p lpar05 -n SMS -i name=SMS_prof
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all
Name      BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
SMS_prof  3         2           8           8       16      1       4
aix52_64  1         2           2048        6       8192    1       2048
```

To add two more slots to the desired I/O of test_prof profile of partition test:

```
$ lssyscfg -r prof -m ITSO_p690 -p test  -n test_profile \
    -F name:desired_io:required_io
test_profile::U1.5-P1/Z1:
$ chsyscfg -r prof -m ITSO_p690 -p test  -n test_profile \
    -i required_io+='U1.5-P1/Z2,U1.5-P2/Z1'
$ lssyscfg -r prof -m ITSO_p690 -p test  -n test_profile \
    -F name:desired_io:required_io
test_profile::U1.5-P1/Z1, U1.5-P2/Z1, U1.5-P1/Z2:
```

The += syntax highlighted in the example above instructs the **chsyscfg** command to add these two slots to the current value of the required_io attribute.

Another syntax, -=, also can be used to instruct the **chsyscfg** command to remove the values following it from the current value of the specified attribute.

rmsyscfg

This command is used to remove the managed system, partition, system profile, and profile.

Syntax

```
rmsyscfg -r {sys|lpar|prof|sysprof} -n <object-name>
    [-m <managed-system>]
    [-p <partition-name>]
    [--help]
```

Example

To remove all of the defined affinity partitions:

```
$ lssyscfg -r alpar -m ITSO_p690 --all
Name  id   DLPAR  State          Profile  OpPanel
aaa   011  0      Not Available  aaa
a     009  0      Not Available  a
aaaa  012  0      Not Available  aaaa
aa    010  0      Not Available  aa
$ rmsyscfg -r alpar -m ITSO_p690 --all
$ lssyscfg -r alpar -m ITSO_p690 --all
No results were found.
```

To remove the partition test:

```
$ rmsyscfg -r lpar -m ITSO_p690 -n test
$ lssyscfg -r lpar -m ITSO_p690 -n test
The partition entered was not found. Please check your entry and retry the
command.
```

To remove the system profile Up5200-01Before5100-04:

```
$ lssyscfg -r sysprof -m ITSO_p690 --all
Name                    Profile
Up5200-01Before5100-04  aix52_64/lpar03, aix52_64/lpar06, aix52_64/lpar07,
aix51_64/lpar01, aix51_64/lpar02, aix52_64/lpar05, aix52_64/lpar04,
aix52_64/lpar08
$ rmsyscfg -r sysprof -m ITSO_p690 -n Up5200-01Before5100-04
$ lssyscfg -r sysprof -m ITSO_p690 --all
No results were found.
```

To remove profile OF for lpar05:

```
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 -n OF
Name  BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
OF    4         2           2           8       8       1       1
$ rmsyscfg -r prof -m ITSO_p690 -p lpar05 -n OF
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 -n OF
The profile entered was not found. Please check your entry and retry the
command.
```

9.3.5 Commands to back up and restore partition profile data

The following commands are used to back up and restore partition profile data:

`bkprofdata` Back up partition profile data to a file.
`rstprofdata` Restore partition profile data from a file.

bkprofdata

This command backs up the partition profile data to a file.

Syntax

```
bkprofdata -m <managed-system> -f <output-file> [--help]
```

-m Specifies the managed system.

-f Specifies the file to contain the backup profile data. If you do not specify the full path for the file, it is stored in /var/hsc/profiles/<MT-MDL*S/N>.

> **Note:** Do not use the output file name, *backupFile* because it is used by the automatic back-up mechanism to save the most current partition profile data. Whenever a change is made to any profile data, backupFile gets updated.

Example

To back up profile data to the ITSO_p690_2 file in the default location:

```
$ bkprofdata -m ITSO_p690 -f ITSO_p690_2
$ cd /var/hsc/profiles/7040-681*021768A; ls -alrt
total 68
drwxr-xr-x    3 root     root         4096 Jun  1 12:18 ..
-rw-r--r--    1 root     root        20464 Jun 16 12:43 ITSO_690
-rw-r--r--    1 root     root        20464 Jun 16 15:56 backupFile
-rw-r--r--    1 root     root        20464 Jun 17 10:54 ITSO_p690_2
drwxr-xr-x    2 root     root         4096 Jun 17 10:54 .
```

To back up profile data to the file /tmp/profdata.09Jun2003:

```
$ ls -al /tmp/profdata.09Jun2003
ls: /tmp/profdata.09Jun2003: No such file or directory
$ bkprofdata -m ITSO_p690 -f /tmp/profdata.09Jun2003
$ ls -al /tmp/profdata.09Jun2003
-rw-r--r--    1 root     root        20464 Jun  9 18:05 /tmp/profdata.09Jun2003
```

Additional information

When you perform the Save Upgrade Data operation (see “Save Upgrade Data” on page 113), it merely gathers the files under the directory /var/hsc/profiles on the HMC then archives them in the special disk partition; it does not perform any profile data backup by itself. Therefore, you must either use the graphical user interface or back up profile data using **bkprofdata** before performing the Save Upgrade Data operation.

rstprofdata

This command restores the partition profile data from a file.

Syntax

```
rstprofdata -m <managed-system> -f <backup-file> -l {1|2|3} [--help]
```

-m Specifies the managed system.

-f Specifies the file containing the backup profile data. You need to specify the full path name.

-l Specifies the restore priority:

1 Full restore of data from the file.

2 Merge current/backup with backup priority.

3 Merge current/backup with current priority.

Example

To restore profile data from the file ITSO_p690_2, giving priority to the data in the backup file over the current configuration:

```
$ rstprofdata -m ITSO_p690 -f /var/hsc/profiles/7040-681*021768A/ITSO_p690_2 -l
2
```

Additional information

- To list your backup files, use the following command on the HMC[10]:

  ```
  ls -al /var/hsc/profiles/<MT-MDL*S/N>
  ```

- Do not restore the backupFile; you would not see any changes because it is used internally by HMC to cache the current image of the profile data.
- A full restore is not permitted when there are logical partitions in the Running state. A full restore can only be issued when the managed system was powered on with the Partition Standby state and there are no partitions running, booting, or in the open firmware state.

> **Note:** HMC uses the LparID as the criteria to decide whether the partition is the same. If the same LparID is used for different partition names in the backup and the current configuration, the result of the restore operation varies depending on the specified priority.

[10] See 10.1.2, “What is my managed system’s MT-MDL*S/N?” on page 219.

9.3.6 Commands to manage hardware resources

The following commands are used to manage hardware resources:

lshwinfo	Displays the temperature of the managed system.
lshwres	Lists the hardware resource configuration.
chhwres	Changes the hardware resource configuration.

lshwinfo

This command displays hardware information, such as temperature, of the specified managed system.

> **Note:** The **lshwinfo** command works for managed systems that are accommodated in the 7040-W42 frame managed by the HMC. (The BPC for the frame must be connected to the HMC via RS-422.)

Syntax

```
lshwinfo -e <frame-name> -r sys [-n <object-name>|--all] [-F <format>] [--help]
```

-e Specifies the frame name.

-n Specifies the object name in the frame. Use --all to list all objects.

-F Specifies the formatted fields to list. Currently, temperature is the only valid value.

Example

In the following example, the managed system 7039-651*020032, which is pSeries 655, shows that the temperature is 28 degrees centigrade.

```
$ lssyscfg -r frame --all
Name              FrameNum  IsReal  PortNums
7040-61R*1234567  0                 -505
$ lshwinfo -e 7040-61R*1234567 -r sys --all
cec_mtms          temperature
7039-651*0200032  28
```

If the command is issued against a managed system other than pSeries 655, the following error message will be displayed:

```
$ lssyscfg -r frame --all
Name              FrameNum  IsReal  PortNums  Frame Type
7040-61R*021767A  0         No                2
$ lshwinfo -r sys -e '7040-61R*021767A' --all
Either the connection to the bulk power assembly was lost, or there is no bulk
power assembly.  Retry the operation.
```

lshwres

This command is used to list hardware resources for the managed system. Specify the -p flag to list hardware resources in the partition.

Syntax

```
lshwres -m <managed-system> -r {ALL|cpu|mem|slot|led}
    [-p <partition-name> | --all] [-y {sys|ident}] [-F <format>] [--help]
```

-m Specifies the managed system.

-r Specifies the resource to list. Use -r ALL to list all resources (cpu, memory, slot, and LED).

-p Specifies the partition to list the resource. Use --all to list resources for all partitions.

-y Specifies the LED type: sys (system attention LED) or ident (identify LED).

-F Specifies the formatted fields to list. Valid values are: name, state, status, id, parent, location, classcode, assigned_to, system, index, location_code, max, min, allocated, free, lmb_size, drawer_id, slot_id, slot_type, partition, partition_name, and phys_loc.

Example

To list all processors in the managed system ITSO_p690, use the **lshwres** command as follows:

```
$ lshwres -m ITSO_p690 -r cpu
id  Status               partition             assigned_to
22  Configured by System  003*7040-681*021768A  lpar03
23  Configured by System  002*7040-681*021768A  lpar02
3   Configured by System  008*7040-681*021768A  lpar08
2   Configured by System  007*7040-681*021768A  lpar07
1   Configured by System  005*7040-681*021768A  lpar05
16  Configured by System  004*7040-681*021768A  lpar04
17  Configured by System  003*7040-681*021768A  lpar03
5   Configured by System  004*7040-681*021768A  lpar04
0   Configured by System  005*7040-681*021768A  lpar05
20  Configured by System
21  Configured by System
6   Configured by System  006*7040-681*021768A  lpar06
7   Configured by System  008*7040-681*021768A  lpar08
18  Configured by System  001*7040-681*021768A  lpar01
19  Configured by System  007*7040-681*021768A  lpar07
4   Configured by System  008*7040-681*021768A  lpar08
```

In this example output, you can see that there are 16 processors, and two (physical processor ID 20 and 21) are not allocated to any partition.

To list the memory resource for partition lpar06, use the **lshwres** command as follows:

```
$ lshwres -m ITSO_p690 -r mem -p lpar06
allocated  free  lmb_size  max  min  partition            system     partition_name
8          193   256       12   4    006*7040-681*021768A  ITSO_p690  lpar06
```

This output shows that lpar06 is allocated eight LMBs and the LMB size (lmb_size) is 256 MB; therefore, it is allocated the memory size of 2048 MB, while the managed system still has 48.25 GB free memory (193 LMBs times 256 MB) in total.

To check whether the system attention LED is on, see 10.1.13, “Is the system attention LED light on?” on page 224.

chhwres

This command is used to make changes (add, remove, move) to the resources (CPU, memory, slot) of the partitions. It performs dynamic logical partitioning (DLPAR) to reconfigure the partition resources dynamically.

It can also be used to set and reset various LEDs on the managed system.

Syntax

```
chhwres -m <managed-system> -o {a|r|m|s} -r {cpu|mem|slot|led}
    [-p <partition-name>]
    [-t <target-partition-name>]
    [-q <quantity>]
    [-i <drawer-id> -s <slot-id> | -l <location-code>]
    [-y {sys|ident} -x <LED-index> -v <LED-setting>]
    [-w <timeout>]
    [-d <detail-level>]
    [--help]
```

-m Specifies the managed system.

-o Specifies the operation to perform:

- **a** Add
- **r** Remove
- **m** Move
- **s** Set[11]

-r Specifies the resource to perform the operation.

[11] Set is the only operation valid for the LED resource type.

-p Specifies the partition to perform the operation or the source partition (for move operation).

-t Specifies the target partition (for move operation).

-q Specifies the quantity of CPUs or of LMBs for memory.

-i Specifies the drawer ID.

-s Specifies the slot ID.

-l Specifies the physical location code.

-y Specifies the LED type: sys (system attention LED) or ident (identify LED).

-x Specifies the LED index.

-v Specifies the LED setting. Valid values are on and off.

-w Specifies the timeout for the operation. Default is 0 (zero), which means no timeout (that is, the operation can take as much time as it needs).

-d Specifies the detail level for the **drmgr**[12] command. Valid values are 0 to 5.

Example

To add two processors to lpar05:

```
$ ssh root@lpar05 lsdev -Cc processor
proc0  Available 00-00 Processor
proc1  Available 00-01 Processor
$ chhwres -m ITSO_p690 -o a -r cpu -q 2 -p lpar05
$ ssh root@lpar05 lsdev -Cc processor
proc0  Available 00-00 Processor
proc1  Available 00-01 Processor
proc20 Available 00-20 Processor
proc21 Available 00-21 Processor
```

To remove 1 GB (four LMBs) from lpar06:

```
$ ssh root@lpar06 lsattr -El mem0
goodsize 2048 Amount of usable physical memory in Mbytes False
size     2048 Total amount of physical memory in Mbytes  False
$ chhwres -m ITSO_p690 -o r -r mem -q 4 -p lpar06
$ ssh root@lpar06 lsattr -El mem0
goodsize 1024 Amount of usable physical memory in Mbytes False
size     1024 Total amount of physical memory in Mbytes  False
```

[12] The **drmgr** command is invoked on an AIX partition if a DLPAR operation is requested from the HMC.

To move one processor from lpar05 to lpar06:

```
$ ssh root@lpar05 lsdev -Cc processor
proc0  Available 00-00 Processor
proc1  Available 00-01 Processor
proc20 Available 00-20 Processor
proc21 Available 00-21 Processor
$ ssh root@lpar06 lsdev -Cc processor
proc6  Available 00-06 Processor
$ chhwres -m ITSO_p690 -o m -r cpu -q 1 -p lpar05 -t lpar06
$ ssh root@lpar05 lsdev -Cc processor
proc1  Available 00-01 Processor
proc20 Available 00-20 Processor
proc21 Available 00-21 Processor
[hscroot@itsohmc hscroot]$ ssh root@lpar06 lsdev -Cc processor
proc0  Available 00-00 Processor
proc6  Available 00-06 Processor
```

To turn off the system attention LED, see 10.1.14, “How can I turn off the system attention LED?” on page 225.

9.3.7 Commands for virtual terminals

The following commands are used to manage virtual terminals:

mkvterm	Open a virtual terminal.
rmvterm	Close a virtual terminal.

mkvterm

This command opens a virtual terminal. The virtual terminal is opened in the same window that you issue the **mkvterm** command.

The recommended approach to open a virtual terminal is to log on to HMC by using ssh (for example, ssh -l hscroot itsohmc.itsc.austin.ibm.com), then use the **mkvterm** command to open the virtual terminal.

To close the opened virtual terminal session, do either of the following:

- Issue the **rmvterm** command from another ssh session.
- In the virtual terminal window, type a tilde and a period (~.).

  A message “Terminate session? [y/n]” appears. Reply y to close the virtual terminal.

> **Note:** If the virtual terminal shows the AIX login or password prompt line, you may need to type the key sequence several times to close the virtual terminal.

Syntax

```
mkvterm -m <managed-system> [-p <partition-name>][--help]
```

-m Specifies the managed system.

-p Specifies the partition to open the virtual terminal session. If omitted, opens the virtual terminal on the Full System Partition.

Example

```
[hscroot@itsohmc hscroot]$ mkvterm -m ITSO_p690 -p lpar05
NVTS itsohmc.itsc.austin.ibm.com 9734 005*7040-681*021768A 1
005*7040-681*021768A _VT_
...
... omitted blank lines ...
...
AIX Version 5
(C) Copyrights by IBM and by others 1982, 2002.
Console login:
```

Note: When the managed system is powered off, you can use **`mkvterm -m <managed-system>`** to open a virtual terminal to access the service processor menu.

rmvterm

This command closes a virtual terminal.

Syntax

```
rmvterm -m <managed-system> [-p <partition-name>][--help]
```

-m Specifies the managed system.

-p Specifies the partition to close the virtual terminal session. If omitted, closes the virtual terminal on the Full System Partition.

Example

```
$ rmvterm -m ITSO_p690 -p lpar05
```

After the message `Connection has closed` appears on the opened virtual terminal, press Enter to return to the prompt.

```
root@lpar05:/ [581] #
 Connection has closed
/opt/hsc/bin/command/mkvterm: line 40:   675 Broken pipe
/opt/hsc/bin/vxterm $s
           [hscroot@itsohmc hscroot]$ [hscroot@itsohmc hscroot]$
```

> **Note:** Currently, besides trying to open a virtual terminal to the partition, there is no better way to check which partition's virtual terminal is currently opened.

Additional information

Processes named [mkvterm] and vxterm can remain on the system even though no virtual terminal is active. To clean up these processes, use the **`kill`** command as the root user.

9.3.8 Commands used in recovery situations

The following commands are used in recovery situations:

`rmsplock`	Removes the lock set in the service processor.
`rsthwres`	Restores the hardware resource configuration.

rmsplock

This command removes the lock set in the service processor in the redundant HMC configuration. In a very rare situation, HMC might fail to remove the lock set in the service processor on a managed system. This command removes all leftover locks.

Syntax

```
rmsplock -m <managed-system> [--help]
```

-m	Specifies the managed system.

Example

To remove any leftover lock on the managed system ITSO_p690:

```
$ rmsplock -m ITSO_p690; echo $?
```

rsthwres

This command restores the hardware resource configuration to a consistent state. Use it when a DLPAR operation fails to complete successfully, thus leaving the hardware resource assignment in NVRAM on the managed system and, on AIX, inconsistent.

If you have a failed DLPAR operation, run this command before continuing to perform any DLPAR operation.

Syntax

```
rsthwres -m <managed-system> -r {cpu|mem|slot} [-p <partition-name>][-u
<processor-id>][-i <drawer-id> -s <slot-id>|-l <location-code>][--help]
```

-m Specifies the managed system.
-r Specifies the resource to restore.
-p Specifies the partition to restore.
-u Specifies the processor ID to restore.
-i Specifies the drawer ID to restore.
-s Specifies the slot ID to restore.
-l Specifies the physical location code to restore.

Example

To restore the CPU configuration after a failed DLPAR operation:

```
$ rsthwres -m ITSO_p690 -r cpu
```

If there is no inconsistency for the CPU resource assignment on the managed system, the command displays the following message:

```
$ rsthwres -m ITSO_p690 -r cpu
There are no recoverable processor resources in the system.
```

To restore the memory configuration after a failed DR operation:

```
$ rsthwres -m ITSO_p690 -r mem
```

To restore the I/O device configuration after a failed DLPAR operation:

```
$ rsthwres -m ITSO_p690 -r slot
```

If there is no inconsistency for the I/O resource assignment on the managed system, the command displays one of the following messages:

```
$ rsthwres -m ITSO_p690 -r slot
The I/O device  with the slot ID  and drawer ID entered is not a recoverable
resource.
$ rsthwres -m ITSO_p690 -r slot -l U1.5-P1-I5
The I/O device  with the physical location code  entered is not a recoverable
resource.
$ rsthwres -m ITSO_p690 -r slot -i '7040-61D*021766A-P2' -s 5
The I/O device  with the slot ID  and drawer ID entered is not a recoverable
resource.
```

9.3.9 Commands used for other purposes

The following commands are used for purposes not explained in the other subsections of 9.3, “HMC commands” on page 184:

`chsysstate` Change system state.
`lssvcevents` List the HMC events

chsysstate

This command is used to change system state. By changing the system state, you can perform various operations on the managed system and partitions, such as: power on, power off, reset, activate, shutdown, and so on.

Syntax

```
chsysstate -m <managed-system> -o {on|off|reset|osreset|osshutdown|rebuild}
    -r {sys|lpar|sysprof}
    [-n <object-name>]
    [-f <profile-name>]
    [-c {full|lpar}]
    [-b {norm|dd|sms|of|ds|std|auto}]
    [--help]
```

-m Specifies the managed system.

-o Specifies the operation to perform:

- **on** Power on the managed system or activate a partition.
- **off** Power off the managed system or perform a hard reset on a partition.
- **reset** Reset the managed system (works only in Full System Partition) or perform a soft reset on a partition.
- **osreset** Reboot a partition.
- **osshutdown** Shut down a partition.
- **rebuild** Rebuild the manage system.

-r Specifies the resource type of the object to perform the operation.

-n Specifies the object to perform the operation.

-f Specifies the partition profile to use.

-c Specifies the mode to power on the managed system:

- **full** Full System Partition
- **lpar** Logical partition

-b Specifies the boot mode:

- **norm** Normal
- **dd** Diagnostic default boot list
- **sms** SMS
- **of** Open firmware OK prompt

ds Diagnostic stored boot list

std Partition standby

auto Automatically start partitions

Example

To rebuild a managed system:

```
$ chsysstate -o rebuild -r sys -n ITSO_p690
```

This **chsysstate** command has more uses; for example, you can use it to activate, shut down, reboot, soft reset, and hard reset a partition, or to power on, reset, and power off a managed system. More example uses are provided in 10.2, “Basic command line samples” on page 227.

lssvcevents

This command is used to display hardware-serviceable events or HMC console events.

Syntax

```
lssvcevents -t {hardware|console}[-d <#days-to-go-back>]
    [-m <managed-system> -s {sp|lpar|ALL} [-p <partition-name>]][--help]
```

-t Specifies the type of event to query.

-d Specifies the number of days to go back and query for the events. Default is seven days. The maximum for hardware event is 90 days.

-m Specifies the managed system (required only for -t hardware).

-s Specifies the source of events to query (required only for -t hardware):

- **sp** Query from the Service Processor
- **lpar** Query from the partitions
- **ALL** Query all above events

-p Specifies the partition to query (optional for -t hardware).

Example

To view HMC console events for the past week:

```
$ lssvcevents -t console
Earliest Timestamp    Description
06/10/03 02:45:20 PM  HSCE2156 DLPAR: Completed moving cpus.
06/10/03 02:45:20 PM  HSCE2156 DLPAR: Completed moving cpus.
06/10/03 02:45:16 PM  HSCE2072 DLPAR: Processor ID 0 was added to partition 6.
```

```
06/10/03 02:45:16 PM  HSCE2071 DLPAR: Processor ID 0 was removed from partition
5.
06/10/03 02:39:06 PM  HSCE2158 DLPAR: Completed removing memory from the
partition.
06/10/03 02:39:06 PM  HSCE2158 DLPAR: Completed removing memory from the
partition.
06/10/03 02:39:02 PM  HSCE2073 DLPAR: 1024 MB of memory was removed from
partition 6.
06/10/03 02:38:39 PM  HSCE2154 DLPAR: Completed adding cpus to the partition.
06/10/03 02:38:12 PM  HSCE2072 DLPAR: Processor ID 21 was added to partition 5.
06/10/03 02:38:11 PM  HSCE2072 DLPAR: Processor ID 20 was added to partition 5.
...
... omitted lines ...
...
06/03/03 05:44:09 AM  HSCE2155 DLPAR: Completed removing cpus from the
partition
.
06/03/03 05:44:07 AM  HSCE2071 DLPAR: Processor ID 2 was removed from partition
7.
06/03/03 05:42:44 AM  HSCE2072 DLPAR: Processor ID 19 was added to partition 7.
06/03/03 05:29:34 AM  HSCE2167 User hscroot: Forced Virtual Terminal Session on
logical partition lpar08 in managed system ITSO_p690 to close
06/03/03 05:23:27 AM  HSCE2014 UserName hscroot Virtual terminal has been open
on partition lpar08 of lpar id 008*7040-681*021768A of managed system
ITSO_p690;
```

To view any hardware-serviceable events from the service processor:

```
$ lssvcevents -t hardware -d 90 -m DEV -s sp
Managed System  Earliest Timestamp   Call Home  Called Home  Error Class
Description
DEV             05/27/2003 11:15:37  Yes        Yes          CECCSP
Bootfailuredetected
```

To view hardware-serviceable events from lpar05 during the past month:

```
$ lssvcevents -t hardware -d 30 -m ITSO_p690 -s lpar -p lpar05
Managed System  Earliest Timestamp   Call Home  Called Home  Error Class
Description
ITSO_p690       05/14/2003 17:55:53  Yes        Yes          OS           The
drive cannot be started.
ITSO_p690       05/14/2003 17:47:50  Yes        Yes          OS           Error
log analysis indicates a hardware failure.
ITSO_p690       06/03/2003 17:56:56  No         No           SURVALNC
Communications to the SFP component on partition lpar08 are unavailable.
```

To view the time when critical console data was performed, see Example 10-16 on page 225.

To view the time partition profile data backup was performed, see Example 10-17 on page 225.

10

Advanced HMC command examples

This chapter provides more-advanced information about using the command line interface on the IBM Hardware Management Console for pSeries (HMC).

The first section describes how we can use the commands to answer many simple questions that the system administrators would like to know.

Next, we describe the use of the command line to do the tasks that are traditionally done by the GUI. We also include a few examples of Perl scripts for the advanced usage of the command line interface.

> **Note:** Avoid copying any files onto the HMC other than those detailed in IBM publications, as this can interfere with problem determination by IBM support personnel. Therefore, all supported commands should be executed via either the rexec or ssh facility from remote systems. We suggest you store such files as administrative scripts on systems other than the HMC.

For further information about the command line interface on the HMC, refer to *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590.

10.1 Frequently asked questions and HMC commands

This section shows how HMC command line interface can be used to answer some frequently asked questions from administrators or managers of the managed system.

10.1.1 What is the managed system name?

All but a few HMC commands require either the managed system name or machine type, model, serial number as the parameter for the **-m** flag.

To get the currently attached and operating managed system name on your HMC, use the **lssyscfg** command with the -r sys option, as in Example 10-1. The managed system system name appears under the Name column. If multiple managed systems are attached to your HMC, the command displays a line for each managed system under the header line.

Example 10-1 Display managed system information[1]

```
$ lssyscfg -r sys --all
Name       CageNum  LMBSize  Mode State  CSPVersion  Model     OpPanel  S/N
ITSO_p690           256      255   Ready  V4.0        7040-681  LPAR...  021768A
```

If a managed system is completely powered off, the command does not display any information for that managed system. However, if the managed system is hooked up to the wall power outlet, some of columns will be displayed depending on the booting-up process of the managed system, because the service processor on the managed system is still supplied power.

If you intend to get the managed system names only, add the -F flag as shown in Example 10-2. The managed system name is the first output field. (Here we include the machine type, model and serial number so that it is easier to identify the managed system.)

Example 10-2 Display managed system names

```
$ lssyscfg -r sys --all -F name:model:serial_number
ITSO_p690:7040-681:021768A:

$ lssyscfg -r sys --all -F name:model:serial_number
regatta00:7040-671:022967A:
cler02:7028-6C4:106B69A:
cler01:7028-6C4:106B64A:
cler03:7028-6C4:106B65A:
```

[1] The value in the Mode column specifies the system partitioning status: 0 =Full System Partition; 255 =Partitioned.

10.1.2 What is my managed system's MT-MDL*S/N?

To get the MT-MDL*S/N[2] information for a managed system, use the **lssyscfg** command with the -r sys option and -F flag as shown in Example 10-3.

Here, we use Perl to concatenate the model and serial number strings together with the asterisk character (*).

*Example 10-3 Display MT-MDL*S/N of a managed system*

```
$ lssyscfg -r sys --all -F name:model:serial_number|perl -F: -ane 'print "The MT-MDL*S/N of 
$F[0] is $F[1]*$F[2]\n"'
The MT-MDL*S/N of ITSO_p690 is 7040-681*021768A

$  lssyscfg -r sys --all -F name:model:serial_number|perl -F: -ane 'print "The MT-MDL*S/N of 
$F[0] is $F[1]*$F[2]\n"'
The MT-MDL*S/N of regatta00 is 7040-671*022967A
The MT-MDL*S/N of cler02 is 7028-6C4*106B69A
The MT-MDL*S/N of cler01 is 7028-6C4*106B64A
The MT-MDL*S/N of cler03 is 7028-6C4*106B65A
```

10.1.3 What is my frame name?

To get the frame name, use the **lssyscfg** command with the -r frame option as shown in Example 10-4.

Example 10-4 Display frame name

```
$ lssyscfg -r frame --all -F name
7040-61R*021767A
```

10.1.4 Is my managed system CUoD-capable?

To verify whether your managed system is processor CUoD capable, use the **lscuod** command with the -r cpu option. To verify whether your managed system is memory CUoD capable or not, use the **lscuod** command with -r mem option.

Example 10-5 shows an output example when the command is executed on a CUoD non-capable system; ITSO_p690 is neither processor CUoD capable nor memory CUoD capable in this example.

Example 10-5 Verify CUoD capabilities

```
$ lscuod -m ITSO_p690 -r cpu -t reg
The managed system is not CUoD capable at the present time.
```

[2] MT-MDL*S/N: machine type, model, and serial number

```
$ lscuod -m ITSO_p690 -r mem -t reg
The managed system is not CUoD capable at the present time.
```

10.1.5 How many affinity partitions are defined or running?

To check the affinity partitions, use the **lssyscfg** command with the -r alpar option as shown in Example 10-6.

Example 10-6 Display all affinity partitions[3]

```
$ lssyscfg -r alpar -m regatta00 --all
No results were found.

$ lssyscfg -r alpar -m ITSO_p690 --all
Name  id DLPAR  State    Profile  OpPanel
aaa   011  0      Running  aaa
a     009  0      Running  a
aaaa  012  0      Running  aaaa
aa    010  0      Running  aa

$ lssyscfg -r alpar -m ITSO_p690 --all
Name  id   DLPAR  State          Profile  OpPanel
aaa   011  0      Not Available  aaa
a     009  0      Not Available  a
aaaa  012  0      Not Available  aaaa
aa    010  0      Not Available  aa
```

If the output of the **lssyscfg** command with -r alpar option is `No results were found`, this managed system does not have any defined affinity partitions.

Notice that if the affinity partitions are running, the regular partitions will not be available. The same is true vice versa.

10.1.6 Which partitions are DLPAR capable?

For the list of DLPAR capable partitions using the Web-based System Manager, select each partition and right-click on it. If the pop-up menu does not contain Dynamic Logical Partitioning, then the partition is not DLPAR capable.

If the Dynamic Logical Partitioning entry appears on the pop-up menu, move the mouse to the entry to see whether its submenu (Adapters, Processors, Memory) is enabled. If it is grayed out, the partition is not DLPAR capable.

[3] The id column shown in the output represents the partition ID, which is used internally in the HMC software to uniquely identify each partition.

This information also can be obtained by using the **lssyscfg** command with the -r lpar option as shown in Example 10-7.

Example 10-7 Display all logical partitions

```
$ lssyscfg -r lpar -m ITSO_p690 --all
Name                 id   DLPAR  State          Profile               OpPanel
lpar06               006  15     Running        aix52_64
lpar03               003  15     Running        aix52_64
FullSystemPartition  000  0      Not Available  PowerOnNormalProfile
lpar07               007  15     Running        aix52_64
lpar04               004  15     Running        aix52_64
lpar01               001  0      Running        aix51_64
lpar08               008  15     Running        aix52_64
lpar05               005  15     Running        aix52_64
lpar02               002  0      Running        aix51_64
```

If the value in the DLPAR column is `15`, the partition is DLPAR capable[4].

10.1.7 How many processors are allocated to each partition?

To display the number of processors allocated to each partition, use the **lshwres** command with the -r cpu option and -F flag as shown in Example 10-8.

Example 10-8 Display CPU allocated to each partition

```
$ lshwres -r cpu -m ITSO_p690 --all -F partition_name:allocated
lpar06:1
lpar03:2
FullSystemPartition:null
lpar07:2
lpar04:2
lpar01:1
lpar08:2
lpar05:2
lpar02:1
```

Notice that you must specify the --all flag to tell the **lshwres** command to list the information for all partitions.

[4] In the future HMC software release, the value is anticipated to be changed to *YES* for DLPAR capable and *NO* for DLPAR incapable.

10.1.8 How many processors are free?

To display the number of free processors (processors that are not assigned to any partition), use the **lshwres** command with the -r cpu option and -F flag as shown in Example 10-9.

Example 10-9 Display the number of free CPUs

```
$ lshwres -r cpu -m ITSO_p690 -p lpar01 -F free
3
```

Notice that you can specify any partition name, including the one that is not currently active, for the -p flag.

10.1.9 How much memory is allocated to each partition now?

To display the amount of memory allocated to each partition, use the **lshwres** command with the -r mem option and -F flag as shown in Example 10-10.

Here, we use Perl to multiply the `lmb_size` and `allocated` to get the size of memory allocated in MB.

Example 10-10 Display memory allocated to each partition

```
$ lshwres -r mem -m ITSO_p690 --all -F partition_name:lmb_size:allocated|grep -v null|perl -F:
-ane '$mem=$F[1]*$F[2]; print "Partition $F[0] has $mem MB allocated..\n"'
Partition lpar06 has 2048 MB allocated..
Partition lpar03 has 3072 MB allocated..
Partition lpar07 has 2048 MB allocated..
Partition lpar04 has 1024 MB allocated..
Partition lpar01 has 1024 MB allocated..
Partition lpar08 has 2048 MB allocated..
Partition lpar05 has 2048 MB allocated..
```

Notice that you must specify the --all flag to tell the **lshwres** command to list the information on all partitions.

Note: The amount of memory allocated to each partition above is the amount that each partition ‘sees.’ It does not include the page_table overhead.

To get the total amount of memory including page_table overhead, use the following command:

```
$ lshwres -r mem -m ITSO_p690
allocated  page_table  partition             assigned_to
2112       64          006*7040-681*021768A  lpar06
3584       512         003*7040-681*021768A  lpar03
2112       64          007*7040-681*021768A  lpar07
1088       64          004*7040-681*021768A  lpar04
1088       64          001*7040-681*021768A  lpar01
2176       128         008*7040-681*021768A  lpar08
2176       128         005*7040-681*021768A  lpar05
1088       64          002*7040-681*021768A  lpar02
```

The *allocated* column is the total amount of memory.

10.1.10 How much memory is free now?

To display the amount of free memory, use the **lshwres** command with the -r mem option and -F flag as shown in Example 10-11.

Here, we use Perl to multiply the `lmb_size` and `free` to get the number of MB free.

Example 10-11 Display free memory

```
$ lshwres -r mem -m ITSO_p690 -p test -F lmb_size:free|perl -F: -ane '$mem=$F[0]*$F[1]; print
"There is $mem MB free..\n"'
There is 50432 MB free..
```

Notice that you can specify any partition name, including the one that is not currently active, for the -p flag.

10.1.11 Display empty I/O slots allocation status

To display the list of I/O slots that are empty and whether they are allocated to any partition, use the **lshwres** command with the -r slot option and -F flag as shown in Example 10-12.

Example 10-12 Display empty I/O slots and their allocation status

```
$ lshwres -r slot -m ITSO_p690 -F phys_loc:slot_type:assigned_to|grep 'Empty'
U1.9-P1-I3:Empty:lpar01
U1.9-P1-I9:Empty:lpar02
```

```
U1.9-P1-I5:Empty:lpar02
U1.9-P1-I8:Empty:lpar02
U1.9-P1-I4:Empty:lpar01
U1.5-P2-I5:Empty:null
U1.5-P2-I8:Empty:lpar08
U1.5-P2-I1:Empty:lpar07
U1.5-P2-I4:Empty:lpar07
U1.5-P2-I3:Empty:null
U1.5-P2-I9:Empty:lpar08
U1.5-P1-I4:Empty:lpar05
U1.5-P1-I3:Empty:lpar05
U1.9-P2-I4:Empty:lpar03
U1.9-P2-I3:Empty:lpar03
U1.9-P2-I5:Empty:lpar04
U1.9-P2-I8:Empty:lpar04
```

Note: If the `assigned_to` field is null, then the slot is not allocated.

10.1.12 Which partition currently has CD/DVD assigned to it?

To display the partition to which the CD/DVD device is assigned, use the **`lshwres`** command withthe -r slot option and -F flag as shown in Example 10-13.

Example 10-13 Display the partition that has the CD-DVD allocated to it

```
$ lshwres -r slot -m ITSO_p690 -F phys_loc:slot_type:assigned_to|grep 'U1.9-P1-I10'
U1.9-P1-I10:SCSI bus controller:lpar05
```

Note: This example shows that the CD/DVD device is connected to the SCSI adapter in the U1.9-P1-I10 PCI slot on the pSeries 690 or pSeries 670.

10.1.13 Is the system attention LED light on?

To check whether the system attention LED is on, use the **`lshwres`** command with the -r led -y sys option as shown in Example 10-14.

Example 10-14 Display the system attention LED

```
$ lshwres -m ITSO_p690 -r led -y sys
index   State  location_code
884737  on     U1.18
```

10.1.14 How can I turn off the system attention LED?

To turn off the system attention LED, use the **chhwres** command with the -o s option as shown in Example 10-14 on page 224.

Example 10-15 Turn off the system attention LED - p690

```
$ lshwres -m ITSO_p690 -r led -y sys
index   State  location_code
884737  on     U1.18
$ chhwres -m ITSO_p690 -o s -r led -y sys -x 884737 -v off
$ lshwres -m ITSO_p690 -r led -y sys
index   State  location_code
884737  off    U1.18
```

To specify the -x flag, you must get the index value for the specific physical location code using the **lshwres** command.

10.1.15 When was the critical console data backup performed?

To display the date and time of the critical console data backup, use the **lssvcevents** command with the -t console option as shown in Example 10-16.

Example 10-16 Display the date and time when critical console data backup was performed

```
$ lssvcevents -t console -d 9999|grep 'backup of critical'
05/23/03 05:25:39 PM  HSCE2062 A backup of critical console data was performed.
05/21/03 09:44:17 AM  HSCE2062 A backup of critical console data was performed.
05/20/03 03:22:32 PM  HSCE2062 A backup of critical console data was performed.
05/15/03 11:01:23 PM  HSCE2062 A backup of critical console data was performed.
05/15/03 05:48:52 AM  HSCE2062 A backup of critical console data was performed.
```

Notice that you can use the -d flag to specify how far back in time (number of days) you want to go for the list of events. Default is 7 (seven) days.

10.1.16 When did I do the profile data backup?

To display the date and time that the profile data backup was performed, use the **lssvcevents** command withthe -t console option as shown in Example 10-17.

Example 10-17 Display the date and time when profile data backup was performed

```
$ lssvcevents -t console -d 9999|grep 'Profile data'
05/20/03 02:44:32 PM  HSCE2004 UserName hscroot Profile data of managed system ITSO_p690 has
been backup to file /var/hsc/profiles/7040-681*021768A/Theeraphong;
05/20/03 01:44:55 PM  HSCE2004 UserName hscroot Profile data of managed system ITSO_p690 has
been backup to file /var/hsc/profiles/7040-681*021768A/Theeraphong;
```

```
05/20/03 12:05:41 PM  HSCE2004 UserName hscroot Profile data of managed system ITSO_p690 has
been backup to file /var/hsc/profiles/7040-681*021768A/KoaTest;
```

Notice that you can use the -d flag to specify how far back in time (number of days) you want to go for the list of events. Default is 7 (seven) days.

10.1.17 Display the operator panel while managed system boots

Use the **lssyscfg** command with the -r sys option and -F flag as shown in Example 10-18.

Example 10-18 Display the operator panel when powering on

```
$ while true; do lssyscfg -r sys -n ITSO_p690 -F name:state:op_panel_value; sleep 3; done
ITSO_p690:No Power:OK:
ITSO_p690:No Power:OK:
ITSO_p690:No Power:OK:
ITSO_p690:No Power:OK:
ITSO_p690:Initializing:90FD:
ITSO_p690:Initializing:90FD:
ITSO_p690:Initializing:9105:
ITSO_p690:Initializing:9107:
ITSO_p690:Initializing:9108:
ITSO_p690:Initializing:9302:
ITSO_p690:Initializing:96C4:
...
... omitted lines ...
...
ITSO_p690:Initializing:E50A:
ITSO_p690:Initializing:E709   U1.9:
ITSO_p690:Initializing:E150:
ITSO_p690:Ready:E701   U1.18-P1-M6:
ITSO_p690:Ready:E701   U1.18-P1-M6:
ITSO_p690:Ready:E701   U1.18-P1-M6:
ITSO_p690:Ready:LPAR...:
ITSO_p690:Ready:LPAR...:
```

10.1.18 Display the operator panel when the partition is activated

Use the **lssyscfg** command with the -r lpar option and -F flag as shown in Example 10-19.

Example 10-19 Display the operator panel during the partition activation

```
$ while true; do lssyscfg -r lpar -m ITSO_p690 -n lpar05 -F name:state:op_panel_value; sleep 1;
done
lpar05:Ready: :
```

```
lpar05:Ready: :
lpar05:Starting:E1FA   1,7:
lpar05:Starting:E1FA   7,2:
lpar05:Starting:E1FA   c,2:
lpar05:Starting:E1FB:
lpar05:Starting:E1FA   3,6:
lpar05:Starting:E1FA   a,1:
lpar05:Starting:E1F1:
lpar05:Running:AIX is starting.:
lpar05:Running:2520   U1.5-P1/Z1:
lpar05:Running:2520   U1.5-P1/Z1:
lpar05:Running:0517   SYNCVG ROOTVG:
lpar05:Running:2520   U1.5-P1/Z1:
lpar05:Running:0c33:
lpar05:Running: :
lpar05:Running: :
```

10.2 Basic command line samples

In this section, we describe some tasks that were documented in Chapter 3, “Basic managed system operation tasks” on page 55. Here, we perform the tasks using the command line interface instead of the GUI.

We also include scripts for some tasks that may be tedious or error-prone when performed on the GUI, such as adding many HMC users, creating partitions and profiles, and documenting the configurations of all partitions and profiles.

10.2.1 Power on the managed system

There are many options for powering on the managed system; for example:

- To power on the managed system into partition standby mode, see Example 10-20.
- To power on the managed system and start system profile, see Example 10-20 and Example 10-21 on page 228.
- To power on the managed system and autostart all partitions, see Example 10-22 on page 229.

Example 10-20 Power on the managed system: partition standby mode

```
$ lssyscfg -r sys --all
Name       CageNum  LMBSize  Mode  State     CSPVersion  Model     OpPanel  S/N
ITSO_p690           256      255   No Power  V4.0        7040-681  OK       021768A
$ chsysstate -o on -r sys -n ITSO_p690
```

```
The command entered is either missing a required parameter or a parameter value is invalid. The
required parameters for this command are -n, -r, -o, and -c. Please check your entry and retry
the command.
$ chsysstate -o on -r sys -n ITSO_p690 -c lpar
...
...
$ lssyscfg -r sys --all
Name       CageNum  LMBSize  Mode  State  CSPVersion  Model      OpPanel  S/N
ITSO_p690           256      255   Ready  V4.0        7040-681   LPAR...  021768A
$ lssyscfg -r lpar -m ITSO_p690 --all
Name                 id   DLPAR  State          Profile               OpPanel
lpar06               006  0      Ready          aix52_64
lpar03               003  0      Ready          aix52_64
FullSystemPartition  000  0      Not Available  PowerOnNormalProfile
lpar07               007  0      Ready          aix52_64
lpar04               004  0      Ready          aix52_64
lpar01               001  0      Ready          aix51_64
test                 013  0      Ready          test_profile
lpar08               008  0      Ready          aix52_64
lpar05               005  0      Ready          aix52_64
lpar02               002  0      Ready          aix51_64
```

The -c flag for the **chsysstate** command is needed to specify whether to power on the managed system with the Full System Partition (-c full) or the partition ready (-c lpar).

After powering on the managed system into partition standby mode, you can choose to activate selected partitions or many partitions according to the order in the system profile. Example 10-21 shows how to activate a system profile.

Example 10-21 Activate a system profile

```
$ lssyscfg -r sysprof -m ITSO_p690 --all
Name                    Profile
Up5200-01Before5100-04  aix52_64/lpar04, aix52_64/lpar05, aix52_64/lpar06, aix52_64/lpar03,
aix51_64/lpar01, aix52_64/lpar08, aix52_64/lpar07, aix51_64/lpar02
$ chsysstate -o on -r sysprof -m ITSO_p690 -n Up5200-01Before5100-04
...
$ lssyscfg -r lpar -m ITSO_p690 --all
Name                 id   DLPAR  State          Profile               OpPanel
lpar06               006  15     Running        aix52_64
lpar03               003  15     Running        aix52_64
FullSystemPartition  000  0      Not Available  PowerOnNormalProfile
lpar07               007  0      Running        aix52_64
lpar04               004  15     Running        aix52_64
lpar01               001  0      Running        aix51_64
test                 013  0      Ready          test_profile
lpar08               008  0      Running        aix52_64
```

```
lpar05               005  15     Running        aix52_64
lpar02               002  0      Running        aix52_64
```

The test partition is not started, as it is not included in the system profile Up5200-01Before5100-04.

Example 10-22 shows how to power on the managed system and autostart all partitions with a single **chsysstate** command invocation with the -b auto option.

Example 10-22 Power on the managed system and start all partitions

```
$ lssyscfg -r sys --all
Name       CageNum  LMBSize  Mode  State     CSPVersion  Model     OpPanel  S/N
ITSO_p690           256      255   No Power  V4.0        7040-681  OK       021768A
$ chsysstate -r sys -o on -n ITSO_p690 -c lpar -b auto
...
...
$ lssyscfg -r sys --all
Name       CageNum  LMBSize  Mode  State  CSPVersion  Model     OpPanel  S/N
ITSO_p690           256      255   Ready  V4.0        7040-681  LPAR...  021768A
[hscroot@itsohmc hscroot]$ lssyscfg -r lpar -m ITSO_p690 --all
Name                 id   DLPAR  State          Profile               OpPanel
lpar06               006  15     Running        aix52_64
lpar03               003  15     Running        aix52_64
FullSystemPartition  000  0      Not Available  PowerOnNormalProfile
lpar07               007  0      Running        aix52_64
lpar04               004  15     Running        aix52_64
lpar01               001  0      Running        aix51_64
test                 013  0      Error          test_profile          20EE000B
lpar08               008  0      Running        aix52_64
lpar05               005  15     Running        aix52_64
lpar02               002  0      Running        aix52_64
```

Notice that all partitions are activated. However, partition test cannot be activated, as it has some conflict with other partitions on the boot disk.

> **Note:** With the -b auto option, partitions are activated in order of partition ID.

10.2.2 Activate a partition

To activate a partition, use the **chsysstate** command with -o on option as shown in Example 10-23.

Example 10-23 Activate a partition

```
$ lssyscfg -r lpar -m ITSO_p690 -n lpar05
Name    id   DLPAR  State  Profile   OpPanel
```

```
lpar05  005  0      Ready  aix52_64
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all
Name      BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
SMS_prof  3         2           8           8       16      1       4
aix52_64  1         2           2048        6       8192    1       2048
$ chsysstate -r lpar -o on -m ITSO_p690 -n lpar05
...
$ lssyscfg -r lpar -m ITSO_p690 -n lpar05
Name    id   DLPAR  State    Profile   OpPanel
lpar05  005  15     Running  aix52_64
```

10.2.3 Shut down the operating system in a partition

To be able to issue the shutdown command from HMC to the partition, the HMC must be at Release 3, Version 2 or later, and the partition must have AIX 5L Version 5.2 plus 5200-01 Recommended Maintenance Level or later.

To shut down AIX in a partition, use the **chsysstate** command with the -o osshutdown option as shown in Example 10-24. Note that there is a one-minute grace period before the shutdown.

Example 10-24 Shut down AIX in a partition

```
$ lssyscfg -r lpar -m ITSO_p690 -n lpar06
Name    id   DLPAR  State    Profile   OpPanel
lpar06  006  0      Running  aix52_64
$ chsysstate -m ITSO_p690 -o osshutdown -r lpar -n lpar06
...
$ lssyscfg -r lpar -m ITSO_p690 -n lpar06
Name    id   DLPAR  State  Profile   OpPanel
lpar06  006  0      Ready  aix52_64
```

10.2.4 Reboot the operating system in a partition

This may seem a bit unintuitive for an AIX user, but to reboot a partition, use the **chsysstate** command with the -o osreset option as shown in Example 10-25.

Example 10-25 Reboot AIX in a partition

```
$ lssyscfg -r lpar -m ITSO_p690 -n lpar03
Name    id   DLPAR  State    Profile   OpPanel
lpar03  003  15     Running  aix52_64
$ chsysstate -m ITSO_p690 -o osreset -r lpar -n lpar03
...
$ lssyscfg -r lpar -m ITSO_p690 -n lpar03
Name    id   DLPAR  State    Profile   OpPanel
```

```
lpar03  003  0      Running  aix52_64  0517   MOUNT ROOT
```

10.2.5 Reset the operating system in a partition

To perform the reset or soft reset of AIX in a partition, use the **chsysstate** command with the -o reset option as shown in Example 10-26.

When the partition is reset, AIX will force a kernel dump and then reboot[5].

Example 10-26 Soft reset a partition

```
$ chsysstate -m ITSO_p690 -o reset -r lpar -n lpar03
...
$ lssyscfg -r lpar -m ITSO_p690 -n lpar03
Name     id  DLPAR  State     Profile   OpPanel
lpar03  003  0      Starting  aix52_64  00c2   6619136
...
$ lssyscfg -r lpar -m ITSO_p690 -n lpar03
Name     id  DLPAR  State    Profile   OpPanel
lpar03  003  15     Running  aix52_64
```

10.2.6 Hard reset a partition

To perform the hard reset or power off the partition, use the **chsysstate** command with the -o off option as shown in Example 10-27.

Example 10-27 Hard reset a partition

```
$ lssyscfg -r lpar -m ITSO_p690 -n lpar04
Name     id  DLPAR  State    Profile   OpPanel
lpar04  004  15     Running  aix52_64
$ chsysstate -m ITSO_p690 -o off -r lpar -n lpar04
...
$ lssyscfg -r lpar -m ITSO_p690 -n lpar04
Name     id  DLPAR  State  Profile   OpPanel
lpar04  004  15     Ready  aix52_64
```

Note: You should always try to shut down or perform a soft reset to the partition first. Use the hard reset as the last resort.

[5] The *autorestart* parameter of AIX, which is used to specify whether to automatically reboot the system after a crash, is not supported in a partitioned environment. Thus, AIX always reboots after system crash on a partition.

10.2.7 Power off the managed system

To power off the managed system, use the **chsysstate** command with the -o off option as shown in Example 10-28.

Example 10-28 Power off the managed system

```
$ lssyscfg -r sys --all
Name       CageNum  LMBSize  Mode  State  CSPVersion  Model     OpPanel  S/N
ITSO_p690           256      255   Ready  V4.0        7040-681  LPAR...  021768A
$ chsysstate -o off -r sys -n ITSO_p690
$ lssyscfg -r sys --all
Name       CageNum  LMBSize  Mode  State  CSPVersion  Model     OpPanel  S/N
ITSO_p690           256      255   Ready  V4.0        7040-681  BOFF     021768A
...
$ lssyscfg -r sys --all
Name       CageNum  LMBSize  Mode  State     CSPVersion  Model     OpPanel  S/N
ITSO_p690           256      255   No Power  V4.0        7040-681  OK       021768A
```

> **Note:** You should shut down all partitions before powering off the managed system.

10.2.8 Create a partition

To create a partition called test:

- Create a configuration file containing the attributes of the partition.
- Use the **mksyscfg** command with the -r lpar option shown in Example 10-29.

Example 10-29 Create a logical partition

```
$ cat /tmp/mklpar.test
name=test
profile_name=test_profile
minimum_cpu=1
desired_cpu=2
maximum_cpu=3
minimum_mem=4
desired_mem=5
maximum_mem=6
$ mksyscfg -r lpar -m ITSO_p690 -f /tmp/mklpar.test
$ lssyscfg -r lpar -m ITSO_p690 -n test
Name  id   DLPAR  State  Profile       OpPanel
test  013  0      Ready  test_profile
$ lssyscfg -r prof -m ITSO_p690 -p test --all
Name          BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
test_profile  1         2           5           3       6       1       4
```

We intentionally include only the minimum attributes required by the **mksyscfg** command. In real-life use, you must specify at least the *required_io* attribute that points to the slot for the boot disk (and maybe a network adapter) for the partition.

> **Note:** Within the input file, the attributes for only one partition can be specified. If you try to create more than one partition with an input file, the command displays the following error message:
>
> ```
> $ mksyscfg -r lpar -m ITSO_p690 -f ./mklpar.many
> There cannot be any duplicate attributes entered. Please retry command.
> ```

10.2.9 Create a partition profile

To create a partition profile for lpar05 called SMS:

- Create a configuration file containing the attributes of the profile.
- Use the **mksyscfg** command with -r prof option as shown in Example 10-30.

Example 10-30 Create a partition profile

```
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all
Name      BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
aix52_64  1         2           2048        6       8192    1       2048
$ cat /tmp/mkprof_lpar05.SMS
name=SMS
minimum_cpu=1
desired_cpu=2
maximum_cpu=8
minimum_mem=1
desired_mem=2
maximum_mem=8
$ mksyscfg -r prof -m ITSO_p690 -p lpar05 -f /tmp/mkprof_lpar05.SMS
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all
Name      BootMode  DesiredCPU  DesiredMEM  MaxCPU  MaxMEM  MinCPU  MinMEM
aix52_64  1         2           2048        6       8192    1       2048
SMS       1         2           2           8       8       1       1
```

> **Restriction:** Within the input file, you can specify the attributes for only one profile. If you try to create many profiles with one input file, you will receive this message:
>
> ```
> $ mksyscfg -r prof -m ITSO_p690 -p lpar07 -f ./mkprof_lpar07.many
> There cannot be any duplicate attributes entered. Please retry command.
> ```

10.2.10 Automate adding users to HMC

The current **mkhmcusr** command has a restriction: the password cannot be specified as a parameter on the command line but must be explicitly entered and re-entered to confirm it. As a result, if we create a simple shell or Perl script, it requires human intervention to enter and re-enter the password.

The *addhmcusers* script in Example 10-31 written in Perl along with the Expect module can be used to fully automate the tasks of adding users on the HMC.

When executed, the script spawns a child process to run the **ssh** command that remotely invokes **mkhmcusr**. It then waits (*expect*) for the password prompt from the **mkhmcusr** command and then automatically supplies (*send*) the password (which is stored in an input configuration file together with other information), eliminating the need to enter the password manually.

Example 10-31 addhmcusers

```
#!/usr/bin/perl
#
use Expect;
#
# The only parameter is a file name in a format of "user role description password".
# Please use _ instead of blank in the description field.
#
$hmc_cmd_dir=”/opt/hsc/bin/”;
$file=$ARGV[0];
open(IN,$file) || die "Cannot open input $file:$!";

while (<IN>) {
    ($user,$role,$desc,$pass)=split;
    $e=Expect->spawn("ssh hscroot\@itsohmc ${hmc_cmd_dir}mkhmcusr -u $user -a $role -d $desc");
    #
    # Wait for "Enter the new password for user xxx:" prompt
    #
    &timeout unless $e->expect(10,"-re","Enter the new password for user .*:\r\n");
    #
    # Send "$pass" as the password
    #
    $e->stty("-echo");
    $e->send("$pass\r");
    $e->stty("echo");
    #
    # Wait for "Retype the new password for user xxx:" prompt
    #
    &timeout unless $e->expect(10,"-re","Retype the new password for user .*:\r\n");
    #
    # Send "$pass" again
    #
    $e->stty("-echo");
    $e->send("$pass\r");
    $e->stty("echo");
    #
    # End the process
    #
    $e->soft_close();
    print "\n";
}
exit 0;
sub timeout {
    sleep 1;
    $e->hard_close();
    printf "Timeout has occurred!\n";
    exit 1;
}
```

Before using this addhmcusers script, make sure that the following tasks have been done on the machine you want to run this script:

- Install OpenSSH packages:

  Refer to 9.1.1, “Setting up OpenSSH on AIX” on page 177.

- Configure OpenSSH client:

  Refer to 9.1.1, “Setting up OpenSSH on AIX” on page 177.

- Install necessary modules for Perl/Expect:

  For further information about how to set up Perl/Expect, refer to Section 3.3.1 Install Perl/Expect of *Managing AIX Server Farms*, SG24-6606.

The following shows the sample execution of this script:

```
tt@murumuru:/home/tt $ ssh-agent $SHELL
tt@murumuru:/home/tt $ ssh-add
Enter passphrase for /home/tt/.ssh/id_dsa: YYYYY
Identity added: /home/tt/.ssh/id_dsa (/home/tt/.ssh/id_dsa)
tt@murumuru:/home/tt $ ssh hscroot@itsohmc /opt/hsc/bin/lshmcusr -u ALL
User Name     Roles                   Full Name
user_admin    User Administrator      User Administrator ID
hscroot       System Administrator    HSC Super User
mrobbins      System Administrator    Matt Robbins
alt_sysadmin  System Administrator    Alternate System Administrator ID
tt            Service Representative  Theeraphong Thitayanun
adv_op        Advanced Operator       Advanced Operator ID
hscpe         Service Representative
tt@murumuru:/home/tt $ cd perl
tt@murumuru:/home/tt/perl $ cat userlist
stu1    op              Student_1       stu1stu
```

```
stu2    advop           Student_2       stu2stu
stu3    sysadmin        Student_3       stu3stu
stu4    usradmin        Student_4       stu4stu
stu5    svcrep          Student_5       stu5stu
stu6    viewer          Student_6       stu6stu
tt@murumuru:/home/tt/perl $ addhmcusers userlist
Enter the new password for user stu1:
Retype the new password for user stu1:

Enter the new password for user stu2:
Retype the new password for user stu2:

Enter the new password for user stu3:
Retype the new password for user stu3:

Enter the new password for user stu4:
Retype the new password for user stu4:

Enter the new password for user stu5:
Retype the new password for user stu5:

Enter the new password for user stu6:
Retype the new password for user stu6:

tt@murumuru:/home/tt $ ssh hscroot@itsohmc /opt/hsc/bin/lshmcusr -u ALL
User Name     Roles                   Full Name
user_admin    User Administrator      User Administrator ID
stu4          User Administrator      Student_4
hscroot       System Administrator    HSC Super User
mrobbins      System Administrator    Matt Robbins
alt_sysadmin  System Administrator    Alternate System Administrator ID
stu3          System Administrator    Student_3
tt            Service Representative  Theeraphong Thitayanun
stu5          Service Representative  Student_5
stu1          Operator                Student_1
adv_op        Advanced Operator       Advanced Operator ID
stu2          Advanced Operator       Student_2
hscpe         Service Representative
stu6          Viewer                  Student_6
```

Notice that since we do not want to enter the password for hscroot user every time the ssh command runs, in the beginning, we invoke the **`ssh-agent`** and **`ssh-add`** commands to help us.

For further information about ssh-agent, refer to *Managing AIX Server Farms*, SG24-6606.

10.2.11 Record all partition/profile configurations for printing

Formerly, when we wanted to document the partition and profile configuration, we had to use the GUI, click on the lpar or profile, select Properties, and record what we saw. This was quite a boring and time-consuming task.

Thanks to the **lssyscfg** command with -r lpar and -r prof options and -z flag, now the task of documenting the configuration is easier.

To document all partitions:

```
$ lssyscfg -r lpar -m ITSO_p690 --all -z
...
name=FullSystemPartition
id=000
dlpar_capability=0
default_profile=PowerOnNormalProfile
activated_profile=
state=Not Available
type=0
op_panel_value=
...
name=test
id=013
dlpar_capability=0
default_profile=test_profile
activated_profile=
state=Error
type=1
op_panel_value=20EE000B
...
name=lpar05
id=005
dlpar_capability=15
default_profile=aix52_64
activated_profile=aix52_64
state=Running
type=1
op_panel_value=
...
```

Note: The affinity partitions will not be listed with the -r lpar option. You need to use the -r alpar option to list the affinity partitions.

To record all profiles for a partition:

```
$ lssyscfg -r prof -m ITSO_p690 -p lpar05 --all -z
name=SMS_prof
maximum_cpu=8
```

```
maximum_mem=16
minimum_cpu=1
minimum_mem=4
desired_cpu=2
desired_mem=8
service_authority=0
sfp_surveillance=1
small_rmo=0
sni_config_mode=0
sni_device_id=
sni_windows=
desired_io=
required_io=
name=aix52_64
maximum_cpu=6
maximum_mem=8192
minimum_cpu=1
minimum_mem=2048
desired_cpu=2
desired_mem=2048
service_authority=1
sfp_surveillance=1
small_rmo=2
sni_config_mode=0
sni_device_id=
sni_windows=
desired_io=U1.5-P1-I3, U1.5-P1-I4, U1.9-P1-I10
required_io=U1.5-P1-I1, U1.5-P1-I2, U1.5-P1/Z1
```

Because there is no option in the **lssyscfg** command that lists all profiles for all partitions in a managed system, the *listallconfig* script in Example 10-32 was created to help with this task.

Given an HMC name, the script lists all profiles for all partitions in all managed systems controlled by that HMC.

Two output files in a print-ready format are produced per managed system:

- /tmp/<hmcname>_<managedsystemname>_lpar.report contains information about all partitions on that managed system.
- /tmp/<hmcname>_<managedsystemname>_profile.report contains information about all profiles on that managed system.

Example 10-32 listallconfig

```
#!/usr/bin/perl
#
# This program will list all lpar/profile information
# for all managed systems controlling by a given HMC.
```

```
#
# Usage: listallconfig <hmc-name>
#
# The only input parameter needed is the name of the HMC
# There will be 2 output files generated per a managed system
# 1. /tmp/<hmcname>_<managedsystemname>_lpar.report
#    contains the information about all partitions on the managed system.
# 2. /tmp/<hmcname>_<managedsystemname>_profile.report
#    contains the information about all profiles on the managed system.
#
$hmc_cmd_dir=”/opt/hsc/bin/”;
@lpartype=(“Full system”,”lpar”,”4-way alpar”,”8-way alpar”);

($ARGV[0] eq ““) ? ($hmc=”itsohmc.itsc.austin.ibm.com”) : ($hmc=$ARGV[0]);

print “\tGetting the managed system name from $hmc...\n”;
@sys=‘ssh hscroot\@$hmc ${hmc_cmd_dir}lssyscfg -r sys --all -F name‘;

foreach $sys (@sys) {
    chomp $sys;
    open(LPAR, ”>>/tmp/${hmc}_${sys}_lpar.report”);
    open(PROFILE, ”>>/tmp/${hmc}_${sys}_profile.report”);

    print “\tGetting partition information for $sys...\n”;
    @lpar =‘ssh hscroot\@$hmc ${hmc_cmd_dir}lssyscfg -r lpar -m $sys --all -F 
name:id:default_profile:type‘;
    foreach (sort @lpar) {
        chomp;
        ($lpar, $id, $defprof, $type) = (split /:/);
        $lpartype = $lpartype[$type];
        write(LPAR);
        next if ($lpar eq “FullSystemPartition”);

        print “\t\tGetting profile information for $lpar...\n”;
        @profile = ‘ssh hscroot\@$hmc ${hmc_cmd_dir}lssyscfg -r prof -m $sys -p $lpar --all -F 
name:minimum_cpu:desired_cpu:maximum_cpu:minimum_mem:desired_mem:maximum_mem:required_io:desire
d_io:service_authority:sfp_surveillance:small_rmo‘;
        foreach (sort @profile) {
            chomp;
            ($profile, $mincpu, $decpu, $maxcpu, $minmem
            , $demem, $maxmem, $reqio, $deio, $serv, $sfp, $rmo) = (split /:/);
            ($serv == 1) ? ($serv = ”Yes”) : ($serv = ”No”);
            ($sfp == 1)  ? ($sfp = ”Yes”)  : ($sfp = ”No”);
            ($rmo == 2)  ? ($rmo = ”Yes”)  : ($rmo = ”No”);
            write(PROFILE);
        }
    }
    close(PROFILE);
    close(LPAR);
}
exit 0;

format LPAR_TOP =

Managed system: @<<<<<<<<<<<<<<<<<<<<<<   HMC: @<<<<<<<<<<<<<<<<<<<<<<    P.@<
                $sys                           $hmc                         $%

==============================================================================
Lpar name                 Lpar ID      Default profile          Partition type
==============================================================================
.
format LPAR =

@<<<<<<<<<<<<<<<<<<<<<<<<     @##    @<<<<<<<<<<<<<<<<<<<<<<    @<<<<<<<<<<<
$lpar               $id    $defprof             $lpartype
.
format PROFILE_TOP =

Managed system: @<<<<<<<<<<<<<<<<<<<<<<<<                                 P.@<
                $sys                                                        $%

------------------------------------------------------------------------------
.
format PROFILE =

Partition: @<<<<<<<<<<<<<<<<<<<<  Profile name: @<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
           $lpar                                $profile
   Minimum CPU:    @#       Desired CPU:    @#       Maximum CPU:    @#
                   $mincpu                  $decpu                   $maxcpu
   Minimum mem: @####       Desired mem: @####       Maximum mem: @####
                $minmem                  $demem                   $maxmem
   Required IO: ^<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                $reqio
~               ^<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                $reqio
~               ^<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                $reqio
~               ^<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                $reqio
   Desired  IO: ^<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                $deio
~               ^<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                $deio
~               ^<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                $deio
~               ^<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                $deio
   Service Authority: @<<   SFP Surveillance: @<<      Small RMO: @<<
                      $serv                  $sfp              $rmo
.
```

Before using this listallconfig script, make sure that the following tasks have been done on the machine you want to run this script:

- Install OpenSSH packages:

  Refer to 9.1.1, “Setting up OpenSSH on AIX” on page 177.

- Configure OpenSSH client:

  Refer to 9.1.1, “Setting up OpenSSH on AIX” on page 177.

The following shows the sample execution of this script:

```
tt@murumuru:/home/tt/perl $ ssh-agent $SHELL
tt@murumuru:/home/tt/perl $ ssh-add
Enter passphrase for /home/tt/.ssh/id_dsa: YYYYYY
Identity added: /home/tt/.ssh/id_dsa (/home/tt/.ssh/id_dsa)
tt@murumuru:/home/tt/perl $ ./listallconfig
        Getting the managed system name from itsohmc.itsc.austin.ibm.com...
        Getting partition information for ITSO_p690...
                Getting profile information for lpar01...
                Getting profile information for lpar02...
                Getting profile information for lpar03...
                Getting profile information for lpar04...
                Getting profile information for lpar05...
                Getting profile information for lpar06...
                Getting profile information for lpar07...
                Getting profile information for lpar08...
                Getting profile information for test...
```

We invoked the **ssh-agent** and **ssh-add** commands at the start so we do not have to enter the password for hscroot user every time the ssh command runs.

For further information about **ssh-agent**, refer to *Managing AIX Server Farms*, SG24-6606.

Example 10-33 shows the partition configuration output file, lpar.report:

Example 10-33 lpar.report sample

```
Managed system: ITSO_p690                 HMC: itsohmc.itsc.austin.ibm    P.1

==============================================================================
Lpar name                 Lpar ID      Default profile          Partition type
==============================================================================


FullSystemPartition             0    PowerOnNormalProfile       Full system
```

```
lpar01                          1    aix51_64                lpar

lpar02                          2    aix51_64                lpar

lpar03                          3    aix52_64                lpar

lpar04                          4    aix52_64                lpar

lpar05                          5    aix52_64                lpar

lpar06                          6    aix52_64                lpar

lpar07                          7    aix52_64                lpar

lpar08                          8    aix52_64                lpar

test                           13    test_profile            lpar
```

Example 10-34 shows the profile configuration output file, profile.report:

Example 10-34 profile.report sample

```
Managed system: ITSO_p690                                                  P.1

------------------------------------------------------------------------------

Partition: lpar01                 Profile name: aix51_64
   Minimum CPU:     1       Desired CPU:     1       Maximum CPU:     4
   Minimum mem:  1024       Desired mem:  1024       Maximum mem:  4096
   Required IO: U1.9-P1-I1, U1.9-P1-I2, U1.9-P1/Z1
   Desired  IO: U1.9-P1-I3, U1.9-P1-I4, U1.9-P1-I10
   Service Authority: No    SFP Surveillance: Yes      Small RMO: No

Partition: lpar02                 Profile name: aix51_64
   Minimum CPU:     1       Desired CPU:     1       Maximum CPU:     3
   Minimum mem:  1024       Desired mem:  1024       Maximum mem:  3072
   Required IO: U1.9-P1-I6, U1.9-P1-I7, U1.9-P1/Z2
   Desired  IO: U1.9-P1-I5, U1.9-P1-I8, U1.9-P1-I9, U1.9-P1-I10
   Service Authority: No    SFP Surveillance: Yes      Small RMO: No

Partition: lpar02                 Profile name: aix52_64
   Minimum CPU:     1       Desired CPU:     1       Maximum CPU:     3
   Minimum mem:  1024       Desired mem:  1024       Maximum mem:  3072
   Required IO: U1.9-P1-I6, U1.9-P1-I7, U1.9-P1/Z2
   Desired  IO: U1.9-P1-I5, U1.9-P1-I8, U1.9-P1-I9, U1.9-P1-I10
   Service Authority: No    SFP Surveillance: Yes      Small RMO: No
```

```
Partition: lpar03                 Profile name: aix52_64
   Minimum CPU:     1       Desired CPU:     2       Maximum CPU:     8
   Minimum mem:  1024       Desired mem:  3072       Maximum mem: 32768
   Required IO: U1.9-P2-I1, U1.9-P2-I2, U1.9-P2/Z1
   Desired  IO: U1.9-P2-I3, U1.9-P2-I4, U1.9-P1-I10
   Service Authority: No    SFP Surveillance: Yes      Small RMO: Yes

Partition: lpar04                 Profile name: aix52_64
   Minimum CPU:     1       Desired CPU:     2       Maximum CPU:     3
   Minimum mem:  1024       Desired mem:  1024       Maximum mem:  3072
   Required IO: U1.9-P2-I6, U1.9-P2-I7, U1.9-P2/Z2
   Desired  IO: U1.9-P2-I5, U1.9-P2-I8, U1.9-P2-I9, U1.9-P1-I10
   Service Authority: No    SFP Surveillance: Yes      Small RMO: Yes

Partition: lpar05                 Profile name: SMS_prof
   Minimum CPU:     1       Desired CPU:     2       Maximum CPU:     8
   Minimum mem:     4       Desired mem:     8       Maximum mem:    16
   Required IO:
   Desired  IO:
   Service Authority: No    SFP Surveillance: Yes      Small RMO: No

Partition: lpar05                 Profile name: aix52_64
   Minimum CPU:     1       Desired CPU:     2       Maximum CPU:     6
   Minimum mem:  2048       Desired mem:  2048       Maximum mem:  8192
   Required IO: U1.5-P1-I1, U1.5-P1-I2, U1.5-P1/Z1
   Desired  IO: U1.5-P1-I3, U1.5-P1-I4, U1.9-P1-I10
   Service Authority: Yes   SFP Surveillance: Yes      Small RMO: Yes

Partition: lpar06                 Profile name: aix52_64
   Minimum CPU:     1       Desired CPU:     1       Maximum CPU:     4
   Minimum mem:  1024       Desired mem:  2048       Maximum mem:  3072
   Required IO: U1.5-P1-I5, U1.5-P1-I6, U1.5-P1/Z2
   Desired  IO: U1.5-P1-I7, U1.5-P1-I8, U1.5-P1-I9, U1.5-P1-I10, U1.9-P1-I10
   Service Authority: No    SFP Surveillance: Yes      Small RMO: Yes


Managed system: ITSO_p690                                                 P.2

------------------------------------------------------------------------------

Partition: lpar07                 Profile name: aix52_64
   Minimum CPU:     1       Desired CPU:     2       Maximum CPU:     6
   Minimum mem:  1024       Desired mem:  2048       Maximum mem:  3072
   Required IO: U1.5-P2-I1, U1.5-P2-I2, U1.5-P2/Z1
   Desired  IO: U1.5-P2-I3, U1.5-P2-I4, U1.9-P1-I10
   Service Authority: No    SFP Surveillance: Yes      Small RMO: Yes

Partition: lpar08                 Profile name: aix52_64
   Minimum CPU:     1       Desired CPU:     2       Maximum CPU:     3
   Minimum mem:  1024      Desired mem:  2048      Maximum mem:  5120
   Required IO: U1.5-P2-I6, U1.5-P2-I7, U1.5-P2-I8, U1.5-P2-I9, U1.5-P2-I10,
                U1.5-P2/Z2
   Desired  IO: U1.9-P1-I10
   Service Authority: No    SFP Surveillance: Yes      Small RMO: Yes

Partition: test                  Profile name: OF_profile
   Minimum CPU:     1      Desired CPU:     2      Maximum CPU:     8
   Minimum mem:     1      Desired mem:     2      Maximum mem:     8
   Required IO:
   Desired  IO:
   Service Authority: No    SFP Surveillance: Yes      Small RMO: No

Partition: test                  Profile name: test_profile
   Minimum CPU:     1      Desired CPU:     2      Maximum CPU:     3
   Minimum mem:     4      Desired mem:     5      Maximum mem:     6
   Required IO: U1.5-P1/Z1, U1.5-P2/Z1, U1.5-P1/Z2
   Desired  IO:
   Service Authority: No    SFP Surveillance: Yes      Small RMO: No
```

10.2.12 Record current HMC information before upgrade

Before you upgrade the HMC software from one release to another, one of the tasks that you must perform is the Save Upgrade Data task.

However, if your HMC software level is earlier than Release 3, Save Upgrade Data task may not perform correctly in some situations. Thus, it is recommended that you perform the following tasks manually:

- Document the scheduled operation.
- Back up profile data for all managed systems.
- Document the HMC remote command execution configuration.

The *saveHMCconfig* script shown in Example 10-35 helps automate these tasks.

Example 10-35 saveHMCconfig

```
#!/usr/bin/perl
#
# This script automates the task of saving/recording the HMC information
# before performing the Save Upgrade Data task.
#
# The only input parameter needed is the name of the HMC
# The output is a file named /tmp/$hmc.rcmd on localhost
#
$hmc_cmd_dir=”/opt/hsc/bin/”;
$dayofyear=(localtime)[7];
```

```
($ARGV[0] eq "") ? ($hmc="itsohmc.itsc.austin.ibm.com") : ($hmc=$ARGV[0]);
$outfile="/tmp/$hmc.rcmd";

print "\tGetting the managed system name from $hmc...\n";
@sys=`ssh hscroot\@$hmc ${hmc_cmd_dir}lssyscfg -r sys --all -F name`;

foreach $sys (@sys) {
        chomp $sys;
        print "\tBackup profile data for $sys to $sys.profdata.$dayofyear..\n";
        system "ssh hscroot\@$hmc ${hmc_cmd_dir}bkprofdata -m $sys -f $sys.profda
ta.$dayofyear";
}

print "\tRecording HMC remote command execution config to $outfile..\n";
system "ssh hscroot\@$hmc ${hmc_cmd_dir}lshmc -r > $outfile";
```

Before using this saveHMCconfig script, ensure that the following tasks have been done on the machine you want to run this script:

- Install OpenSSH packages:

  Refer to 9.1.1, “Setting up OpenSSH on AIX” on page 177.

- Configure OpenSSH client:

  Refer to 9.1.1, “Setting up OpenSSH on AIX” on page 177

The following shows the sample execution of this script:

```
tt@murumuru $ ssh-agent $SHELL
tt@murumuru $ ssh-add
Enter passphrase for /home/tt/.ssh/id_dsa: YYYYY
Identity added: /home/tt/.ssh/id_dsa (/home/tt/.ssh/id_dsa)
tt@murumuru $ ls -al /tmp/*.rcmd
ls: 0653-341 The file /tmp/*.rcmd does not exist.
tt@murumuru $ ./saveHMCconfig itsohmc
        Getting the managed system name from itsohmc...
        Backup profile data for ITSO_p690 to ITSO_p690.profdata.167..
        Recording HMC remote command execution config to /tmp/itsohmc.rcmd..

tt@murumuru $ ssh hscroot@itsohmc ls -al /var/hsc/profiles/*/*profdata*
-rw-r--r--    1 root     root        20464 Jun 17 17:53
/var/hsc/profiles/7040-681*021768A/ITSO_p690.profdata.167
tt@murumuru $ ls -al /tmp/*.rcmd
-rw-r--r--   1 tt       system          161 Jun 17 17:55 /tmp/itsohmc.rcmd
tt@murumuru $ cat /tmp/*.rcmd
Remote Command Execution Configuration:
Remote command execution using the rexec facility:  disabled
Remote command execution using the ssh facility:    enabled
tt@murumuru $
```

Notice that since we do not want to enter the password for hscroot user every time the ssh command runs, we invoke the **`ssh-agent`** and **`ssh-add`** command at the start.

For further information about ssh-agent, refer to *Managing AIX Server Farms*, SG24-6606.

> **Note:** It is our intention to automate the tasks as much as possible; unfortunately, we could not automate the “Document the scheduled operation” task. This is because the scheduled operation is performed by root user on the HMC and is not supported for remote login to the HMC as the root user. Therefore, the scheduled operation task must be recorded by using the graphical user interface on your HMC.

11

Service functions on the HMC

This chapter explains the following applications that are provided in the Service Applications folder on the HMC:

- Inventory Scout Services
- Service Agent
- Service Focal Point

These applications are provided to increase the serviceability of managed systems attached to the HMC and for an easy-to-use interface for servicing managed systems.

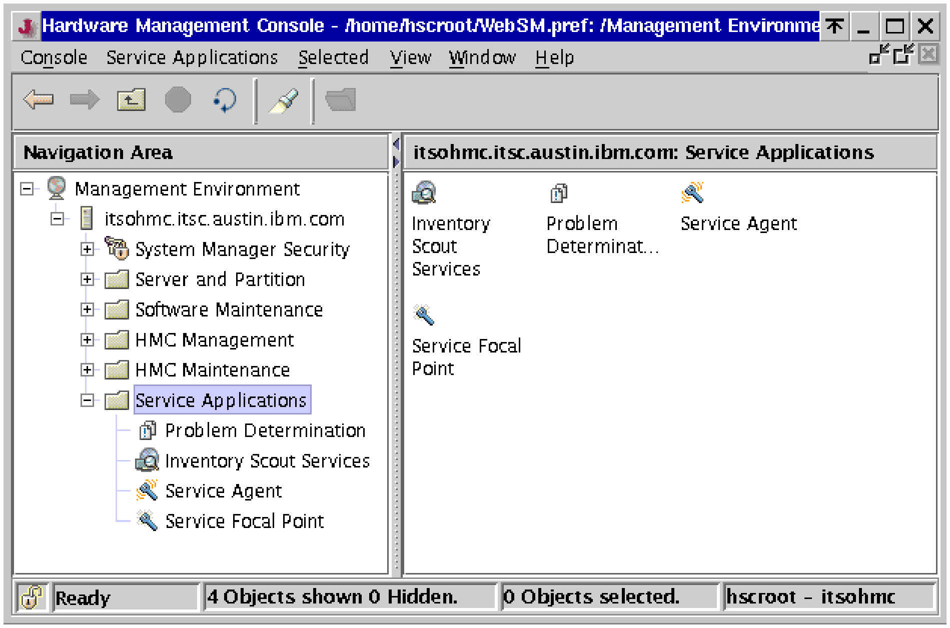
In addition to the applications in the Service Applications folder, we explain the *Microcode Updates* application provided in the Software Maintenance folder in this chapter. It is used for the following purposes for the managed systems:

- Conduct microcode level surveys
- Install Microcode Updates

For further information about the use of these applications, refer to *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590.

11.1 Service Applications

The service functions on the partitioning-capable pSeries servers are centralized on the HMC and are provided under the Service Applications folder as shown in Figure 11-1.



Ready | 4 Objects shown 0 Hidden. | 0 Objects selected. | hscroot - itsohmc

Figure 11-1 Service Applications

The folder contains the applications shown in Table 11-1.

Table 11-1 Service Applications

Service application	Relevant section number
Problem Determination	N/A (The Problem Determination application is only available for the product support engineers.)
Inventory Scout Services	11.2
Service Agent	11.3
Service Focal Point	11.4

Figure 11-2 on page 249 illustrates the relationship between the components that implement these services.

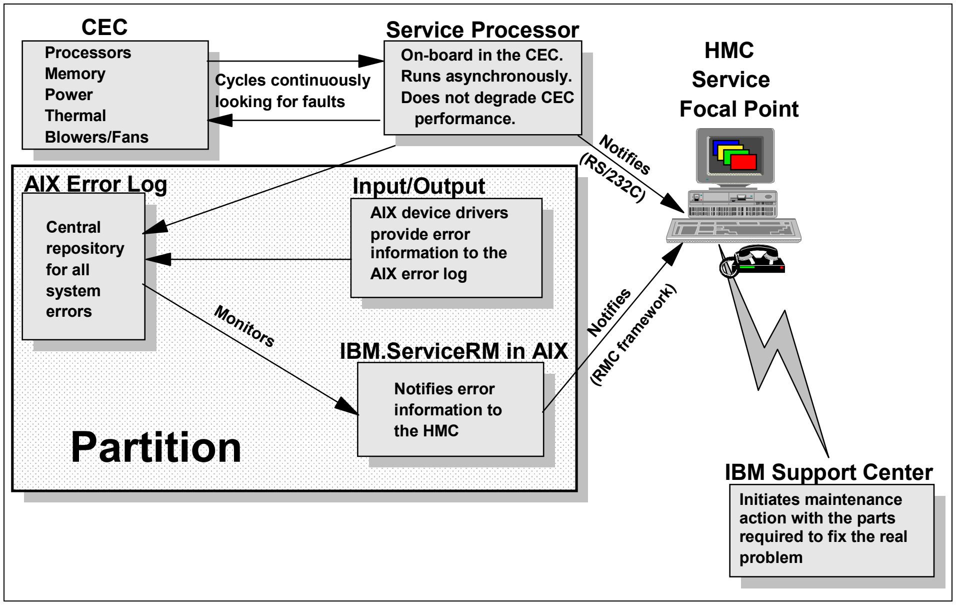

CEC
Processors
Memory
Power
Thermal
Blowers/Fans
Cycles continuously looking for faults
Service Processor
On-board in the CEC.
Runs asynchronously.
Does not degrade CEC performance.
HMC Service Focal Point
Notifies (RS/232C)
AIX Error Log
Central repository for all system errors
Input/Output
AIX device drivers provide error information to the AIX error log
Monitors
IBM.ServiceRM in AIX
Notifies error information to the HMC
Notifies (RMC framework)
Partition
IBM Support Center
Initiates maintenance action with the parts required to fix the real problem

Figure 11-2 Error reporting and consolidation

11.2 Inventory Scout Services

Inventory Scout is a tool that performs the following two functions on pSeries systems that are not managed by HMC:

- Microcode Discovery Service

  Generates a real-time comparison report showing subsystems that may need to be upgraded. For further information about Microcode Discovery Service, visit:

  `http://techsupport.services.ibm.com/server/aix.invscoutMDS`

- VPD Capture Service

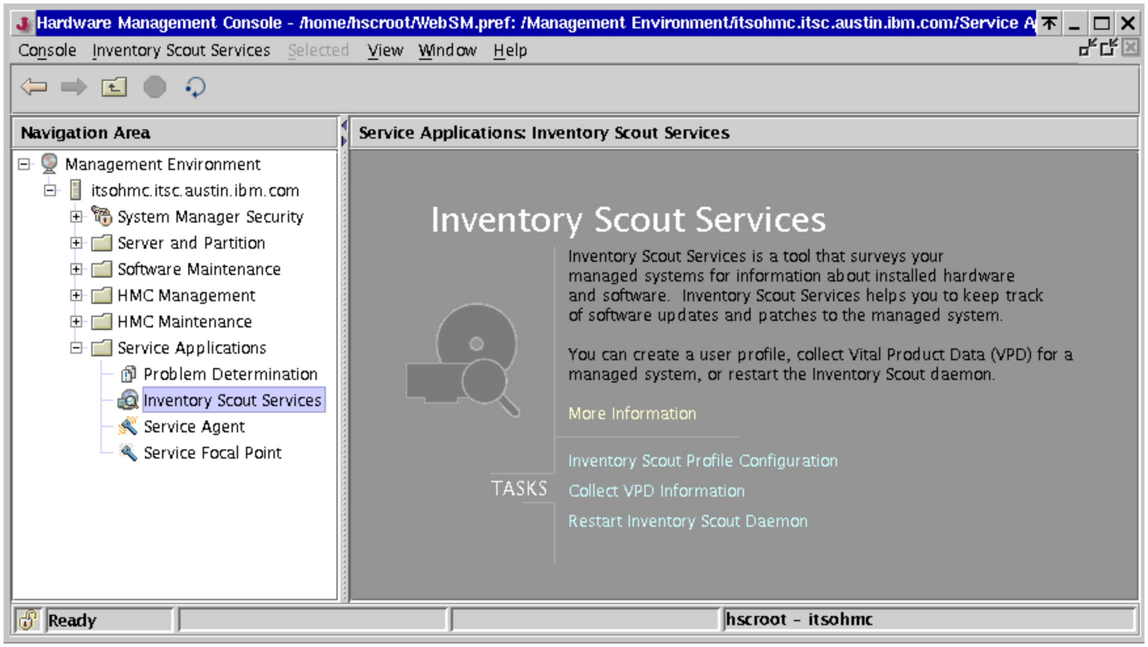
  Transmits your server's vital product data (VPD) information to IBM. For further information about VPD Capture Service, visit:

  `http://techsupport.services.ibm.com/server/aix.invscoutVPD`

On the systems managed by HMC, these functions are provided by the Inventory Scout Services application in the Service Applications folder, which contains tasks shown in Table 11-2 on page 250 and the content area in Figure 11-3 on page 250.

Table 11-2 Inventory Scout Services tasks

Task	Relevant section number
Inventory Scout Configuration	11.2.1
Collect VPD Information	11.2.2
Restart Inventory Scout Daemon	11.2.3



Inventory Scout Services

Inventory Scout Services is a tool that surveys your managed systems for information about installed hardware and software. Inventory Scout Services helps you to keep track of software updates and patches to the managed system.

You can create a user profile, collect Vital Product Data (VPD) for a managed system, or restart the Inventory Scout daemon.

Figure 11-3 Inventory Scout Services[1]

11.2.1 Inventory Scout Configuration

Each partition must be in *automatic configuration* status to be able to send the VPD to the HMC. These conditions are required for the automatic configuration:

- The system microcode Version 3.0 or higher is installed on managed systems.
- The software level of HMC is Release 3, Version 1 or higher.

[1] On the HMC loaded with software level earlier than Release 3, Version 2, there was another task called Conduct Microcode Survey in the Inventory Scout Services application. This task has been removed in HMC software level Release 3, Version 2 because the new Microcode Updates application provides the same function as well as the new function to upgrade microcode on the managed systems.

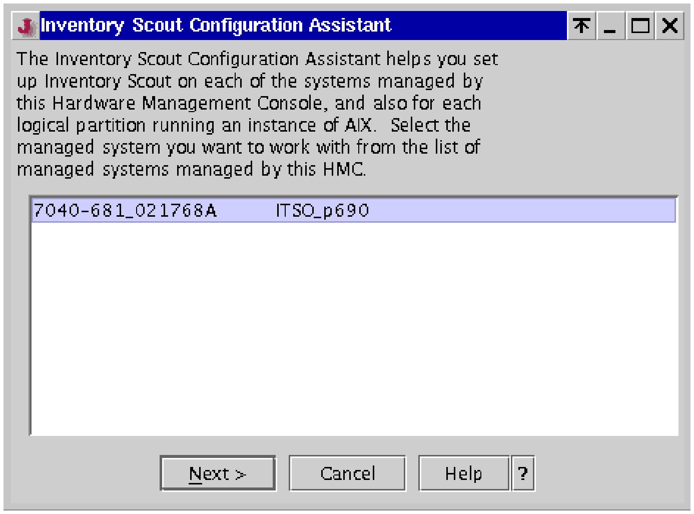
- The partition is installed with either of the following:
  - AIX 5L Version 5.1 with 5100-03 Recommended Maintenance Level or higher
  - AIX 5L Version 5.2 or higher

Otherwise, Inventory Scout uses its own authentication method between the partition and the HMC in order to talk to the Inventory Scout daemon (invscoutd) on AIX. Therefore, it requires the following additional setup on AIX in a partition:

- A user, invscout, must be defined on the partition.
- A password (for example, invscout) must be set for the invscout user.

To manually configure Inventory Scout on partitions:

1. Expand the Service Applications folder, then select the **Inventory Scout Services** application in the Navigation area.
2. Select the Inventory Scout Configuration task in the Contents area . The Inventory Scout Configuration Assistant window opens as in Figure 11-4.

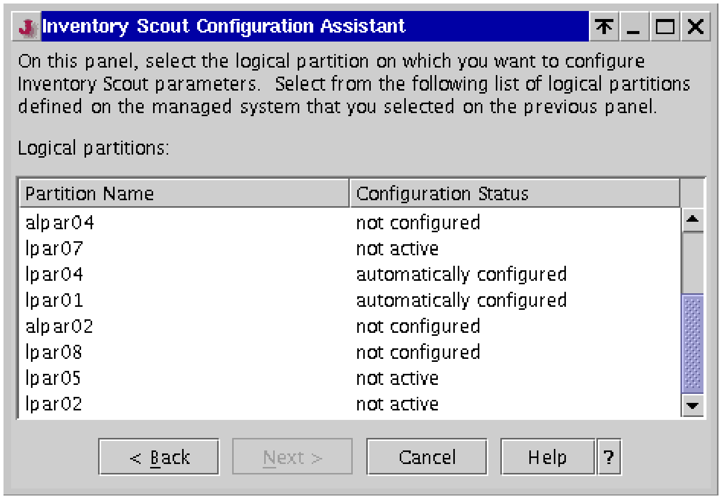

Inventory Scout Configuration Assistant

The Inventory Scout Configuration Assistant helps you set up Inventory Scout on each of the systems managed by this Hardware Management Console, and also for each logical partition running an instance of AIX. Select the managed system you want to work with from the list of managed systems managed by this HMC.

7040-681_021768A ITSO_p690

Figure 11-4 Inventory Scout Configuration Assistant (select managed system)

3. Select the managed system to configure and click **Next**.
4. A list of partitions, along with each partition's configuration status, is displayed as shown in Figure 11-5 on page 252.



On this panel, select the logical partition on which you want to configure Inventory Scout parameters. Select from the following list of logical partitions defined on the managed system that you selected on the previous panel.

Logical partitions:

Partition Name	Configuration Status
alpar04	not configured
lpar07	not active
lpar04	automatically configured
lpar01	automatically configured
alpar02	not configured
lpar08	not configured
lpar05	not active
lpar02	not active

Figure 11-5 Inventory Scout Configuration Assistant (select partitions)

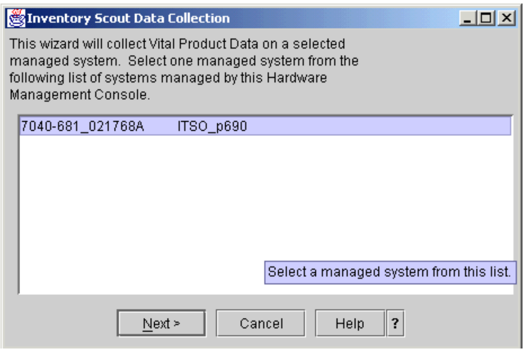
If one of the active partitions shows `automatically configured`, then the partition is already configured. If one of the active partitions shows `not configured`, you must manually configure the Inventory Scout service for that partition. To configure, select the partition and click **Next**, then enter the following information (the host name or IP address of the partition is filled in automatically):

- The password of the invscout user on that partition
- The listening port of invscoutd (default value is 808)

11.2.2 Collect VPD Information

This option enables you to collect VPD for a managed system and save it to the formatted diskette media:

1. Expand the Service Applications folder, then select the **Inventory Scout Services** application in the Navigation area.
2. Select the Collect VPD Information task in the Contents area. The Inventory Scout Data Collection window opens and displays all managed systems attached to the HMC, as shown in Figure 11-6 on page 253.

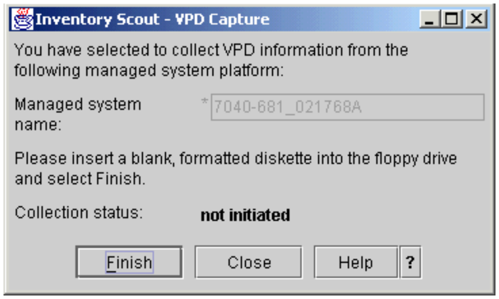

Inventory Scout Data Collection

This wizard will collect Vital Product Data on a selected managed system. Select one managed system from the following list of systems managed by this Hardware Management Console.

7040-681_021768A	ITSO_p690

Figure 11-6 Initiate Inventory Scout Data Collection

3. Select the managed system to collect the VPD information, then click **Next**.
4. As shown in Figure 11-7, you will be prompted to insert the formatted diskette into the diskette drive on the HMC. (To format the diskette, see “Format Removable Media” on page 116.) Once you have inserted the diskette into the drive, click **Finish**.


Inventory Scout - VPD Capture

You have selected to collect VPD information from the following managed system platform:

Managed system name: * 7040-681_021768A

Please insert a blank, formatted diskette into the floppy drive and select Finish.

Collection status: **not initiated**

Figure 11-7 Inventory Scout: VPD Capture

The HMC starts to collect VPD from the managed system, which is collected into a file created on the diskette. The file has the extension .vup, and the first seven characters of its name are the serial number of the managed system. Therefore, you can pull the data from multiple managed systems onto the same media without overwriting data for other systems. The .vup file can be sent to an IBM service representative via e-mail or can be viewed with any text file viewer.

11.2.3 Restart Inventory Scout Daemon

The Restart Inventory Scout Daemon task restarts the Inventory Scout daemon on the HMC; it does not restart that daemon on partitions. The Inventory Scout daemon on the HMC only needs to run if you are going to connect to the HMC from the web applet to conduct surveys.

Note: If you use the Microcode Update application on the HMC (explained in 11.5, “Microcode Updates” on page 272) to conduct surveys, the Inventory Scout daemon does not have to be running on the HMC.

11.3 Service Agent

Electronic Service Agent™ (or simply Service Agent) is an application program that runs on either AIX or Linux[2] to monitor the system for hardware errors. On pSeries systems managed by the HMC, the primary path for system hardware error detection and analysis consists of the diagnostics function provided by AIX, the service processor, and the Service Focal Point (see “Service Agent” on page 254). Service Agent provides the transport facility to IBM.

Service Agent can execute several tasks, including:

- Automatic problem analysis
- Problem-definable threshold levels for error reporting
- Automatic problem reporting
- Automatic customer notification
- Visualize hardware error logs

Although there are several scenarios available for the Service Agent network configuration, we only explain the configuration, which is used on the HMC with managed systems and shown in Figure 11-8.

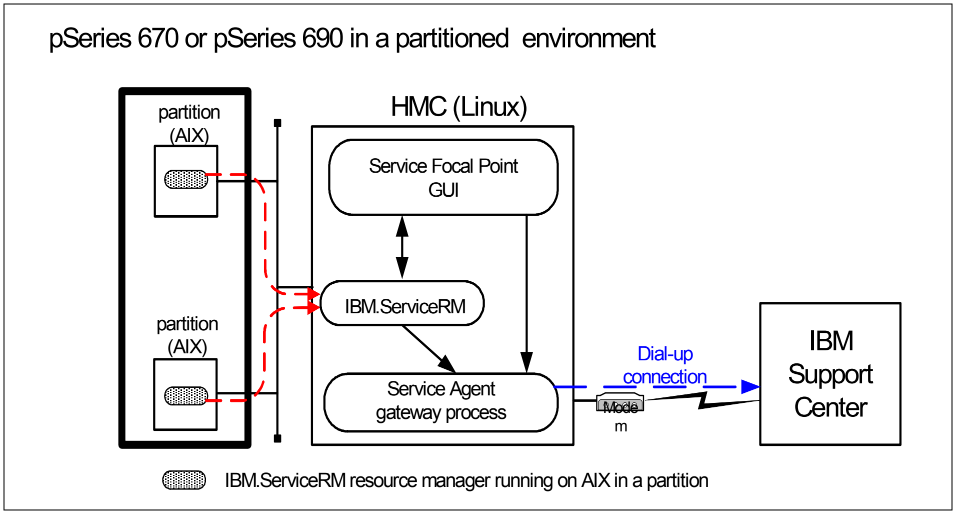

pSeries 670 or pSeries 690 in a partitioned environment
partition (AIX)
partition (AIX)
HMC (Linux)
Service Focal Point GUI
IBM.ServiceRM
Service Agent gateway process
Dial-up connection
Mode m
IBM Support Center
IBM.ServiceRM resource manager running on AIX in a partition

Figure 11-8 Service Agent on the HMC

[2] Service Agent supports the Linux operating system on HMC only.

In this configuration, the Service Agent gateway process running on the HMC places service calls to the IBM support center via a dial-up connection with the attached modem, if necessary.

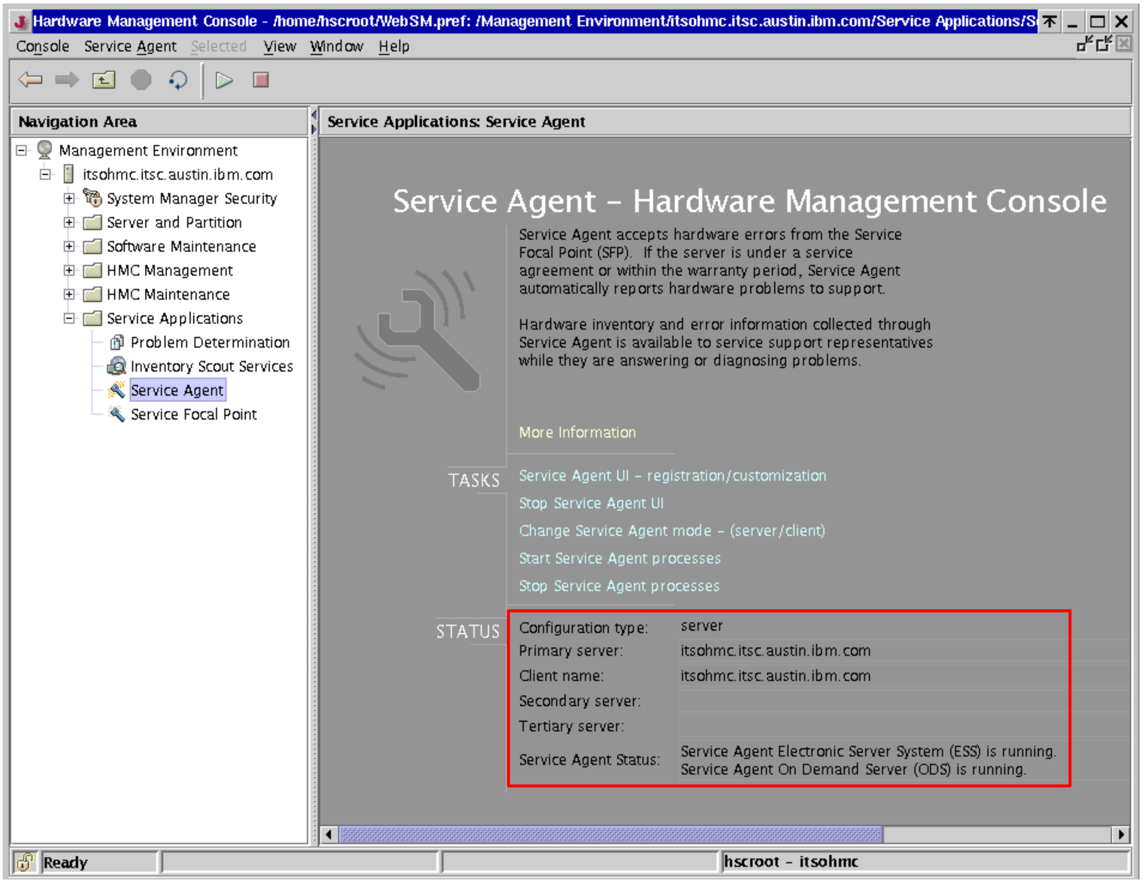
Note: No human intervention is required for this process.

By utilizing Service Agent, managed systems can reduce the amount of downtime experienced in the event of a system component failure by giving the service provider the ability to view the error report entry and, if needed, order any necessary replacement parts prior to arriving on site. The opportunity for human misinterpretation or miscommunication in problem determination is therefore mitigated.

The Service Agent application contains tasks shown in Table 11-3 and in the Content area in Figure 11-9 on page 256.

Table 11-3 Service Agent tasks

Task	Relevant section number
Service Agent UI - registration/customization	11.3.1
Stop Service Agent UI	11.3.2
Change Service Agent mode (server/client)	11.3.3
Start Service Agent processes	11.3.4
Stop Service Agent processes	11.3.5



Service Agent - Hardware Management Console

Service Agent accepts hardware errors from the Service Focal Point (SFP). If the server is under a service agreement or within the warranty period, Service Agent automatically reports hardware problems to support.

Hardware inventory and error information collected through Service Agent is available to service support representatives while they are answering or diagnosing problems.

More Information

TASKS

- Service Agent UI - registration/customization
- Stop Service Agent UI
- Change Service Agent mode - (server/client)
- Start Service Agent processes
- Stop Service Agent processes

STATUS

Configuration type:	server
Primary server:	itsohmc.itsc.austin.ibm.com
Client name:	itsohmc.itsc.austin.ibm.com
Secondary server:	
Tertiary server:	
Service Agent Status:	Service Agent Electronic Server System (ESS) is running. Service Agent On Demand Server (ODS) is running.

Figure 11-9 Service Agent on the HMC

For more information about the Service Agent, refer to the following publications:

- *Electronic Service Agent for pSeries and RS/6000 User's Guide*, available at:

  `ftp://ftp.software.ibm.com/aix/service_agent_code/AIX/svcUG.pdf`

- *Electronic Service Agent for pSeries Hardware Management Console User's Guide*, SC38-7107, available at:

  `ftp://ftp.software.ibm.com/aix/service_agent_code/HMC/HMCSAUG.pdf`

- *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590

11.3.1 Service Agent UI - registration/customization

If the Service Agent UI - registration/customization task is selected, a *Service Agent window* opens after prompting for password input.

From the Service Agent window, you can:

- Configure the Service Agent dialer.
- Test the dialer.
- Register the HMC with IBM.

Several basic usage examples of the Service Agent window are provided in Chapter 12, “Sample Service Agent configurations on the HMC” on page 281.

11.3.2 Stop Service Agent UI

The “Stop Service Agent UI” task closes the Service Agent window if it is already opened.

11.3.3 Change Service Agent mode (server/client)

If you are using multiple HMCs, you may wish to have one HMC be a focal point for all Service Agent dialing. Setting up one HMC as the Service Agent server (gateway) and all other HMCs as Service Agent clients can eliminate the need to have each and every individual HMC hooked up with a phone line (see Figure 11-10 on page 258).

Each client HMC must define a primary gateway. Secondary and tertiary gateways can be defined as well. When the On Demand Server (ODS) process on an Service Agent client seeks to send a message to the IBM Support Center, it will first contact the primary gateway that is running the Electronic Server System (ESS) process. If it is unavailable (for example, if the modem is busy on another outbound call), ODS will try the secondary server, and then the tertiary.

> **Note:** At the time of writing this book, the Service Agent ODS process running on HMC cannot communicate with the Service Agent ESS processes running on AIX systems.

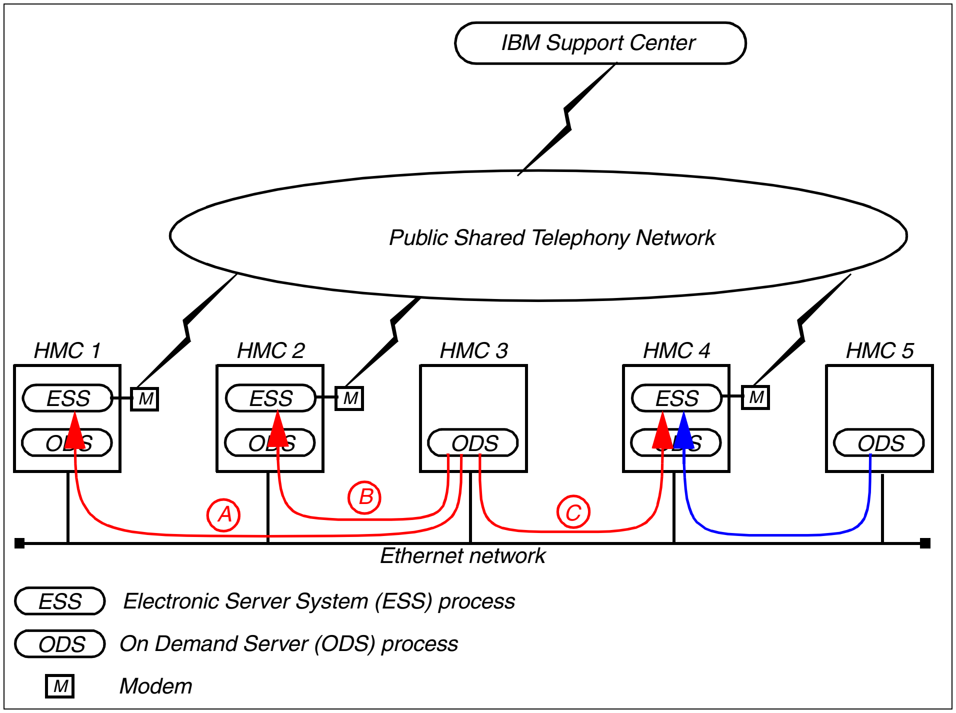
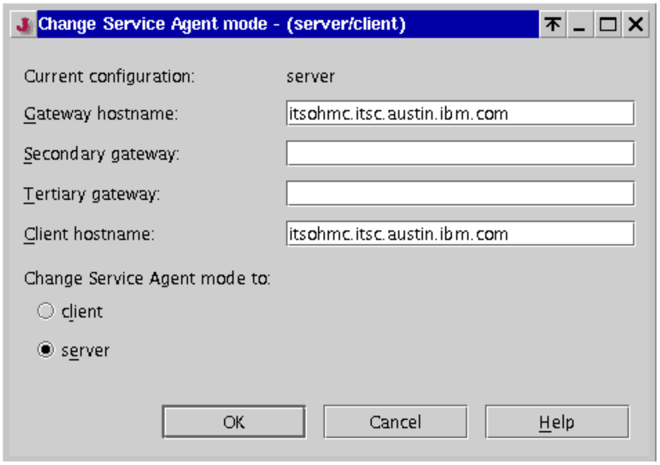

IBM Support Center
Public Shared Telephony Network
HMC 1
HMC 2
HMC 3
HMC 4
HMC 5
ESS
ODS
M
A
B
C
Ethernet network
ESS Electronic Server System (ESS) process
ODS On Demand Server (ODS) process
M Modem

Figure 11-10 Service Agent client/server configuration on multiple HMCs

In Figure 11-10, HMC 3 has three gateways defined: HMC 1 is defined as the primary gateway, HMC 2 is the secondary, and HMC 4 is the tertiary. Not all clients are required to define multiple gateways; HMC 5 has only the primary gateway defined.

To change the Service Agent client/server mode, do the following:

1. Expand the Service Applications folder, then select the **Service Agent** application in the Navigation area.
2. Select the **Change Service Agent mode (server/client)** task in the Content area. The Change Service Agent mode (server/client) window opens as shown in Figure 11-11 on page 259.



Change Service Agent mode - (server/client)

Current configuration: server

Gateway hostname: itsohmc.itsc.austin.ibm.com

Secondary gateway:

Tertiary gateway:

Client hostname: itsohmc.itsc.austin.ibm.com

Change Service Agent mode to:

○ client

● server

Figure 11-11 Change Service Agent mode (server/client)

3. To change the Service Agent mode to:
   - Client
     - Specify the primary Service Agent gateway server host name in the Gateway hostname field. This is a mandatory field.
     - Specify the secondary and tertiary Service Agent gateway server host names in the second and tertiary gateway fields. These are optional fields.
     - Confirm that the host name in the Client hostname field is accurate. This is a mandatory field.

     > **Note:** In the client mode, the gateway server host names must be different from the client host name.

   - Server
     - Confirm that the host names in the Gateway hostname and Client hostname fields are same.
     - Confirm that the secondary and tertiary gateway fields are blank.
4. Click **OK**.
5. Stop the Service Agent processes then restart them on the HMC for the mode change to take effect. (See Section 11.3.5, “Stop Service Agent processes” on page 260 and Section 11.3.4, “Start Service Agent processes” on page 260.)

Note: This task only switches the mode on the Service Agent client side. To connect to the Service Agent server (gateway), all clients must be defined on the gateway as explained in Section 12.5, “Define Service Agent clients on a gateway server” on page 292.

11.3.4 Start Service Agent processes

This task is used to start or restart Service Agent processes on the HMC. If processes are started, the status lines show *running* as highlighted in Figure 11-9 on page 256.

11.3.5 Stop Service Agent processes

This task is used to stop Service Agent processes on the HMC. If processes are stopped, the status lines show *stopped* in the highlighted area in Figure 11-9 on page 256.

11.4 Service Focal Point

Traditional service strategies become more complicated in a partitioned environment. Each partition runs on its own, unaware that other partitions exist on the same system. If one partition reports an error for a shared resource, such as a managed system power supply, other active partitions report the same error. To enable service representatives to avoid long lists of repetitive call-home information, the HMC provides the Service Focal Point application. Service Focal Point recognizes that these errors repeat, and it filters them into one *serviceable event* for the service representative to review.

The Service Focal Point is a system infrastructure on the HMC that manages serviceable event information for the system building blocks. It includes resource managers that monitor and record information about different objects in the system. It is designed to filter and correlate events from the resource managers and initiate a call to the service provider when appropriate. It also provides a user interface that enables a user to view the events and perform problem determination (see Figure 11-2 on page 249).

Note: Service Focal Point only collects hardware errors, such as *PERMANENT* errors from AIX (marked as P) and NON BOOT errors from the service processor.

Upon hardware failure events, the corresponding error entry is notified from the partition to the HMC, as shown in Figure 11-2 on page 249. The IBM.ServiceRM subsystem is in charge of this notification. The AIX diagnostic function creates a serviceable event through IBM.ServiceRM when a hardware problem is determined, and events are notified to the HMC using the *Resource Monitoring and Control (RMC)* framework.

The IBM.ServiceRM is running as the IBM.ServiceRMd daemon and packaged in the devices.chrp.base.ServiceRM fileset in AIX:

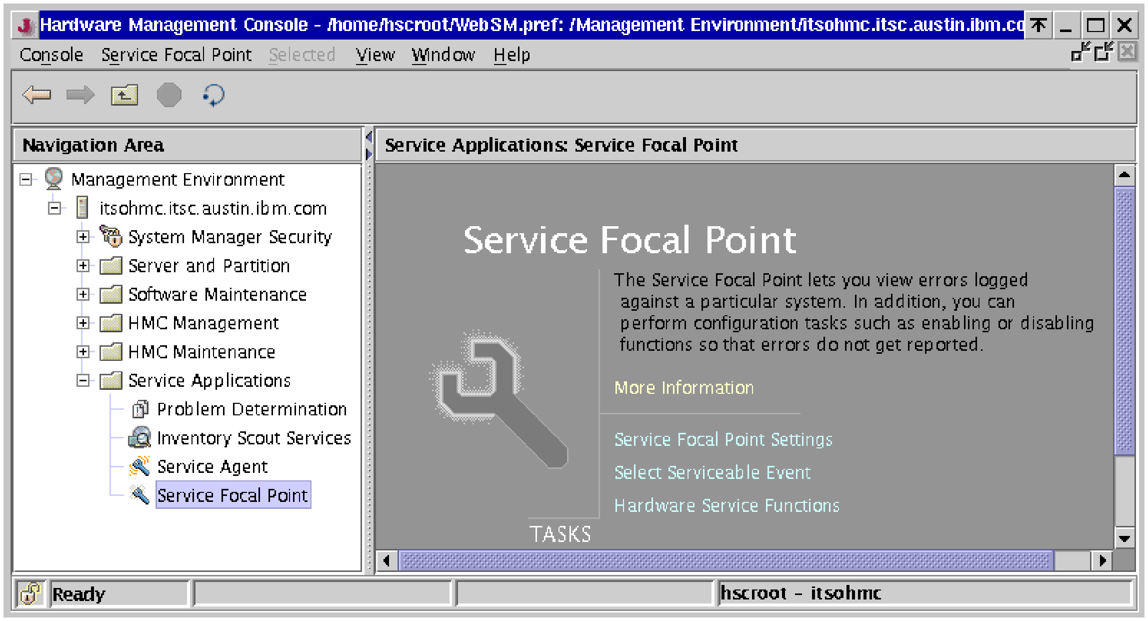
```
# lssrc -g rsct_rm | head -1; lssrc -g rsct_rm | grep ServiceRM
Subsystem         Group            PID          Status
 IBM.ServiceRM    rsct_rm          307354       active
# ps -ef | head -1; ps -ef | grep ServiceRM | grep -v grep
 UID    PID   PPID   C    STIME    TTY  TIME CMD
 root 307354 122982   0   Sep 11      -  0:31 /usr/sbin/rsct/bin/IBM.ServiceRMd
# lslpp -w /usr/sbin/rsct/bin/IBM.ServiceRMd
  File                                        Fileset              Type
  ----------------------------------------------------------------------------
  /usr/sbin/rsct/bin/IBM.ServiceRMd
                                 devices.chrp.base.ServiceRM       File
# lslpp -L devices.chrp.base.ServiceRM
  Fileset                      Level  State  Type  Description (Uninstaller)
  ----------------------------------------------------------------------------
  devices.chrp.base.ServiceRM
                             1.2.0.0    C     F    RSCT Service Resource
Manager
```

From the Service Focal Point interface, you can execute maintenance procedures such as examining the error log history, checking for components requiring replacement, and performing a Field Replaceable Unit (FRU) replacement. If Service Agent is configured on the HMC, the serviceable events are automatically sent to IBM (call-home support) for automatic generation of a maintenance request.

The Service Focal Point application contains tasks shown in Table 11-4 and in the Content area in Figure 11-12 on page 262.

Table 11-4 Service Focal Point tasks

Task	Relevant section number
Service Focal Point Settings	11.4.1
Select Serviceable Event	11.4.2
Hardware Service Functions	11.4.3



The Service Focal Point lets you view errors logged against a particular system. In addition, you can perform configuration tasks such as enabling or disabling functions so that errors do not get reported.

Figure 11-12 Service Focal Point

For further information about Service Focal Point, refer to Appendix A, “Service Focal Point”, *IBM Hardware Management Console for pSeries Maintenance Guide*, SA38-0603.

11.4.1 Service Focal Point Settings

The task opens the Service Focal Point Settings window, which has the following tabs:

- CEC Call Home

  Enable/disable call home for managed systems

- Surveillance Setup

  Set surveillance parameters for managed systems

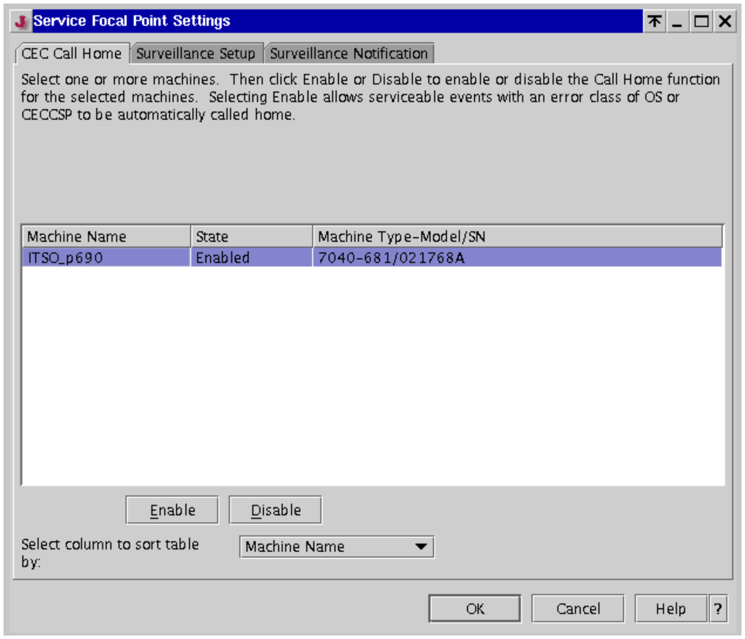
- Surveillance Notification

  Enable/disable surveillance notification to managed systems

Customization of these settings can enable the HMC administrator to perform system tests, maintenance, and parts replacement without alerting IBM to each and every individual change on managed systems.

CEC Call Home

In the event that changes are to be made on a managed system that would normally alert Service Focal Point, but you do not want Service Focal Point alerted, it can be disabled and then re-enabled from the CEC Call Home tab in the Service Focal Point Settings window.



Select one or more machines. Then click Enable or Disable to enable or disable the Call Home function for the selected machines. Selecting Enable allows serviceable events with an error class of OS or CECCSP to be automatically called home.

Machine Name	State	Machine Type-Model/SN
ITSO_p690	Enabled	7040-681/021768A

Select column to sort table by: Machine Name

Figure 11-13 Service Focal Point Settings: CEC Call Home

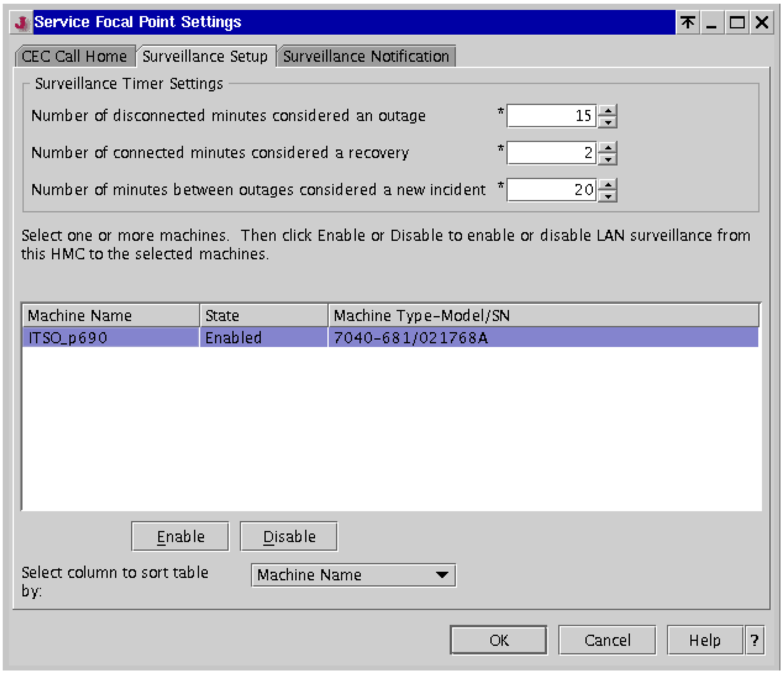
1. Select the managed system for which you want to enable/disable Service Focal Point.
2. Click either **Enable** or **Disable**, then click **OK**.

Surveillance Setup

From this tab in the Service Focal Point Settings window, you can:

- Specify the number of minutes you want Service Focal Point to wait before reporting any given outage.
- Specify the number of minutes you want Service Focal Point to wait before considering any given operating state a recovery.
- Specify the number of minutes between outages before reporting a new incident.

Customization of these settings allows for leeway in reporting outages and recoveries, and can be used to help prevent the Service Focal Point from over-reporting these events.



Surveillance Timer Settings

Number of disconnected minutes considered an outage * 15

Number of connected minutes considered a recovery * 2

Number of minutes between outages considered a new incident * 20

Select one or more machines. Then click Enable or Disable to enable or disable LAN surveillance from this HMC to the selected machines.

Machine Name	State	Machine Type-Model/SN
ITSO_p690	Enabled	7040-681/021768A

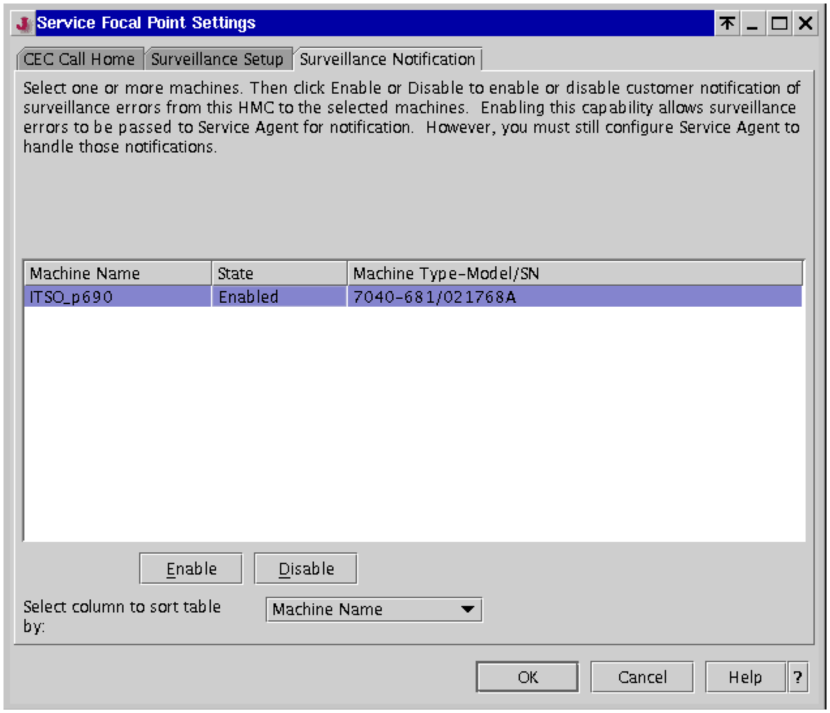
Select column to sort table by: Machine Name

Figure 11-14 Service Focal Point Settings: Surveillance Setup

Surveillance Notification

This tab in the Service Focal Point Settings settings window allows you to enable or disable notification of serviceable events to managed systems. This window can be used to prevent the HMC from reporting back to managed systems that it has recorded a serviceable event on that managed system.[3]

[3] The **`lssvcevents`** command with the -t hardware option also can be used to view serviceable vents on the specified managed system. (See “lssvcevents” on page 214.)



Select one or more machines. Then click Enable or Disable to enable or disable customer notification of surveillance errors from this HMC to the selected machines. Enabling this capability allows surveillance errors to be passed to Service Agent for notification. However, you must still configure Service Agent to handle those notifications.

Machine Name	State	Machine Type-Model/SN
ITSO_p690	Enabled	7040-681/021768A

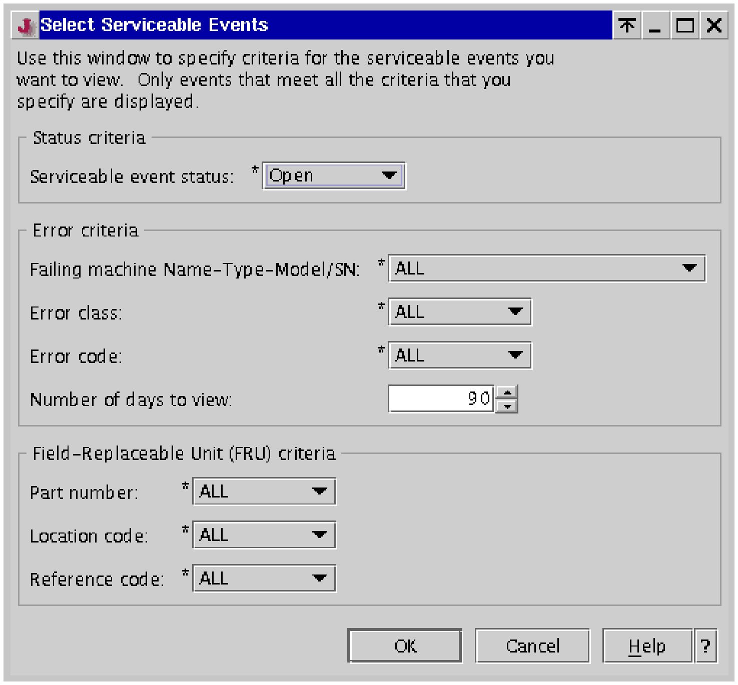
Select column to sort table by: Machine Name

Figure 11-15 Service Focal Point Settings: Surveillance Notification

11.4.2 Select Serviceable Event

This task enables you to view a log of serviceable events and perform actions on events that have happened on managed systems attached to the HMC.

1. Select the Select Serviceable Event task in the Content area. The Select Serviceable Event window opens as shown in Figure 11-16 on page 266.


Select Serviceable Events

Use this window to specify criteria for the serviceable events you want to view. Only events that meet all the criteria that you specify are displayed.

Status criteria

Serviceable event status: * Open

Error criteria

Failing machine Name-Type-Model/SN: * ALL

Error class: * ALL

Error code: * ALL

Number of days to view: 90

Field-Replaceable Unit (FRU) criteria

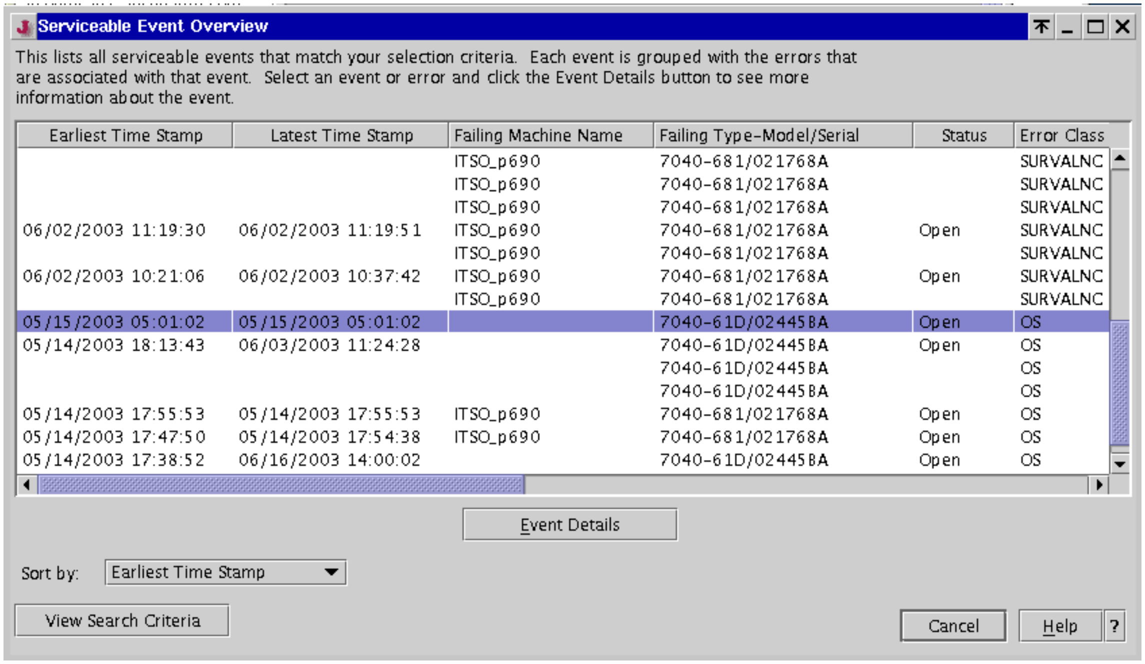
Part number: * ALL

Location code: * ALL

Reference code: * ALL

Figure 11-16 Select Serviceable Event

2. To view all events on all managed systems leave all settings at default and click **OK**. The selection boxes provided in the window shown in Figure 11-16 can be used to filter the serviceable events so that only a subset of events can be retrieved.
3. The Serviceable Event Overview window appears when the search is done. Click on an event to be viewed and click **Event Details**, as shown in Figure 11-17 on page 267.



Serviceable Event Overview

This lists all serviceable events that match your selection criteria. Each event is grouped with the errors that are associated with that event. Select an event or error and click the Event Details button to see more information about the event.

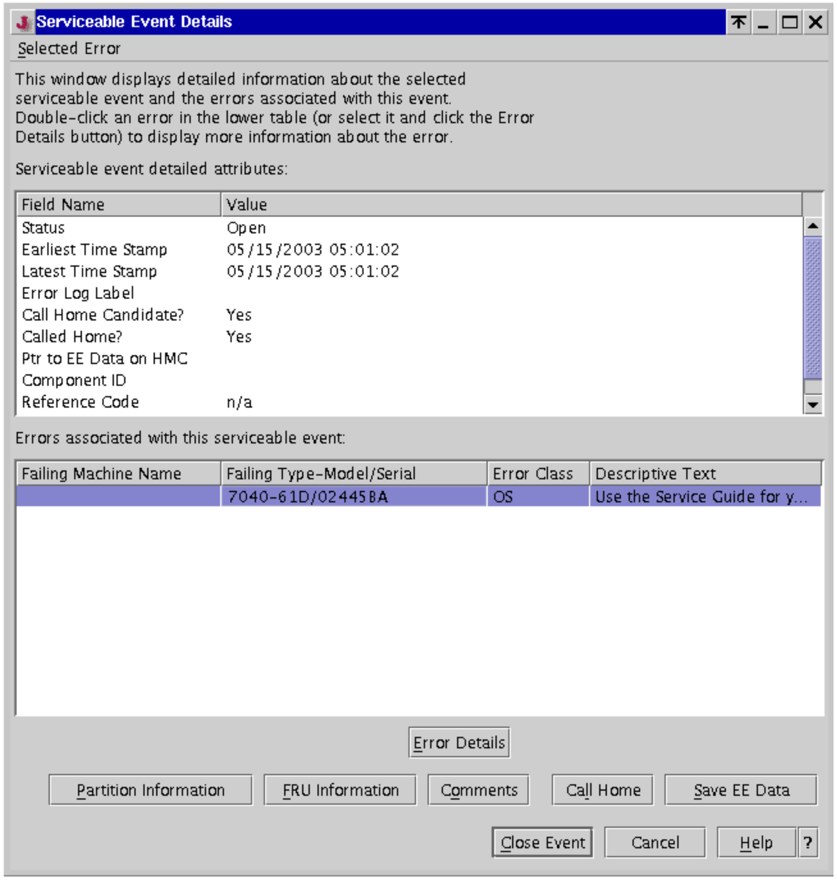
Earliest Time Stamp	Latest Time Stamp	Failing Machine Name	Failing Type-Model/Serial	Status	Error Class
		ITSO_p690	7040-681/021768A		SURVALNC
		ITSO_p690	7040-681/021768A		SURVALNC
		ITSO_p690	7040-681/021768A		SURVALNC
06/02/2003 11:19:30	06/02/2003 11:19:51	ITSO_p690	7040-681/021768A	Open	SURVALNC
		ITSO_p690	7040-681/021768A		SURVALNC
06/02/2003 10:21:06	06/02/2003 10:37:42	ITSO_p690	7040-681/021768A	Open	SURVALNC
		ITSO_p690	7040-681/021768A		SURVALNC
05/15/2003 05:01:02	05/15/2003 05:01:02		7040-61D/02445BA	Open	OS
05/14/2003 18:13:43	06/03/2003 11:24:28		7040-61D/02445BA	Open	OS
			7040-61D/02445BA		OS
			7040-61D/02445BA		OS
05/14/2003 17:55:53	05/14/2003 17:55:53	ITSO_p690	7040-681/021768A	Open	OS
05/14/2003 17:47:50	05/14/2003 17:54:38	ITSO_p690	7040-681/021768A	Open	OS
05/14/2003 17:38:52	06/16/2003 14:00:02		7040-61D/02445BA	Open	OS

Sort by: Earliest Time Stamp

Figure 11-17 Serviceable Event Overview

4. From the Serviceable Event Details window (see Figure 11-18 on page 268), you can:
   - Get partition information on the event.
   - Get field replaceable unit (FRU) information on the event.
   - Add comments.
   - Initiate a call home to IBM for the event.
   - Save extended error (EE) data to DVD-RAM or diskette.

> **Note:** To save extended error data on a DVD-RAM or diskette, you must use formatted media. See “Format Removable Media” on page 116.



Serviceable Event Details

Selected Error

This window displays detailed information about the selected serviceable event and the errors associated with this event. Double-click an error in the lower table (or select it and click the Error Details button) to display more information about the error.

Serviceable event detailed attributes:

Field Name	Value
Status	Open
Earliest Time Stamp	05/15/2003 05:01:02
Latest Time Stamp	05/15/2003 05:01:02
Error Log Label	
Call Home Candidate?	Yes
Called Home?	Yes
Ptr to EE Data on HMC	
Component ID	
Reference Code	n/a

Errors associated with this serviceable event:

Failing Machine Name	Failing Type-Model/Serial	Error Class	Descriptive Text
	7040-61D/02445BA	OS	Use the Service Guide for y...

Figure 11-18 Serviceable event details

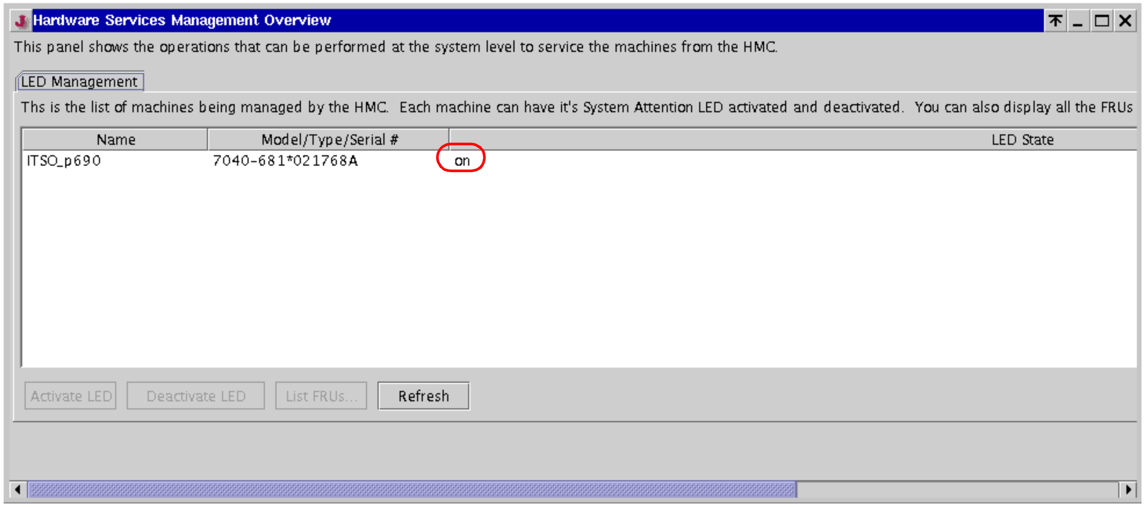
11.4.3 Hardware Service Functions

The “Hardware Service Functions” task allows you either to just identify a frame when you have several frames connected to your HMC, or to turn off the rack indicator light. You are also able to get a Field Replaceable Unit (FRU) list when the rack indicator light is lit and check which component has problems. When a component is shown here with the LED state ON, it is much easier to identify the failing component.

To use this task, do the following:

1. Expand the Service Applications folder, then select the **Service Focal Point** application in the Navigation area.
2. Select the **Hardware Service Functions** task in the Content area.

3. You will see the Hardware Service Management: Overview window, as shown in Figure 11-19. Select the managed system on which you want to check the LED state, then click **List FRUs**.



Hardware Services Management Overview

This panel shows the operations that can be performed at the system level to service the machines from the HMC.

LED Management

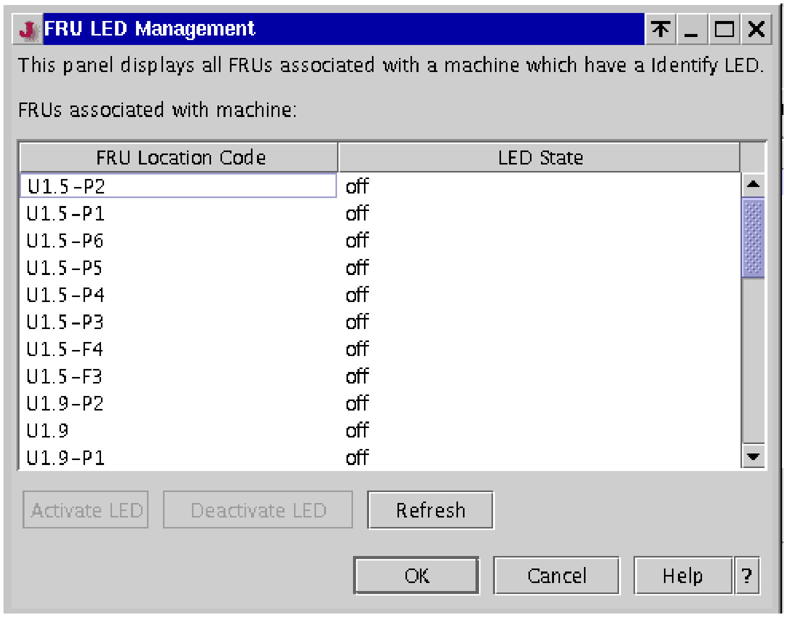
Ths is the list of machines being managed by the HMC. Each machine can have it's System Attention LED activated and deactivated. You can also display all the FRUs

Name	Model/Type/Serial #	LED State
ITSO_p690	7040-681*021768A	on

Figure 11-19 Hardware Service Functions overview

> **Note:** As highlighted in Figure 11-19, the managed system ITSO_p690's attention LED is flashed.

4. You will see the FRU LED Management window (Figure 11-20 on page 270).



This panel displays all FRUs associated with a machine which have a Identify LED.

FRUs associated with machine:

FRU Location Code	LED State
U1.5-P2	off
U1.5-P1	off
U1.5-P6	off
U1.5-P5	off
U1.5-P4	off
U1.5-P3	off
U1.5-F4	off
U1.5-F3	off
U1.9-P2	off
U1.9	off
U1.9-P1	off

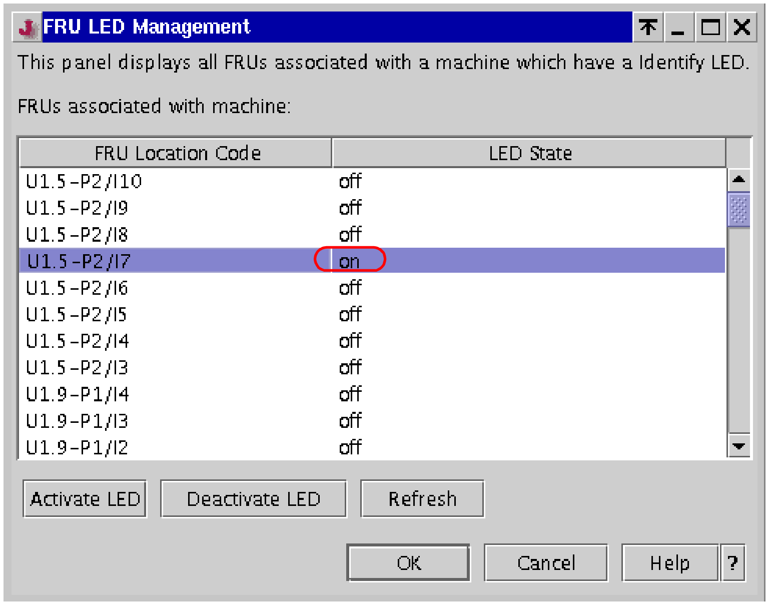
Figure 11-20 FRU LED Management

If any of the LEDs are ON, it would mean that the system has a problem with the indicated component. If the Service Agent is configured to notify IBM of the errors, then IBM customer service representatives will be informed of the problem.[4]

However, another function within this screen is to manually activate and deactivate the LEDs on the system. In the event you wanted to install an adapter in a specific port per the *PCI Adapter Placement References*, SA38-0538, you could use this screen to activate the LED for the slot you wanted to add the adapter to.

Select the PCI slot you want to change, and click **Activate LED**. As shown in Figure 11-21 on page 271, the screen will refresh and show you which slot has an active LED.

[4] In order to dispatch IBM customer service representatives, you need the maintenance agreement (MA) for this system.



This panel displays all FRUs associated with a machine which have a Identify LED.

FRUs associated with machine:

FRU Location Code	LED State
U1.5-P2/I10	off
U1.5-P2/I9	off
U1.5-P2/I8	off
U1.5-P2/I7	on
U1.5-P2/I6	off
U1.5-P2/I5	off
U1.5-P2/I4	off
U1.5-P2/I3	off
U1.9-P1/I4	off
U1.9-P1/I3	off
U1.9-P1/I2	off

Figure 11-21 FRU LED Management: manual changes

You can then go to the back of the 7040-61D drawer and easily locate the PCI slot you want by looking for the slot with a blinking umber LED as shown in Figure 11-22 on page 272.

> **Note:** Activate LED only one slot at a time because it is difficult to distinguish two blinking slots.

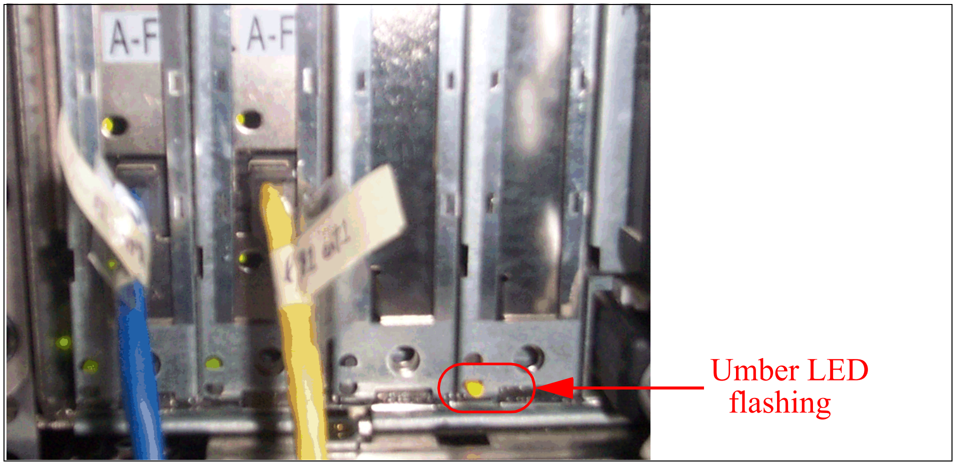


Figure 11-22 Umber LED flashing in a PCI slot

As you can see, the fourth slot from the left has the bottom umber LED active when we set its condition to On in the FRU LED Management window.

The organization of location codes varies from system to system. To understand about the physical location of I/O slots, refer to the following publications:

- Appendix F, “System Records,” in *IBM @server pSeries 690 Installation Guide*, SA38-0587
- Appendix F, “System Records,” in *IBM @server pSeries 670 Installation Guide*, SA38-0613
- Chapter 1, “Reference Materials,“ in *IBM @server pSeries 655 Installation Guide*, SA38-0616
- Chapter 1, “Reference Materials,“ in *IBM @server pSeries 650 Model 6M2 Installation Guide*, SA38-0610
- Chapter 1, “Reference Materials,“ in *IBM @server pSeries 630 Model 6C4 and 6E4 Installation Guide*, SA38-0605

There is an excellent example of how physical location codes map to AIX location codes in Appendix A of *The Complete Partitioning Guide for IBM @server pSeries Servers*, SG24-7039.

11.5 Microcode Updates

There are several aspects to the overall microcode management strategy that include the survey, distribution, and installation of microcodes. In the past, it required an IBM service representitive to go to the customer’s site to survey and update the microcode. With the Microcode Updates function available in the HMC and AIX, the customer can now manage their microcode management without IBM service representitives’ help.

Furthermore, IBM has recently introduced the Customer Managed Microcode method of updating microcode on pSeries systems. Using CMM a customer can survey and update microcode for a standalone pSeries system that is not managed by HMC, as well as the pSeries system managed by HMC.

For more information about the CMM method, vist the following URL:

http://techsupport.services.ibm.com/server/mdownload

Although this method can be used to update the microcode on individual AIX partitions, the Microcode Updates application is a more centralized and convenient function for performing the same task for all the hardware components that are allocated to multiple partitions on a managed system.

Figure 11-23 on page 274 shows how the mechanism of the microcode update works from a standalone AIX server and from an HMC.

The application is able to survey and report the existing and latest microcode levels and provide suggested actions for each device. It also provides the capability for installation of microcodes and warns the user before a reboot or installation of back level codes. With this, the customer is able to keep current on the microcode levels at their convenience.

Note: In order to have the Microcode Updates function, the following conditions must be satisfied:

- AIX
  - AIX 5L Version 5.1 plus 5100-04 Recommended Maintenance Level or later
  - AIX 5L Version 5.2 plus 5200-01 Recommended Maintenance Level or later.
- The HMC software must be Release 3, Version 2.1 or later.

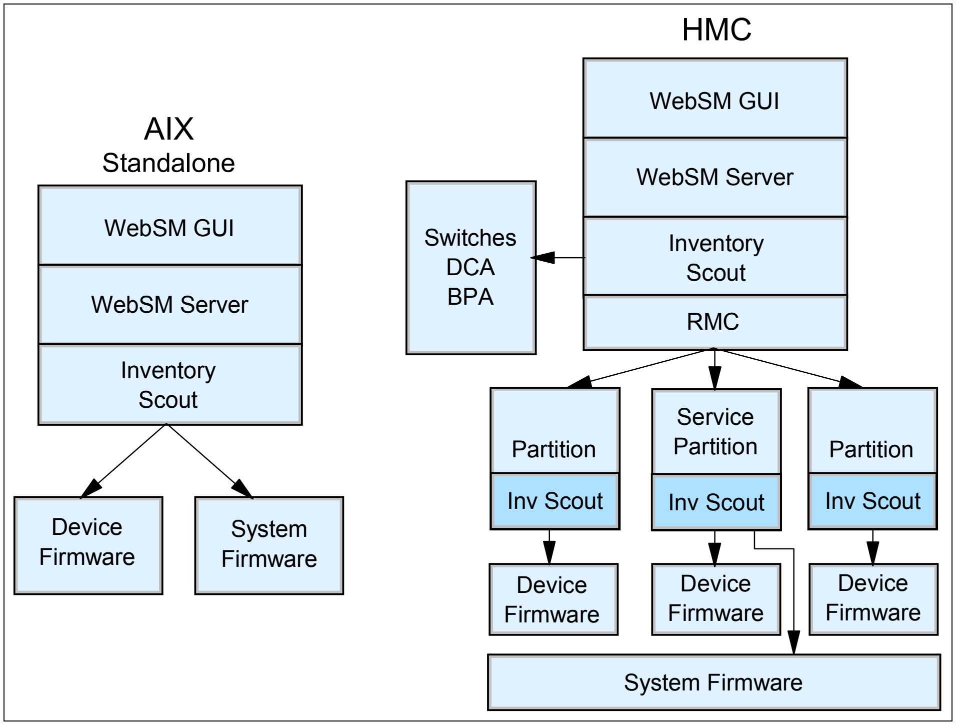
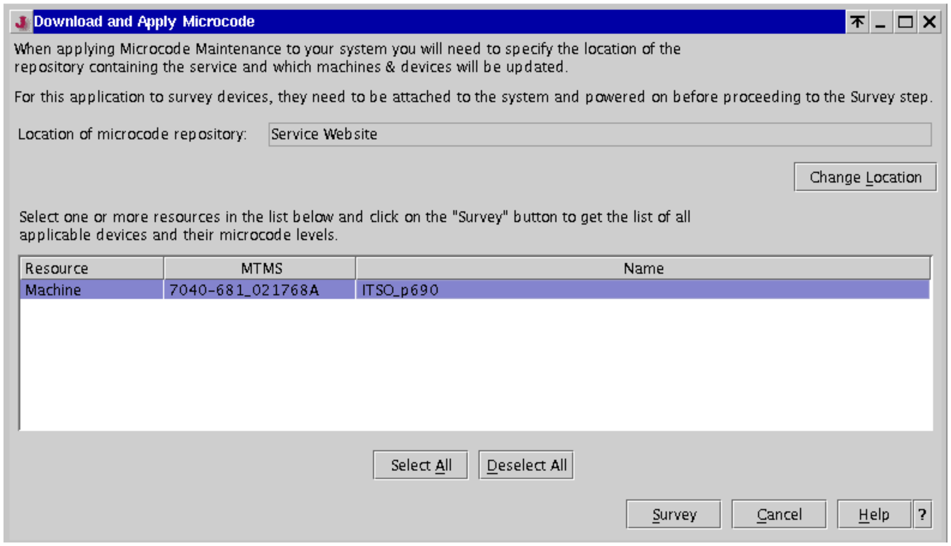


Figure 11-23 Mechanism of the Microcode Updates

Here are the steps to survey and install the latest microcode levels from the HMC:

1. Expand the Software Maintenance folder, then select the Microcode Updates applicaiton in the Navigation area.
2. Select the Microcode Updates task in the Content area. The Download and Apply Microcode Update window opens as shown in Figure 11-24 on page 275.



When applying Microcode Maintenance to your system you will need to specify the location of the repository containing the service and which machines & devices will be updated.

For this application to survey devices, they need to be attached to the system and powered on before proceeding to the Survey step.

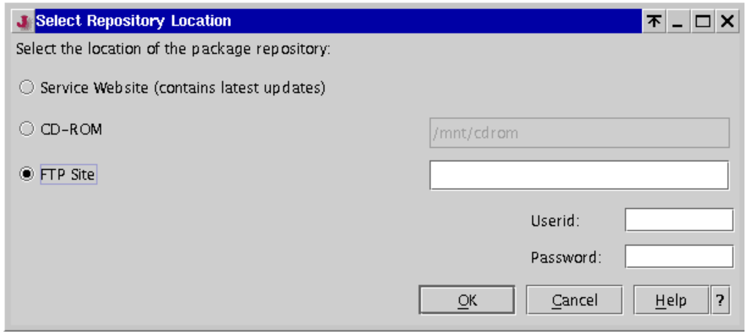
Location of microcode repository: Service Website

Select one or more resources in the list below and click on the "Survey" button to get the list of all applicable devices and their microcode levels.

Resource	MTMS	Name
Machine	7040-681_021768A	ITSO_p690

Figure 11-24 Download and Apply Microcode Updates

3. Click **Change Location** if you wish to change from the default Web site Service location. The Select Repositry Location window opens as shown in Figure 11-25. Specify the required information depending on the selected location in the window, then click **OK**.



Select the location of the package repository:

○ Service Website (contains latest updates)

○ CD-ROM /mnt/cdrom

● FTP Site

Userid:

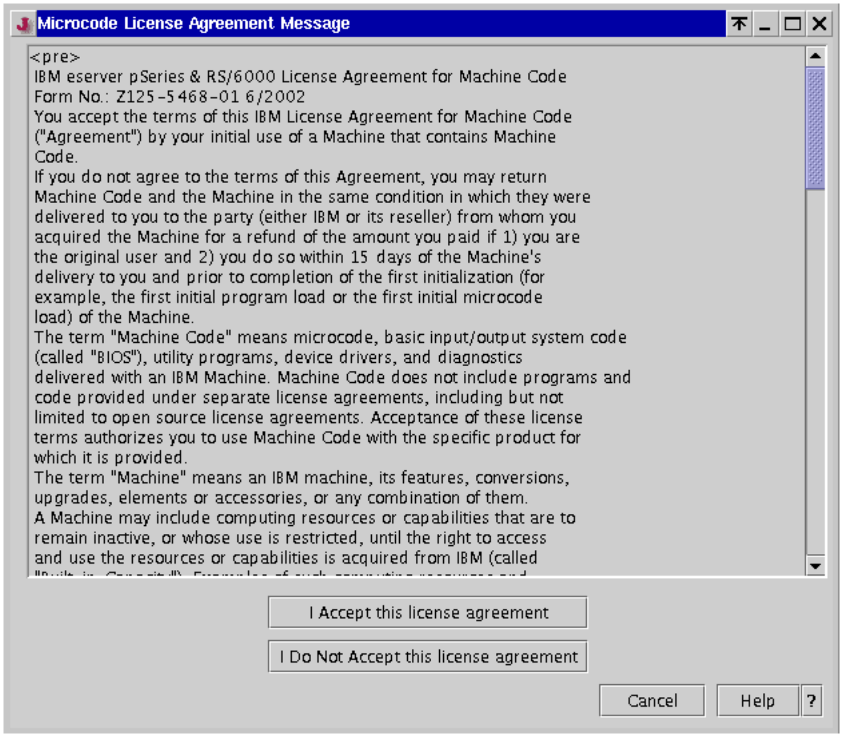
Password:

Figure 11-25 Select Repository Location

> **Note:** If your HMC can access the Internet, select Service Website. If not, select either CD-ROM or FTP site. In either case, you need to prepare the repositry by yourself.

4. After confirming the location, select the systems that you wish to survey, then click **Survey** in the Download and Apply Microcode Update window

(Figure 11-24 on page 275). The Microcode License Agreement Message window opens as shown in Figure 11-26.

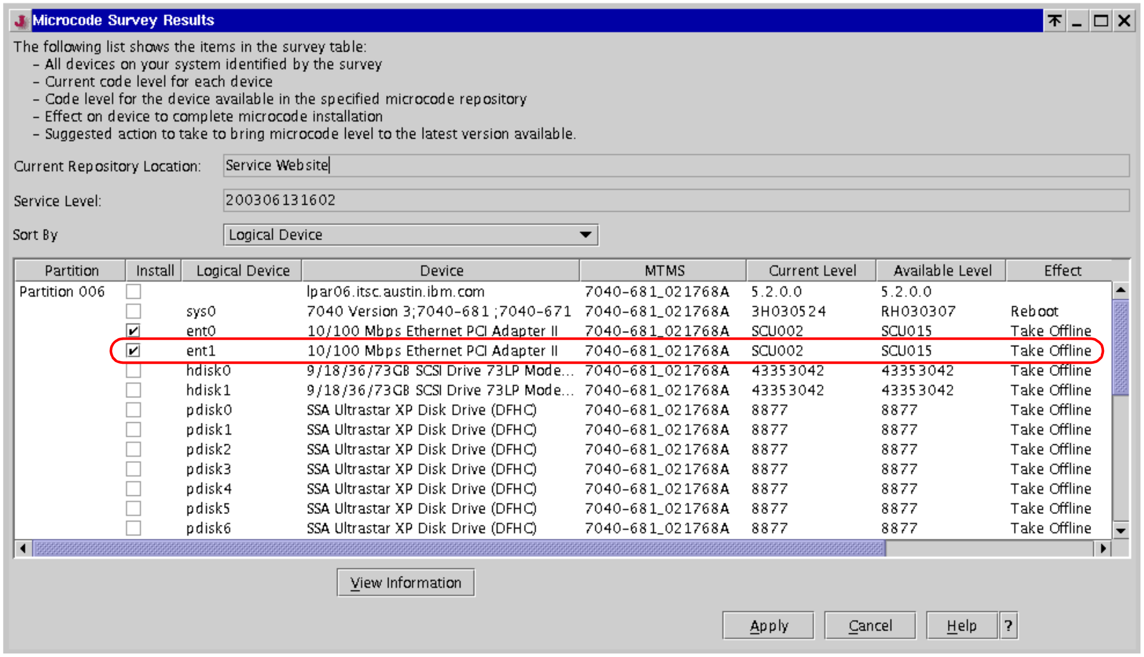

Microcode License Agreement Message
I Accept this license agreement
I Do Not Accept this license agreement
Cancel
Help
?

```
<pre>
IBM eserver pSeries & RS/6000 License Agreement for Machine Code
Form No.: Z125-5468-01 6/2002
You accept the terms of this IBM License Agreement for Machine Code
("Agreement") by your initial use of a Machine that contains Machine
Code.
If you do not agree to the terms of this Agreement, you may return
Machine Code and the Machine in the same condition in which they were
delivered to you to the party (either IBM or its reseller) from whom you
acquired the Machine for a refund of the amount you paid if 1) you are
the original user and 2) you do so within 15 days of the Machine's
delivery to you and prior to completion of the first initialization (for
example, the first initial program load or the first initial microcode
load) of the Machine.
The term "Machine Code" means microcode, basic input/output system code
(called "BIOS"), utility programs, device drivers, and diagnostics
delivered with an IBM Machine. Machine Code does not include programs and
code provided under separate license agreements, including but not
limited to open source license agreements. Acceptance of these license
terms authorizes you to use Machine Code with the specific product for
which it is provided.
The term "Machine" means an IBM machine, its features, conversions,
upgrades, elements or accessories, or any combination of them.
A Machine may include computing resources or capabilities that are to
remain inactive, or whose use is restricted, until the right to access
and use the resources or capabilities is acquired from IBM (called
```

Figure 11-26 Microcode License Agreement Message

5. Once you have accepted the license agreement, click **I Accept this license Agreement**. Then the microcode survey process starts on the selected managed systems.

6. When the survey is completed, a summary of all the devices, their current and latest microcode levels, effects of the updates, and suggested actions will be displayed as shown in Figure 11-27 on page 277.



The following list shows the items in the survey table:
- All devices on your system identified by the survey
- Current code level for each device
- Code level for the device available in the specified microcode repository
- Effect on device to complete microcode installation
- Suggested action to take to bring microcode level to the latest version available.

Current Repository Location: Service Website

Service Level: 200306131602

Sort By: Logical Device

Partition	Install	Logical Device	Device	MTMS	Current Level	Available Level	Effect
Partition 006	☐		lpar06.itsc.austin.ibm.com	7040-681_021768A	5.2.0.0	5.2.0.0	
	☐	sys0	7040 Version 3;7040-681;7040-671	7040-681_021768A	3H030524	RH030307	Reboot
	☑	ent0	10/100 Mbps Ethernet PCI Adapter II	7040-681_021768A	SCU002	SCU015	Take Offline
	☑	ent1	10/100 Mbps Ethernet PCI Adapter II	7040-681_021768A	SCU002	SCU015	Take Offline
	☐	hdisk0	9/18/36/73GB SCSI Drive 73LP Mode...	7040-681_021768A	43353042	43353042	Take Offline
	☐	hdisk1	9/18/36/73GB SCSI Drive 73LP Mode...	7040-681_021768A	43353042	43353042	Take Offline
	☐	pdisk0	SSA Ultrastar XP Disk Drive (DFHC)	7040-681_021768A	8877	8877	Take Offline
	☐	pdisk1	SSA Ultrastar XP Disk Drive (DFHC)	7040-681_021768A	8877	8877	Take Offline
	☐	pdisk2	SSA Ultrastar XP Disk Drive (DFHC)	7040-681_021768A	8877	8877	Take Offline
	☐	pdisk3	SSA Ultrastar XP Disk Drive (DFHC)	7040-681_021768A	8877	8877	Take Offline
	☐	pdisk4	SSA Ultrastar XP Disk Drive (DFHC)	7040-681_021768A	8877	8877	Take Offline
	☐	pdisk5	SSA Ultrastar XP Disk Drive (DFHC)	7040-681_021768A	8877	8877	Take Offline
	☐	pdisk6	SSA Ultrastar XP Disk Drive (DFHC)	7040-681_021768A	8877	8877	Take Offline

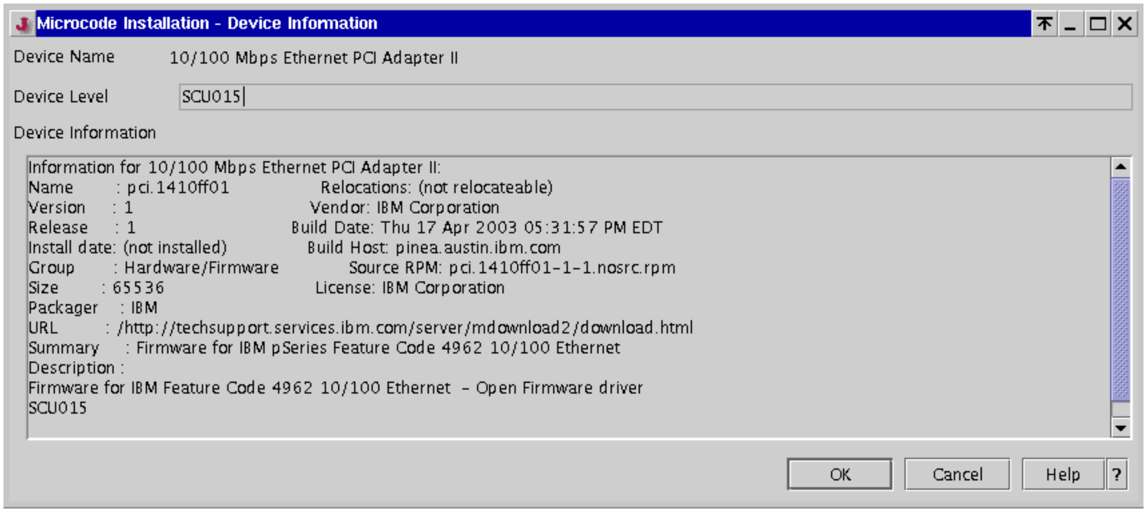
Figure 11-27 Microcode Survey Results

For any selected devices, the Effect column includes:

Take Offline The user must take devices offline prior the update of the microcode; otherwise the update will fail.

Reboot The user must confirm that he understands that the system will reboot as a result of the Microcode Updates. Applications should be stopped, all users should be notified, and the non-service partitions should be shut down.

7. It is also possible to view the details for each device. Select the device to be viewed and click **View Information**. The details of the device will be shown as in Figure 11-28 on page 278.



Device Name 10/100 Mbps Ethernet PCI Adapter II

Device Level SCU015

Device Information

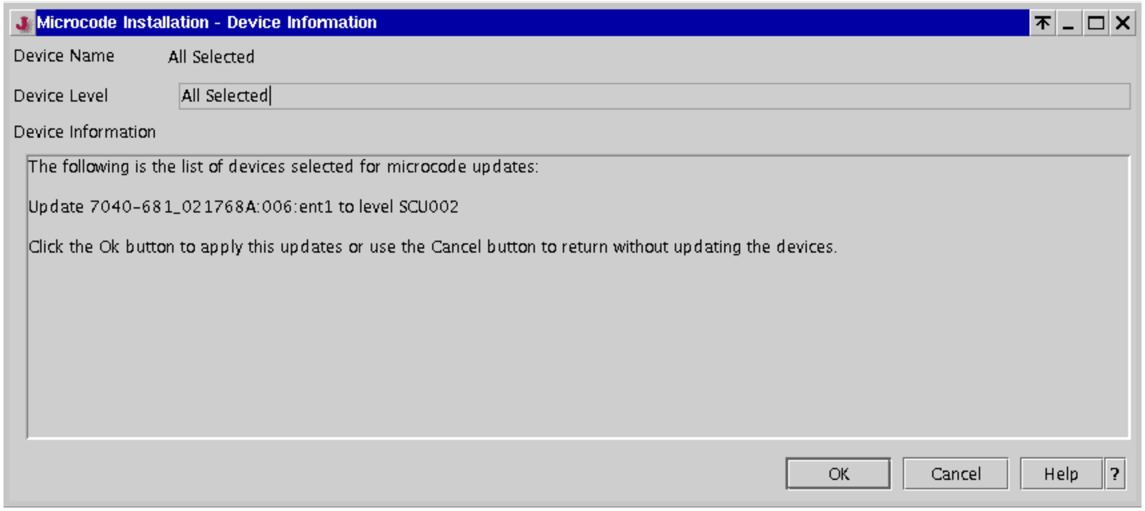
```
Information for 10/100 Mbps Ethernet PCI Adapter II:
Name        : pci.1410ff01                Relocations: (not relocateable)
Version     : 1                          Vendor: IBM Corporation
Release     : 1                      Build Date: Thu 17 Apr 2003 05:31:57 PM EDT
Install date: (not installed)            Build Host: pinea.austin.ibm.com
Group       : Hardware/Firmware            Source RPM: pci.1410ff01-1-1.nosrc.rpm
Size        : 65536                      License: IBM Corporation
Packager    : IBM
URL         : /http://techsupport.services.ibm.com/server/mdownload2/download.html
Summary     : Firmware for IBM pSeries Feature Code 4962 10/100 Ethernet
Description :
Firmware for IBM Feature Code 4962 10/100 Ethernet  - Open Firmware driver
SCU015
```

Figure 11-28 Microcode Installation - Device Information

> **Note:** Only one device at a time can be selected when you click **View Information**.

8. Update some or all of the devices by selecting Install check boxes on the device line(s) and clicking **Apply** in the Microcode Survey Results window.

   The confirmation message shown in Figure 11-29 on page 279 appears. You can either proceed with the update by selecting **OK** or abort the update by selecting **Cancel**.



Device Name All Selected

Device Level All Selected

Device Information

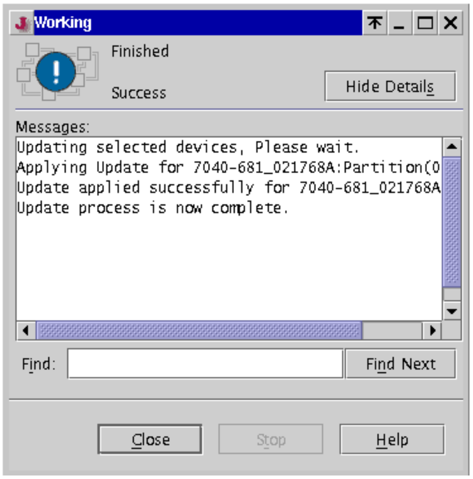
The following is the list of devices selected for microcode updates:

Update 7040-681_021768A:006:ent1 to level SCU002

Click the Ok button to apply this updates or use the Cancel button to return without updating the devices.

Figure 11-29 Confirmation message

9. When the microcode update is completed, the window in Figure 11-30 appears. The system will automatically reboot if required.



Finished

Success

Messages:

```
Updating selected devices, Please wait.
Applying Update for 7040-681_021768A:Partition(0
Update applied successfully for 7040-681_021768A
Update process is now complete.
```

Find:

Figure 11-30 Microcode Updates Finished

12

Sample Service Agent configurations on the HMC

This chapter briefly explains examples of configuring Service Agent on the HMC by providing the following sections:

- “Configuring the Service Agent dialer” on page 282
- “Testing the dialer settings” on page 286
- “Registering your HMC with IBM” on page 287
- “Sending VPD to IBM” on page 290

These subsections are organized to show the logical task flow when you configure Service Agent on the HMC.

The following sections are provided to explain optional tasks for configuring Service Agent on the HMC:

- “Sending VPD to IBM” on page 290
- “Define Service Agent clients on a gateway server” on page 292

For further information about Service Agent on the HMC, refer to *Electronic Service Agent for pSeries HMC User’s Guide*.

12.1 Configuring the Service Agent dialer

For the Service Agent to perform any of its call home functions the dialer must first be properly configured.

Note: The following steps can be performed from the local HMC console only.

To configure the Service Agent dialer, do the following:

10. Expand the Service Applications folder in theNavigation area, then click **Service Agent**.
11. Click **Service Agent UI - registration/customization** as shown in Figure 11-9 on page 256.
12. When prompted to enter a password as shown in Figure 12-1, type the default password (`password`), then click **OK**.

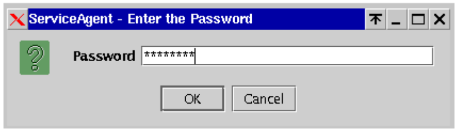


Figure 12-1 Service Agent – Enter the Password

13. AThe Electronic Service Agent for pSeries - Hardware Management Console window opens.

    Note: Hereafter this window is referred to as the *Service Agent window*.

14. As shown in Figure 12-2, click **Network** in the Navigation area (number 1 in the figure), click the icon representing your HMC (number 2), then click **Dialer** (number 3).

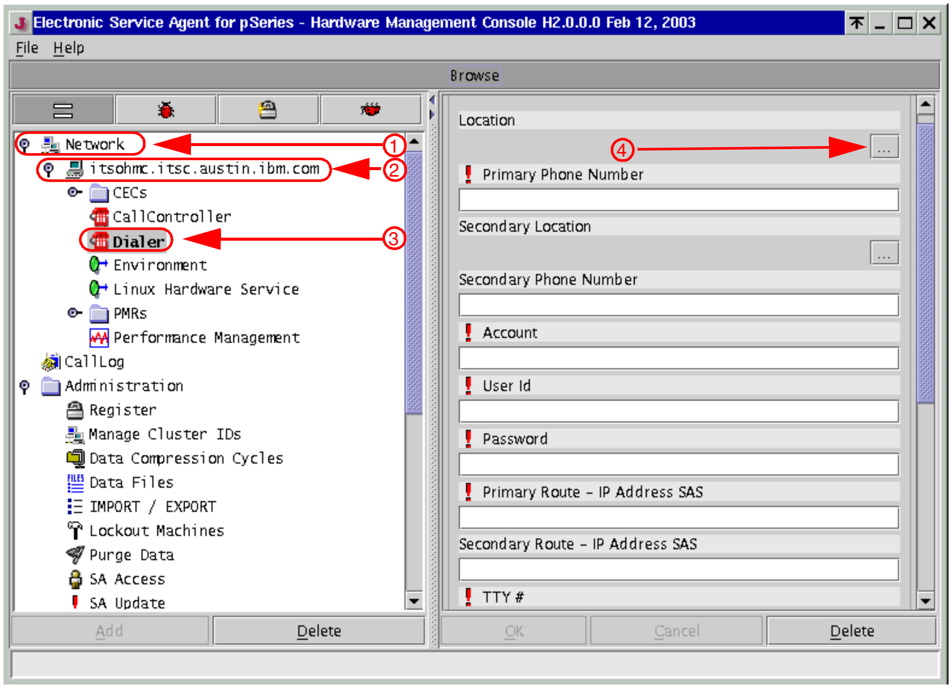
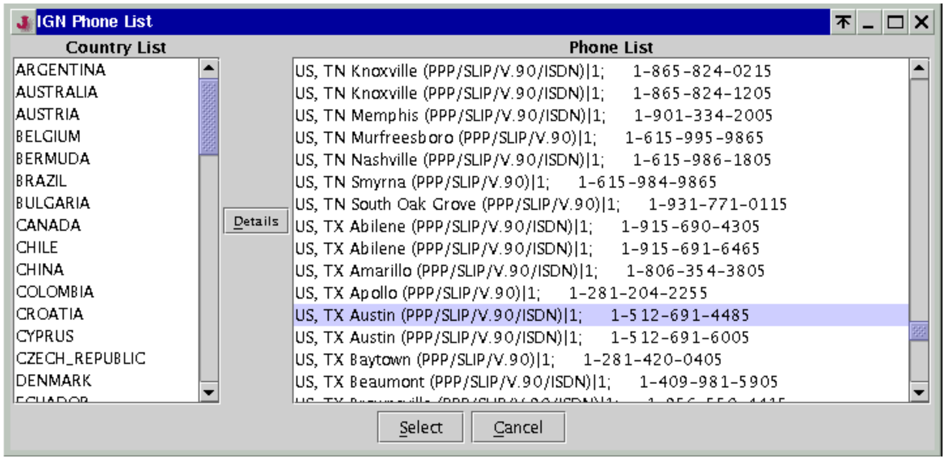


Figure 12-2 Service Agent - blank dialer configuration

15. In the right pane in Figure 12-2, click the box containing the ellipsis (…) next to the field labeled Location (number 4 in the figure). The IGN Phone List window opens as shown in Figure 12-3 on page 284.

16. Choose your country, state (or province), and city in this window, then click **Select**.



ARGENTINA
AUSTRALIA
AUSTRIA
BELGIUM
BERMUDA
BRAZIL
BULGARIA
CANADA
CHILE
CHINA
COLOMBIA
CROATIA
CYPRUS
CZECH_REPUBLIC
DENMARK

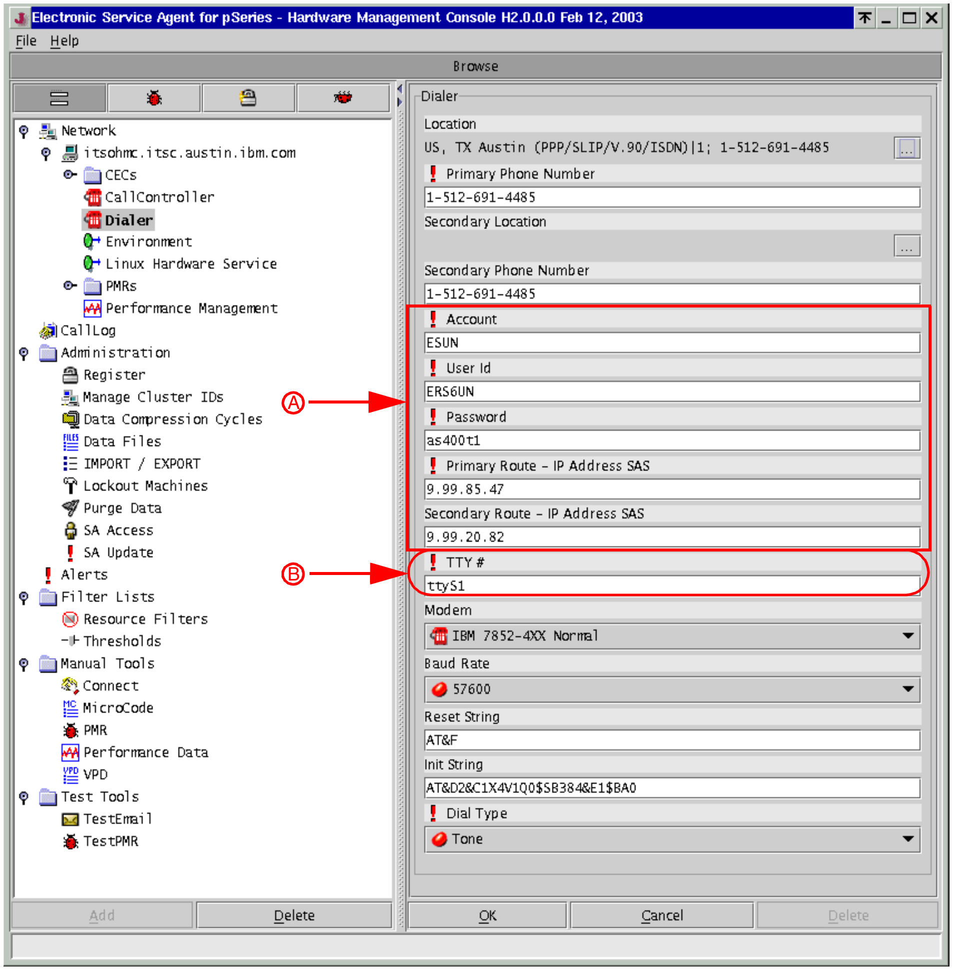
US, TN Knoxville (PPP/SLIP/V.90/ISDN)|1; 1-865-824-0215
US, TN Knoxville (PPP/SLIP/V.90/ISDN)|1; 1-865-824-1205
US, TN Memphis (PPP/SLIP/V.90/ISDN)|1; 1-901-334-2005
US, TN Murfreesboro (PPP/SLIP/V.90)|1; 1-615-995-9865
US, TN Nashville (PPP/SLIP/V.90/ISDN)|1; 1-615-986-1805
US, TN Smyrna (PPP/SLIP/V.90)|1; 1-615-984-9865
US, TN South Oak Grove (PPP/SLIP/V.90)|1; 1-931-771-0115
US, TX Abilene (PPP/SLIP/V.90/ISDN)|1; 1-915-690-4305
US, TX Abilene (PPP/SLIP/V.90/ISDN)|1; 1-915-691-6465
US, TX Amarillo (PPP/SLIP/V.90/ISDN)|1; 1-806-354-3805
US, TX Apollo (PPP/SLIP/V.90)|1; 1-281-204-2255
US, TX Austin (PPP/SLIP/V.90/ISDN)|1; 1-512-691-4485
US, TX Austin (PPP/SLIP/V.90/ISDN)|1; 1-512-691-6005
US, TX Baytown (PPP/SLIP/V.90)|1; 1-281-420-0405
US, TX Beaumont (PPP/SLIP/V.90/ISDN)|1; 1-409-981-5905

Figure 12-3 Service Agent - select dialer location

17. In the right pane in Figure 12-2 on page 283, click the **...** next to the field labeled Secondary Location. Select the secondary phone number in the IGN Phone List window.

> **Note:** If necessary, modify the primary and secondary phone numbers. For example, if your phone system requires a dial-out extension number, such as 9, modify the phone numbers to 9-1-512-691-4485.

18. Now all of the Service Agent dialer configuration fields should be automatically filled out as shown in Figure 12-4 on page 285. Click **OK** and the dialer should be properly configured.



Dialer

Location: US, TX Austin (PPP/SLIP/V.90/ISDN)|1; 1-512-691-4485

! Primary Phone Number: 1-512-691-4485

Secondary Location:

Secondary Phone Number: 1-512-691-4485

! Account: ESUN

! User Id: ERS6UN

! Password: as400t1

! Primary Route - IP Address SAS: 9.99.85.47

Secondary Route - IP Address SAS: 9.99.20.82

! TTY #: ttyS1

Modem: IBM 7852-4XX Normal

Baud Rate: 57600

Reset String: AT&F

Init String: AT&D2&C1X4V1Q0$SB384&E1$BA0

! Dial Type: Tone

Figure 12-4 Service Agent: configured dialer

Note:

- Fields indicated by A in Figure 12-4 on page 285 should not be modified, unless you are instructed to do so by IBM Support.
- As indicated by B in Figure 12-4, specify the following value in the TTY# field depending on the serial port to which the modem is connected on your HMC:

ttyS0	First serial port (S1)
ttyS1	Second serial port (S2)

12.2 Testing the dialer settings

Note: To test the dialer setting, your modem must be powered on and properly connected to the phone line jack and the serial port on the HMC.

To test the dialer settings, do the following:

1. Click **Manual Tools** in the Navigation area in the Service Agent window (number 1 in Figure 12-5), then click **Connect** (number 2).
2. The window shows Connect and Disconnect buttons in the right pane as shown in Figure 12-5. Click the **Connect** button (3 in Figure 12-5).

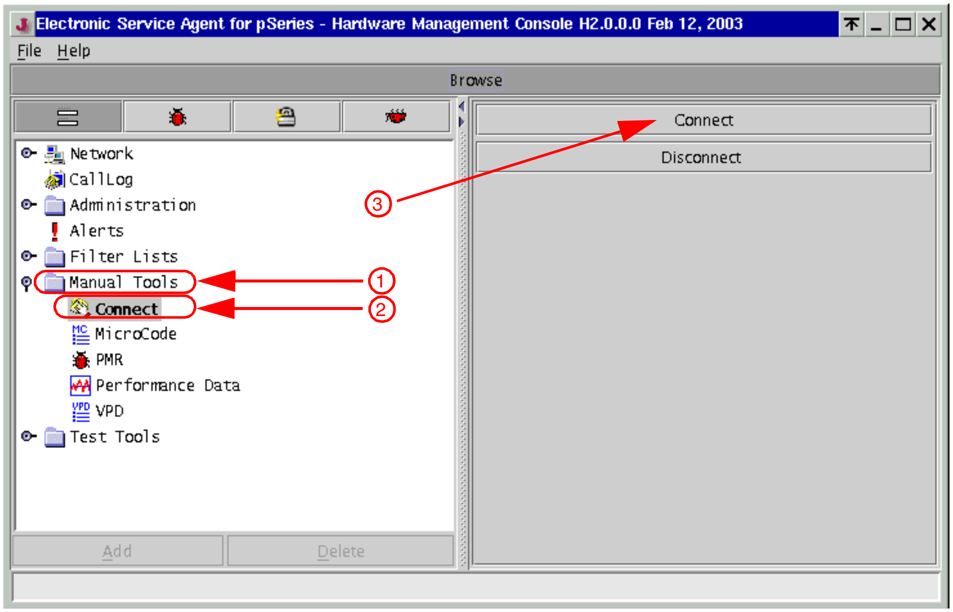


Figure 12-5 Service Agent: testing the dialer

3. At this point the modem should begin dialing out. To verify whether the dial-out is successfully completed, click **CallLog** in the Navigation area. In the CallLog, the log entry similar to the following should be found:

```
2003/06/09 15:22:... | TEST Connection (Success:1, Fail: 0);
```

4. If you get `Dialer not configured` errors in your CallLog, do the following:
   - Check your modem cabling and power.
   - Check your modem dip-switch settings.

- Review the configuration steps explained in 12.1, “Configuring the Service Agent dialer” on page 282.

> **Note:** Along with the entry in the CallLog, you will receive a phone call from an IBM service representative to notify you that the test connection has been successfully completed at the phone number specified in the location fields shown in Figure 12-6 on page 288.

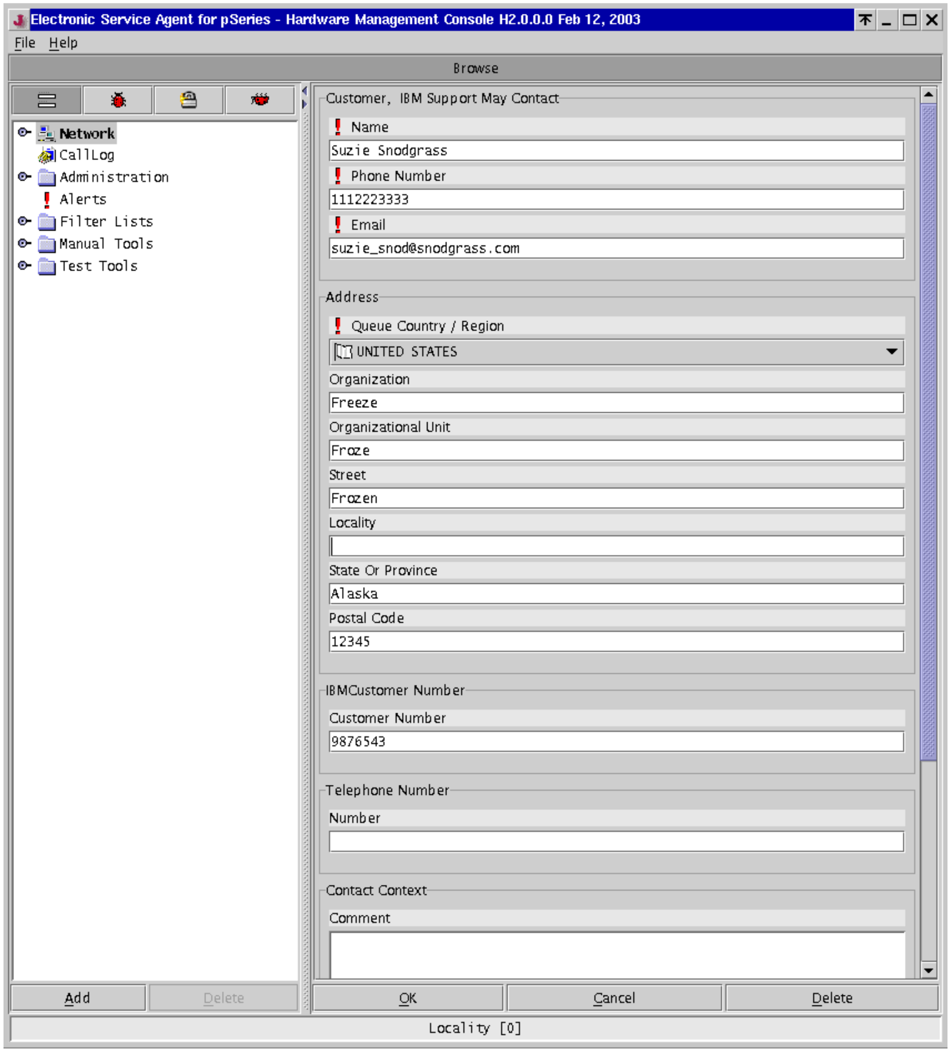
12.3 Registering your HMC with IBM

> **Note:** Before registering your HMC with IBM, you must first properly configure the dialer (see 12.1, “Configuring the Service Agent dialer” on page 282).

To register your HMC with IBM, do the following:

1. In the Navigation area on the Service Agent window, click **Network**.

2. The Service Agent window shows many fields to be filled out, as shown in Figure 12-6. All fields beginning with '!' are mandatory, such as Name, Phone Number, and Email. For the Queue Country / Region field, click the down arrow and select the appropriate region. All other fields are optional.



Customer, IBM Support May Contact

! Name
Suzie Snodgrass

! Phone Number
1112223333

! Email
suzie_snod@snodgrass.com

Address

! Queue Country / Region
UNITED STATES

Organization
Freeze

Organizational Unit
Froze

Street
Frozen

Locality

State Or Province
Alaska

Postal Code
12345

IBMCustomer Number

Customer Number
9876543

Telephone Number

Number

Contact Context

Comment

Figure 12-6 Registration information

3. In the Navigation area on the Service Agent window, expand **Administration** (A in Figure 12-7 on page 289) and click **Register** (B).

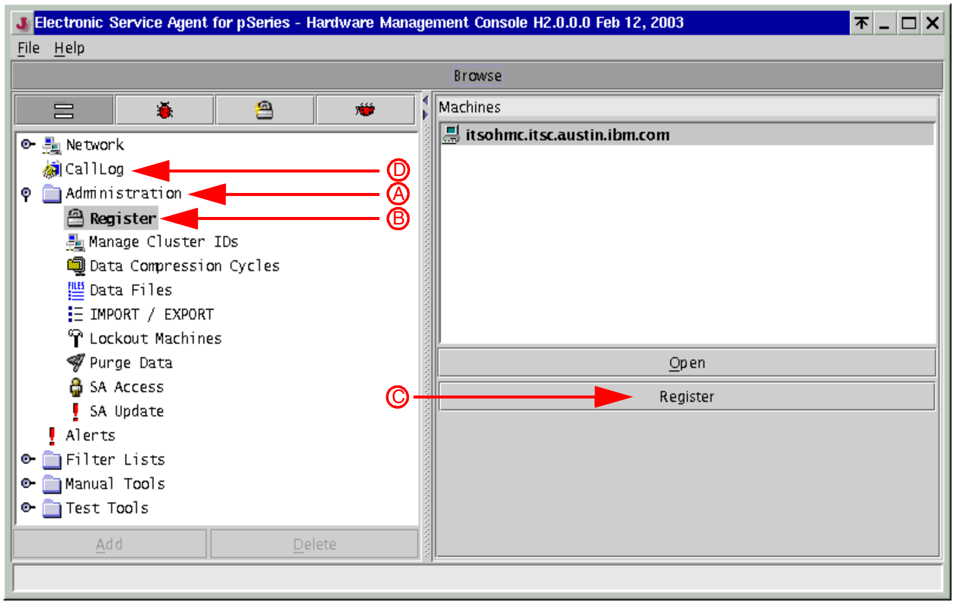
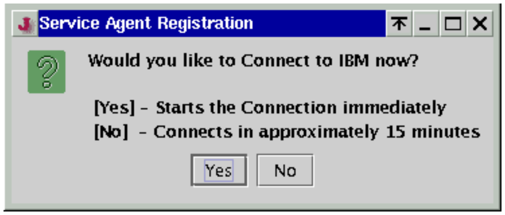


Figure 12-7 Service Agent: registering HMC

4. Select the HMC to be registered from the right pane, then click **Register** as indicated by C.
5. When prompted to connect to IBM as shown in Figure 12-8, select **Yes** or **No**.

   If Yes is selected, then the modem should start dialing out within a minute; if No is selected it should start within 15 to 20 minutes.



Service Agent Registration

Would you like to Connect to IBM now?

[Yes] - Starts the Connection immediately
[No] - Connects in approximately 15 minutes

Figure 12-8 Service Agent Registration

6. After the modem has finished dialing out, click **CallLog** as indicated by D in Figure 12-7 in order to confirm whether the registration has successfully completed. If it succeeded, this or a similar log entry should be found:

```
2003/06/09 15:47:... | LICENSE (Success: 1, Fail: 0);
```

12.4 Sending VPD to IBM

In the event an IBM representative asks you to submit VPD for one of your managed systems, you can transmit the data to IBM using the Service Agent as follows:

1. In the navigation area under Manual Tools click **VPD**. This will open a menu of managed systems for which VPD tasks are accessible, shown in Figure 12-9.

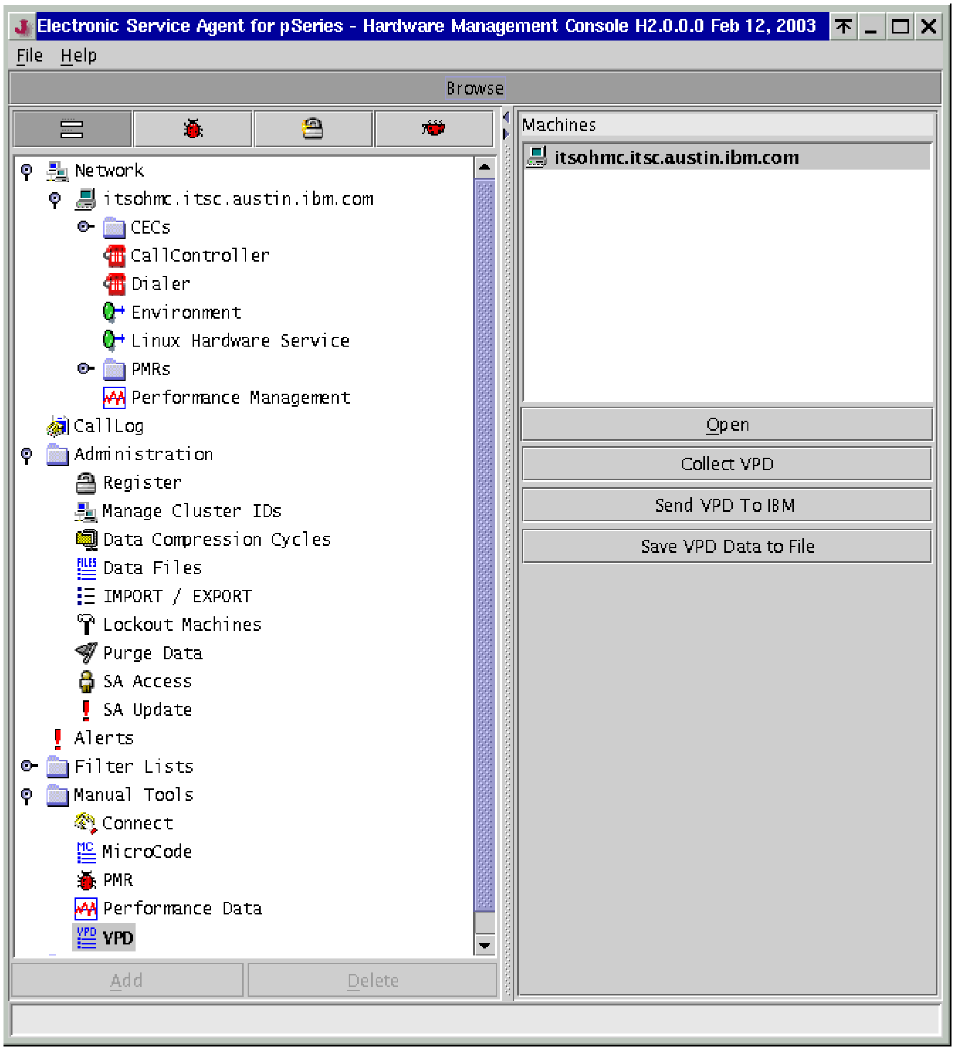
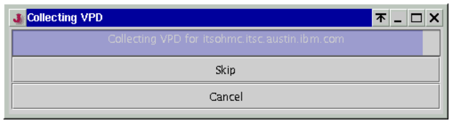


Figure 12-9 Service Agent: VPD tasks

This window has four buttons in the right pane:

- Click **Open** to show a list of known information for a specific managed system, including the system's primary HMC, IP address, and other pertinent data.
- Click **Collect VPD** to collect VPD for the managed systems connected to this HMC.
- Clicking **Send VPD to IBM** automatically sends VPD for the managed systems connected to this HMC to IBM.
- Click **Save VPD Data to File** to save VPD data into a file on the HMC hard drive.

2. To send VPD to IBM, VPD must be collected first onto one of the HMCs. Select the HMC on which you want to perform this task, then click **Collect VPD**. The Service Agent should start gathering VPD information and will display the status screen shown in Figure 12-10.

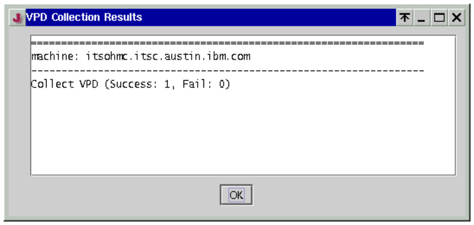


Collecting VPD for itsohmc.itsc.austin.ibm.com

Figure 12-10 Service Agent: VPD collection status

3. When it is finished, the information window in Figure 12-11 is displayed.

   This shows the number of successful VPD collection attempts or the number of failures. If the VPD collection attempt failed, see 11.2, "Inventory Scout Services" on page 249.

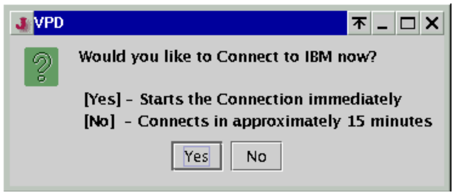


```
================================================================
machine: itsohmc.itsc.austin.ibm.com
----------------------------------------------------------------
Collect VPD (Success: 1, Fail: 0)
```

Figure 12-11 Service Agent - VPD Collection Results

> **Note:** Before proceeding to send your VPD to IBM, ensure that the HMC from which you gathered VPD is registered with IBM. See 12.3, "Registering your HMC with IBM" on page 287.

4. Click **Send VPD to IBM**. The confirmation window in Figure 12-12 opens. Click either **Yes** or **No**.



VPD

Would you like to Connect to IBM now?

[Yes] - Starts the Connection immediately
[No] - Connects in approximately 15 minutes

Figure 12-12 Service Agent: VPD transmittal

5. After the modem has finished dialing out, click **CallLog** as indicated by D in Figure 12-7 on page 289 to confirm whether the VPD has been transmitted successfully to IBM.
6. Once the VPD is transmitted to IBM, click **CallLog** under Network in the Navigation area. If it succeeded, the log entry similar to the following example should be found:

```
2003/06/09 17:42:... | VPD (Success: 1, Fail: 0);
```

12.5 Define Service Agent clients on a gateway server

To define an HMC as a Service Agent client on the HMC that works as a Service Agent gateway, do the following:

1. In the Navigation area on the Service Agent window, click **Network**.
2. From the menu located at the bottom left of the window, select **Add** → **Child** → **Machine** as shown in Figure 12-13.

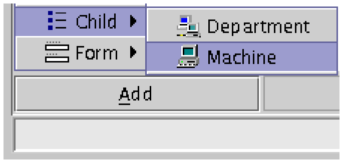
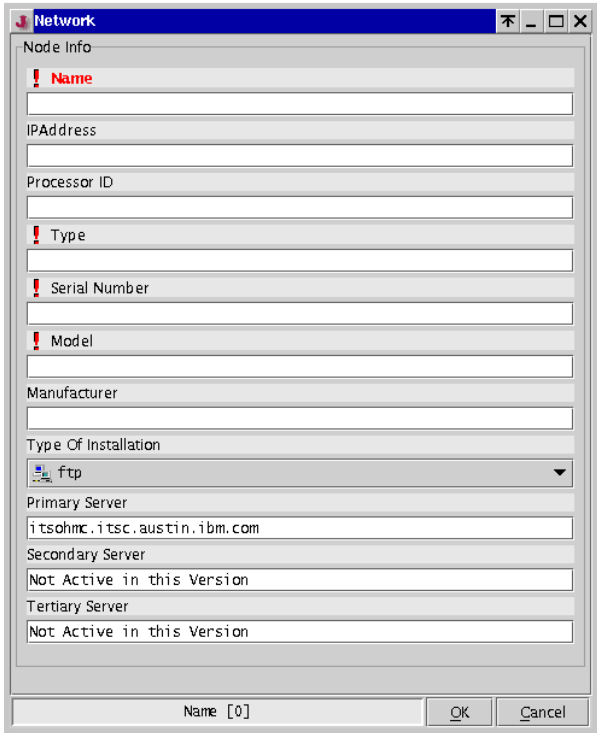


Figure 12-13 Network, Add, Child, Machine

3. A window opens to define the Service Agent client on the gateway as shown in Figure 12-14.



Network

Node Info

! Name

IPAddress

Processor ID

! Type

! Serial Number

! Model

Manufacturer

Type Of Installation: ftp

Primary Server: itsohmc.itsc.austin.ibm.com

Secondary Server: Not Active in this Version

Tertiary Server: Not Active in this Version

Name [0]

Figure 12-14 Defining an Service Agent client

4. Complete the required fields for the HMC by providing the host name and IP address (all fields starting with a '!' are mandatory), then click **OK** to save the information.

A

Configuring asynchronous adapters on the HMC

This appendix explains how to configure the following asynchronous adapters on the HMC:

FC 2943	8-port asynchronous adapter EIA-232/RS-422, PCI bus
FC 2944	128-port asynchronous adapter, PCI bus

For further detailed information about the tasks explained in this appendix, refer to the following publications:

- *IBM Hardware Management Console for pSeries Maintenance Guide*, SA38-0603
- *AIX 5L Version 5.2 Asynchronous Communications Guide*
- *8-Port Asynchronous PCI Adapter Installation and User's Guide*, SA23-2562
- *128-Port Asynchronous PCI Adapter Installation and User's Guide*, SA23-2563
- *Adapter, Devices, and Cable Information for Multiple Bus Systems*, SA38-0516

Note: All the tasks explained in this appendix must be performed by a user with System Administrator authority, such as the hscroot user, who logs in to the HMC locally.

Hardware setup

Before configuring asynchronous adapters in the HMC graphical user interface, the adapter and related hardware must be set up as explained in this section.

Add an 8-port asynchronous adapter

To add an 8-port asynchronous adapter on the HMC:

1. Power off the HMC.
2. Insert the 8-port asynchronous adapter into one of the available PCI slots.
3. Connect the 8-port fanout box cable to the adapter (see “Using 8-port asynchronous adapters” on page 25).
4. Power on the HMC. The Linux kernel should detect the adapter, and the Kudzu[1] configuration screens will be displayed on the HMC. Confirm the addition of the asynchronous adapter.

Note: If the Linux kernel detects the 128-port asynchronous adapter, it displays a message in the boot phase similar to the following:

```
epca: IBM 8-Port Async (PCI) I/O = 0xfea00000, Mem = 0xfe800000 Ports = 8
```

Add a 128-port asynchronous adapter

To add a 128-port asynchronous adapter on the HMC:

1. Power off the HMC.
2. Insert the 128-port asynchronous adapter into one of the available PCI slots.
3. Connect RANs to the adapter appropriately (see “Using 128-port asynchronous adapters” on page 26).
4. Power on the RANs.
5. Program the RAN node number on each RAN as explained in , “Set the RAN node number” on page 297.
6. Power on the HMC. The Linux kernel should detect the adapter, and the Kudzu configuration screens will be displayed on the HMC. Confirm the addition of the asynchronous adapter.

[1] Kudzu is a hardware probing tool that automatically detects and configures devices on the IA-32 architecture Linux operating system.

Note: If the Linux kernel detects the 128-port asynchronous adapter, it displays a message in the boot phase similar to the following:

```
epca:IBM 128-Port Async (PCI) I/O = 0xfea0000 0, Mem = 0xfe800000 Ports = 32
```

Set the RAN node number

To set the RAN node number, do the following:

1. Turn on the RAN and wait for the power-on self-test (POST) to complete.
2. When P1 is displayed on the front panel seven-segment LED display, press the Left Arrow button once (see Figure A-1). The current node number is displayed (for example, 1n for node 1).

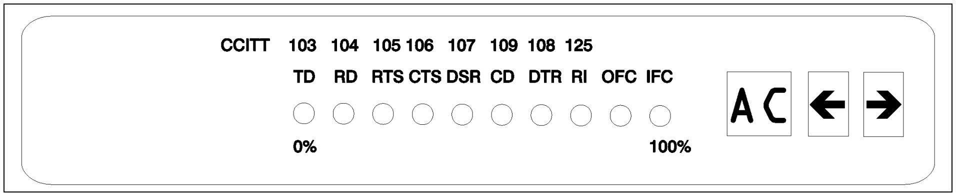


Figure A-1 RAN front view

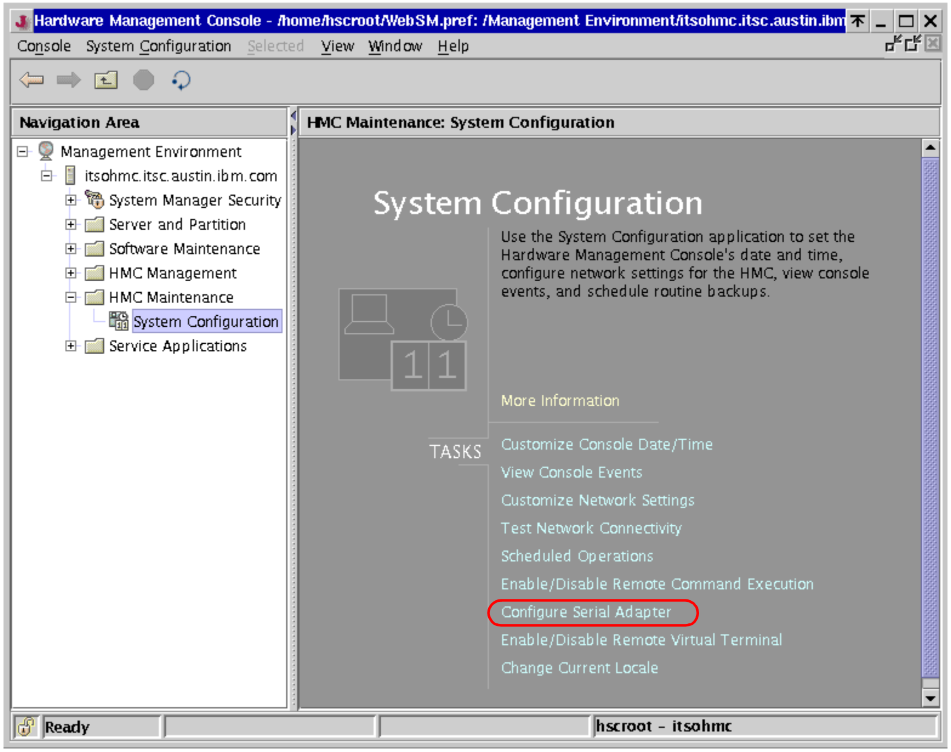
3. Press the Right Arrow button to advance the node number through the eight possible settings (1n-8n).
4. When the desired node number is displayed, press the Left Arrow button again to select the number. The display should now read P*n* (indicating a pass condition). If there was an error, the display reads E*n*.

In the case of duplicate node numbers, the RAN farthest from the host adapter displays E*n*, instead of AC, when the system is started.

Configure Serial Adapter

To configure asynchronous adapters on the HMC, use the Configure Serial Adapter task as follows:

1. Expand the HMC Maintenance folder, then select the System Configuration application in the Navigation area.
2. Select the Configure Serial Adapter task in the Content area as shown in Figure A-2 on page 298.

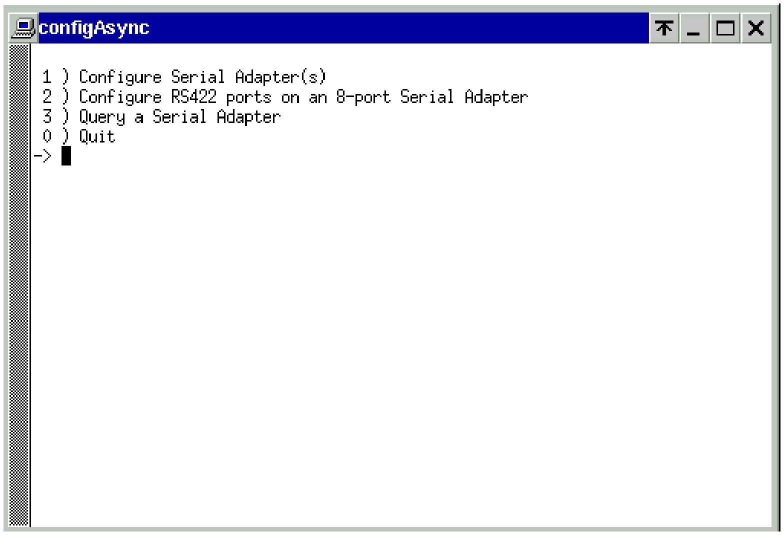

Hardware Management Console - /home/hscroot/WebSM.pref: /Management Environment/itsohmc.itsc.austin.ibm
Console System Configuration Selected View Window Help
Navigation Area
Management Environment
itsohmc.itsc.austin.ibm.com
System Manager Security
Server and Partition
Software Maintenance
HMC Management
HMC Maintenance
System Configuration
Service Applications
HMC Maintenance: System Configuration
System Configuration
More Information
TASKS
Customize Console Date/Time
View Console Events
Customize Network Settings
Test Network Connectivity
Scheduled Operations
Enable/Disable Remote Command Execution
Configure Serial Adapter
Enable/Disable Remote Virtual Terminal
Change Current Locale
Ready
hscroot - itsohmc

Use the System Configuration application to set the Hardware Management Console's date and time, configure network settings for the HMC, view console events, and schedule routine backups.

Figure A-2 Configure Serial Adapter

3. This opens the configAsync window, shown in Figure A-3, which offers the following options:
   - 1. Configure a serial adapter.
   - 2. Configure RS422 ports on an 8-port serial adapter.
   - 3. Query all configured adapters on the HMC.

To select an option, type the corresponding number and press Enter. To close this window when you have finished using it, type 0 (zero) and press Enter.



```
1 ) Configure Serial Adapter(s)
2 ) Configure RS422 ports on an 8-port Serial Adapter
3 ) Query a Serial Adapter
0 ) Quit
->
```

Figure A-3 configAsync window

8-port asynchronous adapter configuration

To configure 8-port asynchronous adapters on the HMC:

1. Select option **1** from the configAsync window menu shown in Figure A-3.
2. The following message is displayed in the window, as indicated by A in Figure A-4 on page 300:

   ```
   How many boards would like to install? (1-12)
   ```

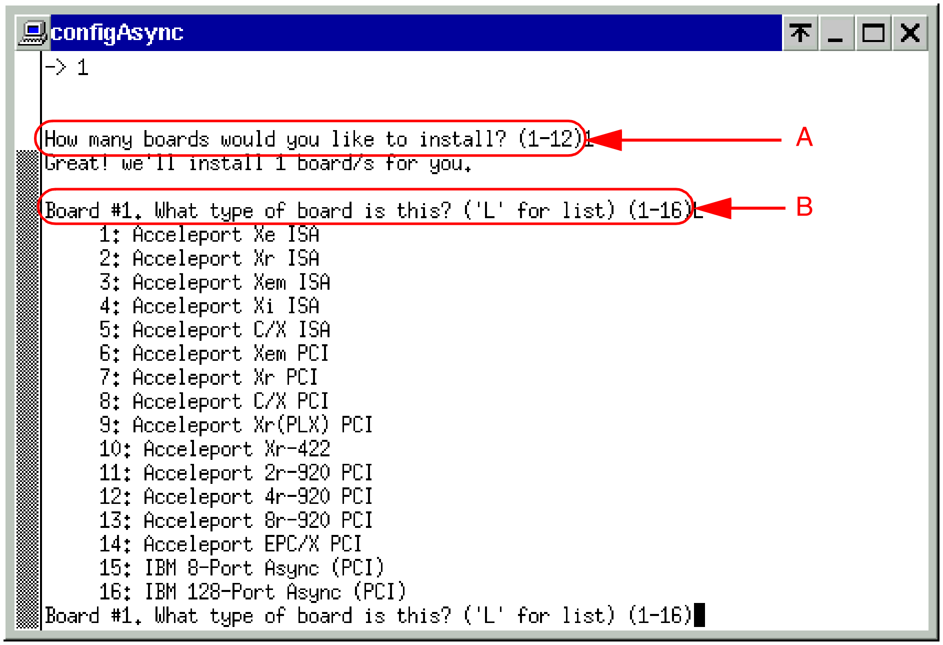
   Type the number of adapters to be configured and press Enter.

   > **Note:** If an asynchronous adapter is already configured on the HMC and you are going to configure another, type 2, not 1, then press Enter.

3. The following message is displayed in the window, as indicated by B in Figure A-4:

   ```
   What type of board is this? (‘L’ for list) (1-16)
   ```

   Type `15` and press Enter. If you type L, the selection list will be displayed.



```
-> 1


How many boards would you like to install? (1-12)1
Great! we'll install 1 board/s for you.

Board #1. What type of board is this? ('L' for list) (1-16)L
     1: Acceleport Xe ISA
     2: Acceleport Xr ISA
     3: Acceleport Xem ISA
     4: Acceleport Xi ISA
     5: Acceleport C/X ISA
     6: Acceleport Xem PCI
     7: Acceleport Xr PCI
     8: Acceleport C/X PCI
     9: Acceleport Xr(PLX) PCI
     10: Acceleport Xr-422
     11: Acceleport 2r-920 PCI
     12: Acceleport 4r-920 PCI
     13: Acceleport 8r-920 PCI
     14: Acceleport EPC/X PCI
     15: IBM 8-Port Async (PCI)
     16: IBM 128-Port Async (PCI)
Board #1. What type of board is this? ('L' for list) (1-16)
```

Figure A-4 Specify number of adapters and adapter type

4. The following message is displayed in the window:

   ```
   Do you want to set Altpin on this board? (‘y’ or ‘n’)
   ```

   Type `n` and press Enter.

5. Depending on the number you have specified in step 2, do the following:

   – If you specified 1, the configuration tool displays the main menu shown in Figure A-3 on page 299. Type 0 and press Enter to close the window.

   – If you specified 2, the configuration tool will continue the process to configure another adapter. Depending on the type of the second adapter, follow one of these sections:

     - , “8-port asynchronous adapter configuration” on page 299
     - , “128-port asynchronous adapter configuration” on page 301

When the second adapter is configured, the configuration tool displays the main menu shown in Figure A-3 on page 299. Type 0 and press Enter to close the window.

> **Note:** Reboot the HMC for this configuration change to take effect.

128-port asynchronous adapter configuration

To configure 128-port asynchronous adapters on the HMC complete the following steps:

> **Note:** The information you supply to the configuration tool in these steps is used to generate the correct microcode image to be downloaded on RANs upon the HMC reboot. If the information does not match with the actual adapter and RAN configuration, RANs will not display *AC* (ready to operate) on their LED.

1. Select option **1** from the configAsync window menu shown in Figure A-3 on page 299.
2. The following message is displayed in the window as indicated by A in Figure A-4 on page 300:

   ```
   How many boards would like to install? (1-12)
   ```

   Type the number of adapters to be configured and press Enter.

   > **Note:** If an asynchronous adapter is already configured on the HMC and you are going to configure another, type 2, not 1, then press Enter.

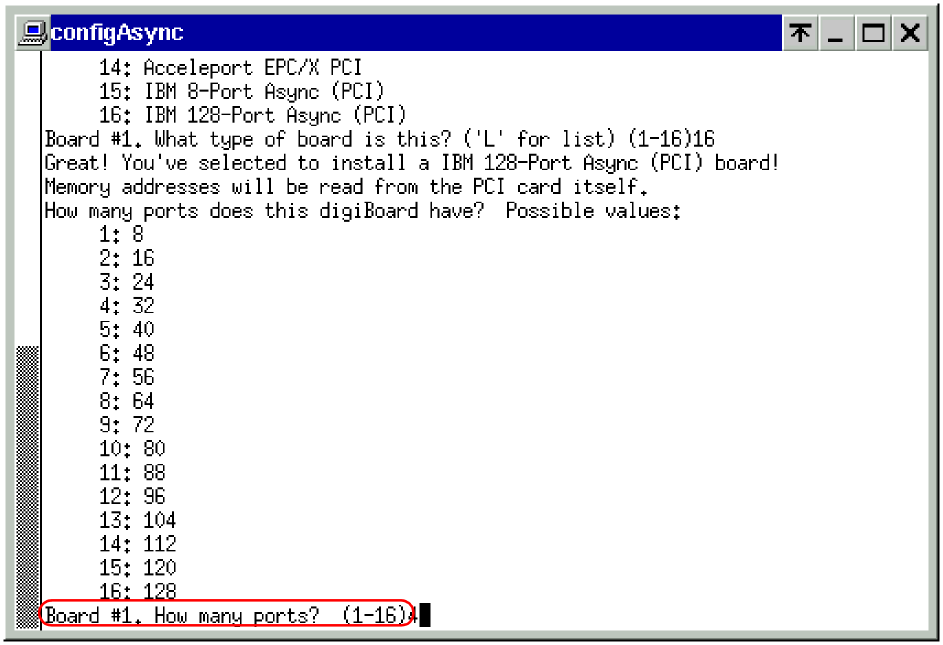
3. The following message is displayed in the window, as indicated by B in Figure A-4 on page 300:

   ```
   What type of board is this? ('L' for list) (1-16)
   ```

   Type 16 and press Enter. If you type L, the selection list will be displayed.
4. The window displays the following message, highlighted in Figure A-5 on page 302:

   ```
   How many ports? (1-16)
   ```

   Count the number of RANs that are attached to the adapter and multiply by two for the number to enter on the command line. For example, if you have two RANs (2 multiplied by 2 equals 4), type 4 and press Enter to inform the configuration tool that 32 ports are connected to the adapter via two RANs.



```
     14: Acceleport EPC/X PCI
     15: IBM 8-Port Async (PCI)
     16: IBM 128-Port Async (PCI)
Board #1. What type of board is this? ('L' for list) (1-16)16
Great! You've selected to install a IBM 128-Port Async (PCI) board!
Memory addresses will be read from the PCI card itself.
How many ports does this digiBoard have?  Possible values:
     1: 8
     2: 16
     3: 24
     4: 32
     5: 40
     6: 48
     7: 56
     8: 64
     9: 72
     10: 80
     11: 88
     12: 96
     13: 104
     14: 112
     15: 120
     16: 128
Board #1. How many ports?  (1-16)4
```

Figure A-5 Specify total number of ports

5. The following message is displayed in the window:

   `Do you want to set Altpin on this board? (‘y’ or ‘n’)`

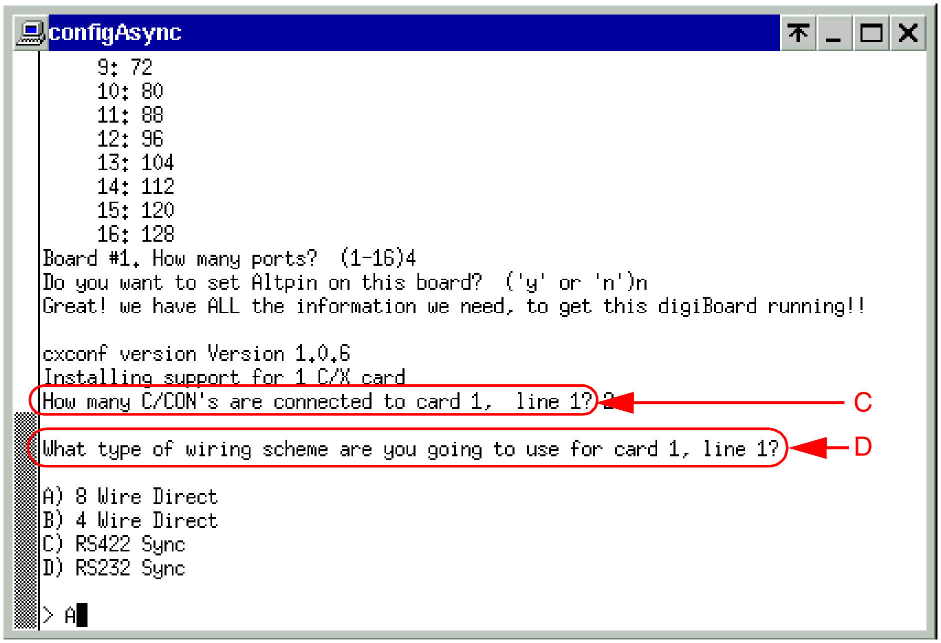
   Type **`n`**, then press Enter.

6. The window displays the following message, as indicated by C in Figure A-6:

   ```
   How many C/CON's are connected to card1, line 1?
   ```

   Count the number of RANs connected to connector 1 of the adapter, then type that number and press Enter.

   Note: The term *C/CON* is used to refer to RAN in this configuration tool.



```
     9: 72
     10: 80
     11: 88
     12: 96
     13: 104
     14: 112
     15: 120
     16: 128
Board #1. How many ports?  (1-16)4
Do you want to set Altpin on this board?  ('y' or 'n')n
Great! we have ALL the information we need, to get this digiBoard running!!

cxconf version Version 1.0.6
Installing support for 1 C/X card
How many C/CON's are connected to card 1,  line 1? 2

What type of wiring scheme are you going to use for card 1, line 1?

A) 8 Wire Direct
B) 4 Wire Direct
C) RS422 Sync
D) RS232 Sync

> A
```

Figure A-6   Specify number of RANs and wiring scheme

7. The window displays the following message, as indicated by D in Figure A-6:

   ```
   What type of wiring scheme are you going to use for card 1, line 1?
   ```

   Type `A` and press Enter.

8. The window displays the following message, as highlighted in Figure A-7:

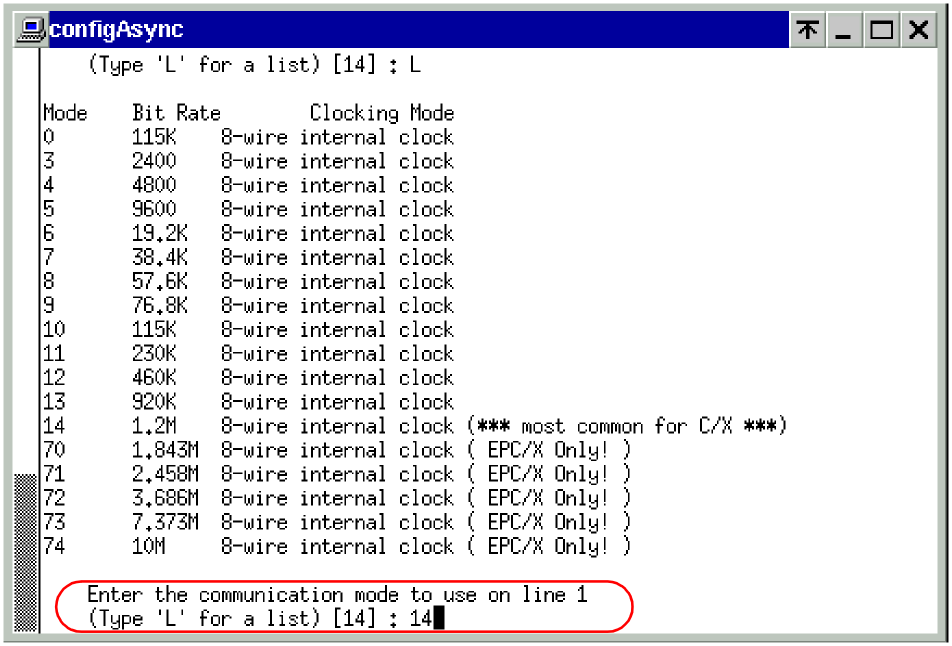
```
Enter the communication mode to use on line 1 (Type ‘L’ for a list) [14]:
```

   Type 14 and press Enter.

9. The window displays the following message:

```
How many ports does this C/CON (RAN) support?
```

   Type 16 and press Enter.



```
    (Type 'L' for a list) [14] : L

Mode     Bit Rate        Clocking Mode
0        115K    8-wire internal clock
3        2400    8-wire internal clock
4        4800    8-wire internal clock
5        9600    8-wire internal clock
6        19.2K   8-wire internal clock
7        38.4K   8-wire internal clock
8        57.6K   8-wire internal clock
9        76.8K   8-wire internal clock
10       115K    8-wire internal clock
11       230K    8-wire internal clock
12       460K    8-wire internal clock
13       920K    8-wire internal clock
14       1.2M    8-wire internal clock (*** most common for C/X ***)
70       1.843M  8-wire internal clock ( EPC/X Only! )
71       2.458M  8-wire internal clock ( EPC/X Only! )
72       3.686M  8-wire internal clock ( EPC/X Only! )
73       7.373M  8-wire internal clock ( EPC/X Only! )
74       10M     8-wire internal clock ( EPC/X Only! )

    Enter the communication mode to use on line 1
    (Type 'L' for a list) [14] : 14
```

Figure A-7 Specify bit rate

10. To specify the appropriate settings for line 2, the configuration tool repeats steps 6 through 9.

11. Depending on the number you have specified in step 2, do the following:

   – If you specified 1, the configuration tool will display the main menu shown in Figure A-3 on page 299. Type 0 and press Enter to close the window.

   – If you specified 2, the configuration tool will continue the process to configure another adapter. Depending on the type of the second adapter, follow one of these sections:

     - , “8-port asynchronous adapter configuration” on page 299
     - , “128-port asynchronous adapter configuration” on page 301

When the second adapter is configured, the configuration tool displays the main menu shown in Figure A-3 on page 299. Type 0 and press Enter to close the window.

Note: Reboot the HMC for this configuration change to take effect.

Configuring RS-422 ports on an 8-port asynchronous adapter

This task enables you to switch a port on the 8-port asynchronous adapter from RS-232 to RS-422.

Note: Use RS-422 for the ports that are connected to the BPC in 7040-42W frame.

To configure RS-422 ports on an 8-port asynchronous adapter on the HMC:

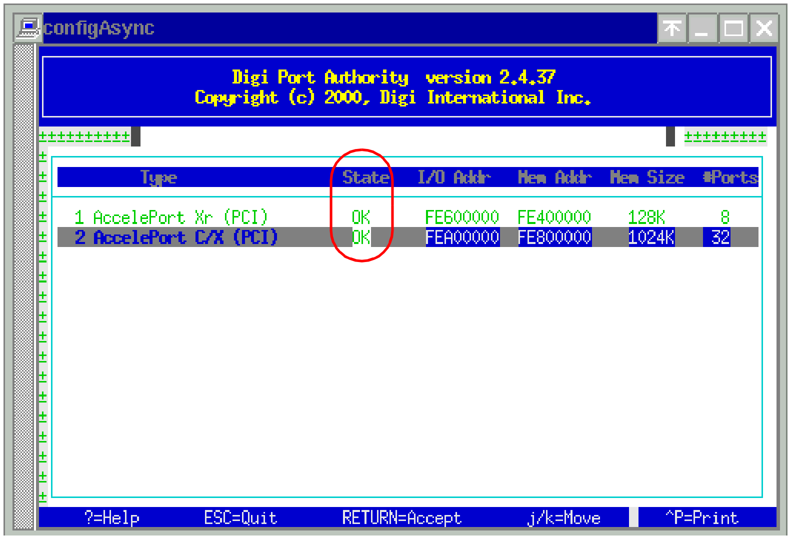
1. Select option **2** from the configAsync window menu shown in Figure A-3 on page 299.
2. From the list, select the 8-port adapter on which you wish to change the configuration.
3. From the menu bar, select the port change.

Verifying asynchronous adapters

To verify whether the asynchronous adapters are configured correctly on your HMC, use option 3, Query a Serial Adapter, in the configAsync window main menu (see Figure A-3 on page 299).

Adapter status

If the State column of adapters shows OK as in Figure A-8, the adapters are correctly configured and recognized by the Linux kernel.

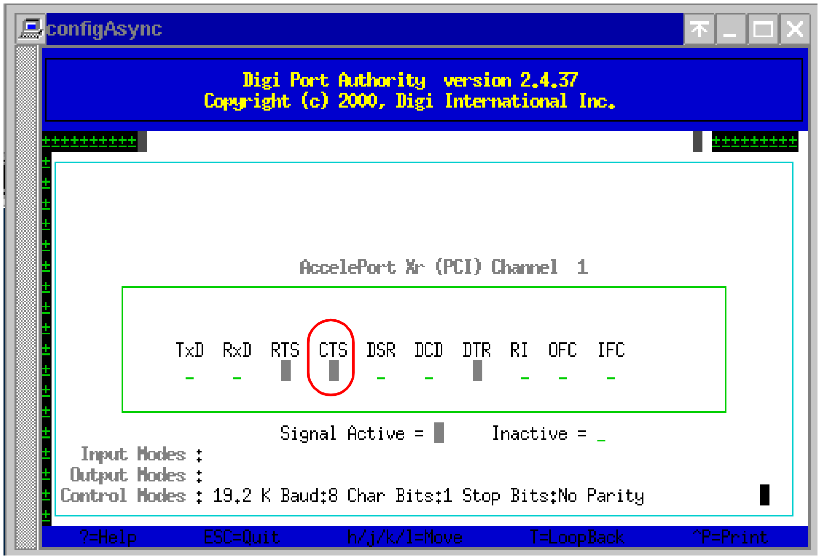


```
              Digi Port Authority  version 2.4.37
           Copyright (c) 2000, Digi International Inc.

          Type                State   I/O Addr  Mem Addr  Mem Size  #Ports

  1 AccelePort Xr (PCI)        OK     FE600000  FE400000   128K       8
  2 AccelePort C/X (PCI)       OK     FEA00000  FE800000   1024K     32

   ?=Help      ESC=Quit      RETURN=Accept       j/k=Move      ^P=Print
```

Figure A-8 Adapter status

Ports status (8-port asynchronous adapter)

If you select the 8-port asynchronous adapter from Figure A-8, the window shows the status of one of the ports. For example, the first port status is shown in Figure A-9 on page 307. Press the right or left arrow key to display the status of other ports on the adapter.



```
                Digi Port Authority  version 2.4.37
          Copyright (c) 2000, Digi International Inc.

                     AccelePort Xr (PCI) Channel  1

         TxD  RxD  RTS  CTS  DSR  DCD  DTR  RI  OFC  IFC
          _    _    █    █    _    _    █    _   _    _

                 Signal Active = █      Inactive = _
  Input Modes :
 Output Modes :
Control Modes : 19.2 K Baud:8 Char Bits:1 Stop Bits:No Parity

    ?=Help      ESC=Quit      h/j/k/l=Move      T=LoopBack      ^P=Print
```

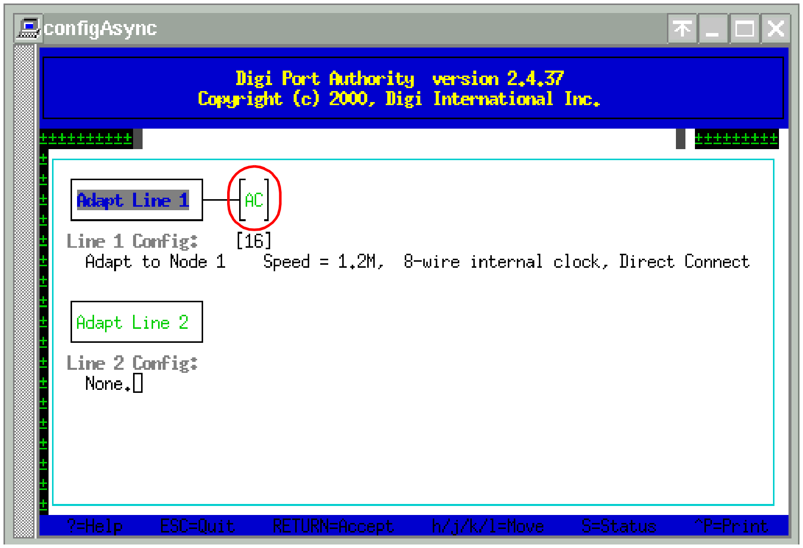
Figure A-9   Port status for 8-port asynchronous adapter

> **Note:** If the port is connected to one of the HMC ports on the managed system, the CTS (Clear To Send) signal should be raised, as highlighted in Figure A-10 on page 308.

RANs status (128-port asynchronous adapter)

If you select the 128-port asynchronous adapter from Figure A-8 on page 306, the window shows the status of one of the RANs. For example, the first RAN status is shown in Figure A-10.

If the RAN does not correctly download the microcode from the adapter, it shows DN in the highlighted area in Figure A-10.



```
            Digi Port Authority  version 2.4.37
       Copyright (c) 2000, Digi International Inc.

 Adapt Line 1 ─[AC]
 Line 1 Config:    [16]
   Adapt to Node 1    Speed = 1.2M,  8-wire internal clock, Direct Connect

 Adapt Line 2
 Line 2 Config:
   None.

 ?=Help   ESC=Quit   RETURN=Accept   h/j/k/l=Move   S=Status   ^P=Print
```

Figure A-10 Successful microcode download to RAN

Removing an asynchronous adapter

After you remove an asynchronous adapter, take the following steps:

1. Log in with the ID hscpe and open a command prompt window.
2. Type `su -`, then log in with the root password.
3. At the command prompt, type `/usr/sbin/digiConf`.
4. When prompted, set the configuration to the correct number of adapters in the HMC.

> **Note:** These steps are supposed to be done by IBM service representitives. The passwords for hscpe and root must be provided by the customer.

B

Recommended network configuration in a partitioned environment

The Ethernet adapter and TCP/IP configuration on the HMC and the partitions must be configured appropriately so that they can communicate with each other as explained in this appendix.

To configure the network settings on the HMC, see 4.2.4, “Customize Network Settings” on page 83.

Appropriate network configuration

To prevent problems with DLPAR operations on the HMC, as well as the Inventory Scout, Service Agent, and Service Focal Point, you should view the Ethernet network between the HMC and partitions as a mandatory administrative network used for these purposes. This network can be considered equivalent to the *SP Ethernet* network used in the RS/6000 SP environment.

With careful network planning, you should not have any problems using these applications; however, if an AIX administrator mistakenly changes the TCP/IP configuration on a partition without notifying the HMC administrator, it might result in severe communication problems.

Authentication mechanism

The Service Focal Point and DLPAR functions rely on the Resource Monitoring and Control (RMC) framework between the HMC and partitions. The RMC framework performs not only session management, but also authentication between network peers.

The ctcas subsystem, also known as the *cluster authentication* daemon, is in charge of this authentication mechanism. It is running as the ctcasd daemon and is packaged in the rsct.core.sec fileset in AIX, as shown in the following:

```
# lssrc -g rsct
Subsystem         Group            PID         Status
 ctrmc            rsct             299204      active
 ctcas            rsct             188658      active
# ps -ef | head -1; ps -ef | grep ctcas | grep -v grep
     UID    PID   PPID   C    STIME    TTY  TIME CMD
    root 188658 139350   0   Sep 11      -  0:03 /usr/sbin/rsct/bin/ctcasd
# lslpp -w /usr/sbin/rsct/bin/ctcasd
  File                                         Fileset               Type
  ----------------------------------------------------------------------------
  /usr/sbin/rsct/bin/ctcasd                    rsct.core.sec         File
```

The configuration process of authentication between the HMC and partitions is briefly summarized in Table B-1.

Table B-1 Authentication process

Sequence	On the HMC	On an AIX partition
1	The DMSRM resource manager places the secret key and the HMC host name in the NVRAM of the managed system. For every reboot of the HMC, it places a new secret key.	

Sequence	On the HMC	On an AIX partition
2		The IBM.CSMAgentRM resource manager reads the secret key and the HMC host name from NVRAM using an RTAS call. The NVRAM is checked every five minutes to detect any new HMCs, key changes, or both. An existing HMC with a changed key causes the registration process (the next two steps) to be performed again.
3		After the HMC and partition have authenticated each other using the secret key and have exchanged some information about each other (for example, public keys), IBM.CSMAgentRM grants the HMC permission to access the necessary resource classes on the partition. Without proper permission on AIX, the HMC will be able to establish a session with the partition but will not be able to query for the operating system information, such as DLPAR capabilities, or execute DLPAR operation commands afterward.
4		The last part of the registration process is the creation of an IBM.ManagedNode resource with a Hostname attribute set to the partition's host name on the HMC. Then, an IBM.ManagementServer resource is created with a Hostname attribute set to the HMC host name on the partition.
5	After the ManagedNode resource is created and authenticated, the ServiceRM and LparCmdRM resource managers establish a session with the partition for DLPAR operation and receive serviceable events.[a]	

[a] Beginning with HMC Release 3, Version 2, resource managers request RMC to establish sessions between the HMC and partitions instead of establishing by themselves. This reduced the number of communication problems between the HMC and partitions explained in , “Diagnosing communication problems between the HMC and partitions” on page 314.

Note: The current implementation of the authentication mechanism used in the RMC framework is called *UNIX hostname authentication*. The RMC, and therefore the HMC, may implement new authentication mechanisms in accordance with the future development plan of RMC.

Trouble-free network planning rules

To avoid unnecessary configuration errors in DLPAR operations, you must understand the following rules:

- All combinations of a host name and an IP address must be unique.
- All network interfaces on the HMC and partitions must be assigned different host names and, therefore, different IP addresses.
- The assigned IP address must be consistently resolved regardless of the location (on the HMC or partitions). If some name services, such as NIS, DNS, and LDAP, are used, they must be reliable and return consistent results.
- The network interface on the HMC, which is resolved to the node name (the string returned from the **hostname** command), must be reachable from all of the partitions.

The following examples show inappropriate network configurations:

- Duplicate IP addresses

  Two partitions have different host names but the same IP address on their network interface.

- Unresolvable host name

  A partition does not have the valid DNS configuration, while the HMC uses DNS for the name resolution. The partition cannot resolve the HMC host name to an IP address (*unresolvable*).

- Inconsistent name resolution

  The HMC is assigned the fully qualified domain name (FQDN) itsohmc.itsc.austin.ibm.com for both the node name and the host name for eth0 interface. An AIX partition uses DNS for the name resolution, but there are the following files on the partition:

  ```
  # cat /etc/netsvc.conf
  hosts=local,bind
  # grep itsohmc /etc/hosts
  9.3.4.30       itsohmc    itsohmc.itsc.austin.ibm.com
  ```

  Therefore, the same IP address 9.3.4.30 is resolved as:

  On the HMC itsohmc.itsc.austin.ibm.com

  On the partition itsohmc

- Unreachable network interface

  The HMC has two network interfaces, eth0 and eth1. Although the FQDN itsohmc.itsc.austin.ibm.com is assigned for both the node name and the host name for the eth0 interface, all partitions can reach the eth1 interface only.

We strongly suggest that you do the following before doing any recovery activities:

1. Issue the **hostname** command on the HMC and all partitions. To issue the **hostname** command on the HMC, you can use OpenSSH, as shown in the following example:

   ```
   $ whence ssh
   /usr/bin/ssh
   $ ssh -l hscroot itsohmc.itsc.austin.ibm.com hostname
   hscroot@itsohmc.itsc.austin.ibm.com's password: XXXXXX
   itsohmc.itsc.austin.ibm.com
   ```

   For further information about how to use OpenSSH on AIX, refer to *Managing AIX Server Farms*, SG24-6606.

2. Issue the **host** command against all of the network interfaces on the HMC and all of the partitions:

   a. Confirm how many interfaces are available:

   ```
   $ ssh -l hscroot itsohmc.itsc.austin.ibm.com\
       “/sbin/ifconfig -l | grep Link”
   hscroot@itsohmc.itsc.austin.ibm.com's password: XXXXXX
   eth0      Link encap:Ethernet  HWaddr 00:02:55:13:85:2E
   lo        Link encap:Local Loopback
   ```

   b. Confirm the IP address of eth0:

   ```
   $ ssh -l hscroot itsohmc.itsc.austin.ibm.com /sbin/ifconfig eth0
   hscroot@itsohmc.itsc.austin.ibm.com's password: XXXXXX
   eth0      Link encap:Ethernet  HWaddr 00:02:55:13:85:2E
             inet addr:9.3.4.30  Bcast:9.3.5.255  Mask:255.255.254.0
             UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
             RX packets:1256676 errors:0 dropped:0 overruns:0 frame:7
             TX packets:1381966 errors:0 dropped:0 overruns:0 carrier:13
             collisions:404844 txqueuelen:100
             RX bytes:132305448 (126.1 Mb)  TX bytes:1048151698 (999.5 Mb)
             Interrupt:10 Base address:0x5000
   ```

   c. Confirm both the reverse and regular name resolutions:

   ```
   # ssh -l hscroot itsohmc.itsc.austin.ibm.com host 9.3.4.30
   hscroot@itsohmc.itsc.austin.ibm.com's password: XXXXXX
   30.4.3.9.in-addr.arpa. domain name pointer itsohmc.itsc.austin.ibm.com.
   # ssh -l hscroot itsohmc.austin.ibm.com host itsohmc.itsc.austin.ibm.com
   hscroot@itsohmc.itsc.austin.ibm.com's password:
   itsohmc.itsc.austin.ibm.com. has address 9.3.4.30
   ```

For further information about the RMC framework and its resource managers, refer to the following publications:

- *A Practical Guide for Resource Monitoring and Control*, SG24-6615

- *IBM Reliable Scalable Cluster Technology for AIX 5L: Messages*, GA22-7891
- *IBM Reliable Scalable Cluster Technology for AIX 5L: RSCT Guide and Reference*, SA22-7889
- *IBM Reliable Scalable Cluster Technology for AIX 5L: Technical Reference*, SA22-7890

Note: It is highly recommended to use fully qualified host names when you configure the network interfaces. This setup is critical because dynamic logical partitioning operations, Service Focal Point, and Inventory Scout rely on the networking between the HMC and the logical partitions being set up correctly.

Diagnosing communication problems between the HMC and partitions

Prior to the HMC software Release 3, Version 2, there were cases communication problems occurred between the HMC and partitions:

If the host name resolution in the environment was carefully planned and implemented as explained in , “Trouble-free network planning rules” on page 312, those problems most likely did not occur. If not, or the host names for the HMC and partitions were changed after the initial configuration, the communication problems arose, then they were sometimes very difficult to solve.

In this case, not only for DLPAR operations, but also most service functions were affected and unable to be used until the problem was resolved.

Beginning with the following software levels, the communication and authentication mechanism between the HMC and partitions become more robust in terms of the host name resolution, therefore the communication problem hardly occurs in the configuration where these software levels are used:

- HMC software Release 3, Version 2 and later
- AIX 5L Version 5.1 plus 5100-03 Recommended Maintenance Level and later
- AIX 5L Version 5.2 and later

Once the problem occurs, you can use the `DiagnoseHMC` command on the HMC and the AIX partition that has the problem in order to verify the communication and authentication mechanism between the HMC and the partition is correctly configured.

If the `DiagnoseHMC` command is executed on an AIX partition (AIX 5L Version 5.2 plus 5200-01 Recommended Maintenance Level), the command prints the message shown in Example B-1 that verifies no configuration problem exists on the partition.

Example: B-1 DiagnoseHMC output

```
# /opt/csm/csmbin/diagnostics/DiagnoseHMC
- Check local RMC subsystem.
        - Get the installed versions of RMC packages.
        - Check the primary hostname of the local machine.
        - Check the amount of free space in /var.
        - Check that the RSCT registry data is not corrupted.
        - Check node ID information.
                Checking resources of class AuditLog: ok
                Checking resources of class AuditLogTemplate: ok
                Checking resources of class ManagementServer: ok
        - Check that the CT security files look ok.
                checking /var/ct/cfg/ct_has.pkf: ok
                checking /var/ct/cfg/ct_has.qkf: ok
                checking /var/ct/cfg/ct_has.thl: ok
        - Check local RSCT daemons.
                - Check the ctrmc subsystem.
                - Check the ctcasd subsystem.
                        ctcas is not running.
------------------------ Findings ----------------------------
(1)  ctcas is not running. Ensure that /usr/sbin/rsct/bin/ctcasd is present and
executable.
Try to start ctcas by running:
        startsrc -s ctcas
------------------------------------------------------
```

The ctcas subsystem is started on-demand basis by the RMC, if the /usr/sbin/rsct/bin/ctstrtcasd command exists. Therefore, you can ignore the warning message regarding the ctsasd subsystem on AIX partitions installed with AIX 5L Version 5.2 plus 5200-01 Recommended Maintenance Level and later.

The **DiagnoseHMC** is installed in the /opt/csm/csmbin/diagnostics directory on both AIX and HMC. On AIX, it is included in the csm.core fileset, which is installed by default. On HMC, the command requires the root authority.

```
# oslevel -r
5200-01
# lslpp -w /opt/csm/csmbin/diagnostics/DiagnoseHMC
  File                                            Fileset               Type
  ----------------------------------------------------------------------------
  /opt/csm/csmbin/diagnostics/DiagnoseHMC         csm.core              File
# lslpp -L csm.core
  Fileset                      Level  State  Type  Description (Uninstaller)
  ----------------------------------------------------------------------------
```

```
csm.core                   1.3.1.0    C     F    Cluster Systems Management
                                                 Core
```

C

A brief introduction to VLAN

This appendix gives you a brief introduction of the VLAN (Virtual LAN) technology, which is commonly found on today's switching devices, by providing the following sections:

- "Historical networking review" on page 318
- "What is a switch?" on page 319
- "What is VLAN?" on page 320
- "Several VLAN technologies" on page 321
- "AIX VLAN support (802.1Q VLAN interface)" on page 325
- "Vendor-specific VLAN technologies (Cisco)" on page 326

The last section contains useful information to implement a secure network configuration in a partitioned environment.

Historical networking review

Historically, the concept of TCP/IP was easy to understand, as shown in Figure C-1. A network administrator who understood the concept could use the same methodology to administer the network regardless of the underlying physical network media technologies (Ethernet, token-ring, FDDI). This simplicity contributed to TCP/IP, which today dominates the Internet.

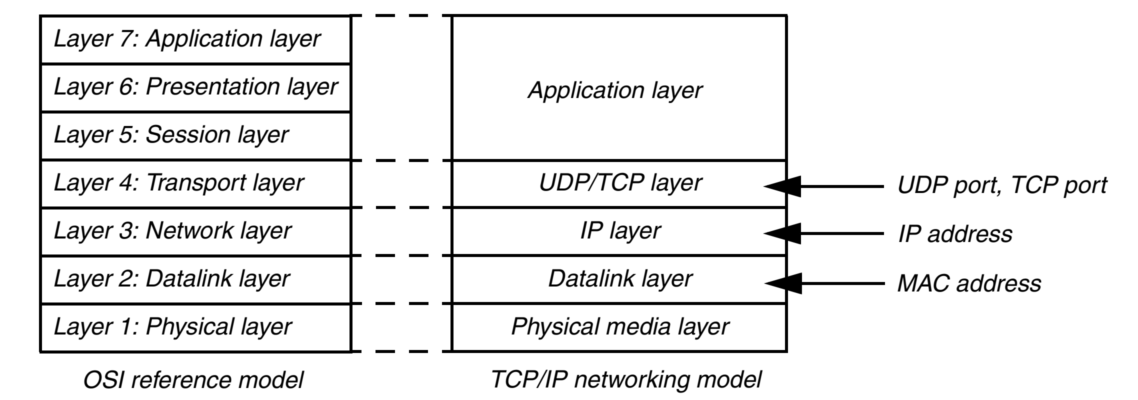


Figure C-1 OSI seven-layered networking reference model and TCP/IP model

If Ethernet was chosen as the physical network media for the TCP/IP network, these network devices could be used depending on the purpose and appropriate network layer.

IP router IP routers work with the IP layer and use the IP address information to determine how IP packets are transmitted over networks. Although IP routers work with the IP layer, they commonly support the IP filtering function, which can be used to filter out undesirable network accesses, based on UDP or TCP port numbers.

Note: Firewall devices can be seen as IP router devices that are exclusively developed for their IP filtering capability and intentionally used in the network to shut out undesirable network invasions.

Ethernet bridge Ethernet bridges work with the datalink layer and use the MAC address information to determine how Ethernet frames are transmitted over networks.

Ethernet hub[1]

An Ethernet hub, typically used for the 10 BASE-T Ethernet network, provided a single broadcast domain for all of the nodes connected to its ports. Because those Ethernet hubs did not have an intelligent processing unit inside, sometimes they were referred to as unintelligent or dumb hubs.

When the 100 BASE-TX Ethernet (Fast Ethernet) technology was evolved, limited processing capabilities were added to some Ethernet hub devices in order to support half- and full-duplex 100 Mbps Ethernet. These types of Ethernet hub devices are actually bridges rather than traditional (repeater type) hubs, therefore they are sometimes referred to as *intelligent hubs*.

What is a switch?

In the past, typical IP routers used processors designed for general purposes and ran with software that supported many functions, such as IP forwarding, IP filtering, and security policies. Therefore, those IP routers were usually slower than bridges but provided more functions. Also bridges were slow and seldom supported the actual wire-speed operations between any two given ports.

During the 1990s, several network hardware vendors developed high-speed bridges and marketed Ethernet switches (or simply switches) that were designed to use ASIC (Application-Specific Integrated Circuit) and advanced memory technology in order to improve performance. This type of switch is now known as an *L2 switch*.

Current L2 switches generally provide the following capabilities, as well as higher network traffic speed compared to the bridges in the past:

- Separate access domains
- Network segmentation
- Extended distance limitations
- Increased aggregate capacity
- Data rate flexibility

After L2 switches had dominated the network hardware market, several network hardware vendors coined a new term, *L3 switch*, to advertise their high-speed IP router products that were designed using hardware components and concepts similar to the L2 switches.

[1] If 10 BASE2 or 10 BASE5 Ethernet was used as the physical network media, repeaters were used instead of hubs.

Unlike L2 switches that operate using MAC address information, L3 switches operate using IP address information, as IP routers do.

Many L3 switch products also support a function very similar to the IP filtering function found on traditional IP routers; a switch product that supports this function is commonly referred to as an *L4 switch* and can be used to filter out undesirable network access based on UDP or TCP port numbers.

Some network switch products support L2 switching only, while others support L3 or L4 switching, depending on the product range and configuration; it is not rare that an L2 switch product that supports L3/L4 switching capabilities by plugging in hardware modules.

To configure L2, L3, or L4 switches, most products provide several methods to access their operating system, such as:

- Serial port access
- Telnet access
- Web browser based access
- SNMP MIB-based access[2]
- Proprietary application access connected to switches either over the serial line or using the management network port

Enterprise networks nowadays commonly are based on switching technology. Those networks are composed of different kinds of network switch devices and can be very complex. In fact, every network device used for LAN can be a switch. Therefore, it is important to understand the switching technologies in order to share the *switching world* with your network administrators, so that your pSeries servers can perform more efficiently and securely.

What is VLAN?

VLAN is a technology used for establishing virtual network segments on top of physical switch devices. If configured appropriately, a VLAN definition can straddle multiple switches. Typically, a VLAN is a broadcast domain that enables all nodes in the VLAN to communicate each other without any L3 routing or inter-VLAN bridging. (There are exceptions explained in the following sections.)

For example, two VLANs (VLAN 1 and 2) are defined on three switches (Switch A, B, and C) in Figure C-2 on page 321. Although nodes C-1 and C-2 are physically connected to the same switch C, traffic between two nodes can be

[2] SNMP stands for Simple Network Management Protocol. MIB stands for Management Information Base.

blocked. To enable communication between VLAN 1 and 2, L3 routing or inter-VLAN bridging should be established between them; this is typically provided by an L3 device.

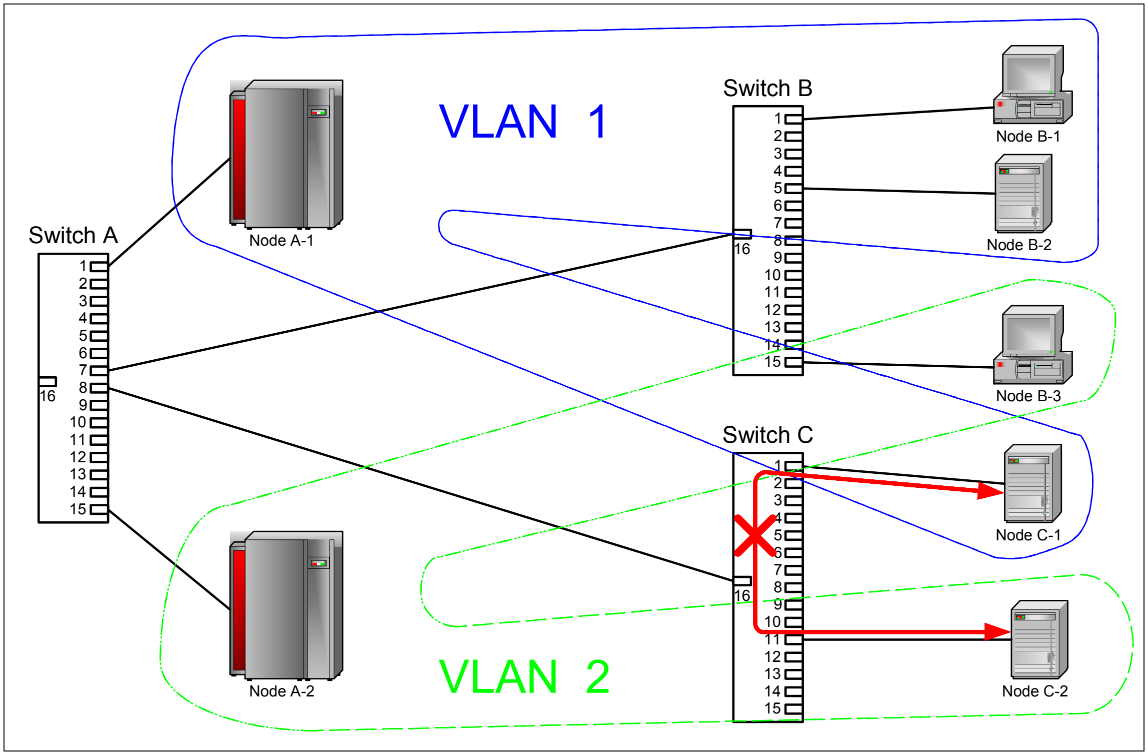


Figure C-2 VLAN concept

Thus, the use of VLAN provides the following advantage over traditional network devices:

- Flexible network deployment
- LAN security

Several VLAN technologies

These technologies for implementing VLANs are explained in this section:

- Port-based VLAN
- Layer 2 VLAN
- Policy-based VLAN
- 802.1Q VLAN

Support of these technologies varies from one switch product to another. In fact, the difference in firmware versions, even for the same switch product, may affect the support status. Therefore, it is recommended to carefully read the product publications shipped with the switch product, that you are going to use.

Port-based VLAN

The port-based VLAN is the simplest way and is implemented on most switch products. By instructing the switch operating system, a physical port can be assigned to a VLAN. Figure C-3 illustrates the port-based VLAN concept: physical ports 1, 6, and 13 belong to VLAN A, while 3, 12, and 15 belong to B.

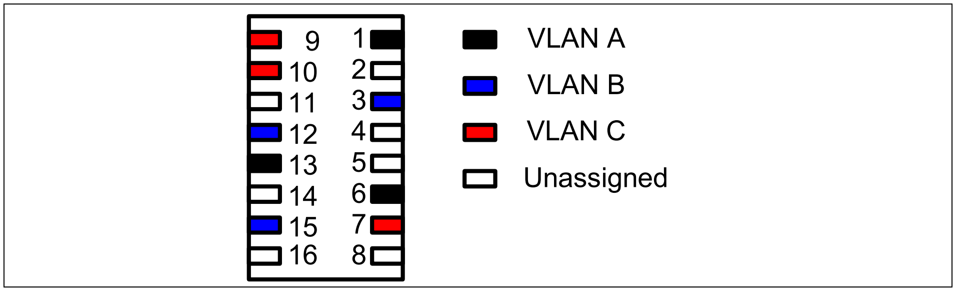


Figure C-3 Port-based VLAN concept

Although the VLAN standard enables defining overlapping VLAN ports based on the port-based VLAN technology (see port 12 in Figure C-4), this configuration is considered obsolete and is not implemented on most switch products available on the market.

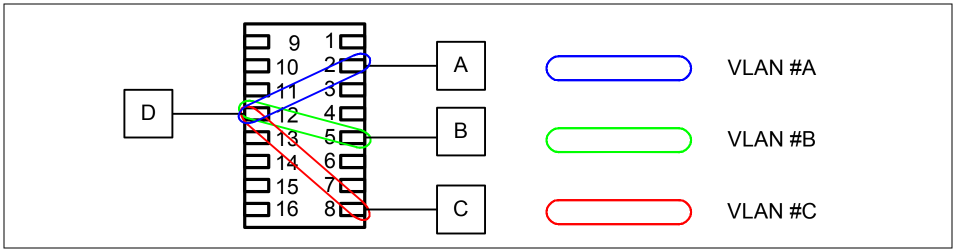


Figure C-4 Overlapping port definition based on the port-based VLAN

Layer 2 VLAN

Instead of the physical port-basis assignment, the layer 2 VLAN technology uses the MAC address information of connected devices to define VLANs. Because a network device is usually connected to a physical port and it is less common to reconnect the device to another port (except for in a port malfunction situation), this is quite similar to the port-based VLAN in terms of VLAN security.

Policy-based VLAN

This is the most advanced VLAN technology and there are many possibilities for implementing it, depending on the switch products.

The policy-based VLAN uses several information entities, such as subnets (on IP networks) and protocols (on multi-protocol networks[3]) to differentiate network traffics.

802.1Q VLAN

The 802.1Q VLAN uses additional information in the Ethernet frame to differentiate network traffic. The additional information, called VLAN tag, is four bytes long and, optionally, can be inserted into the Ethernet frame (see Figure C-5).

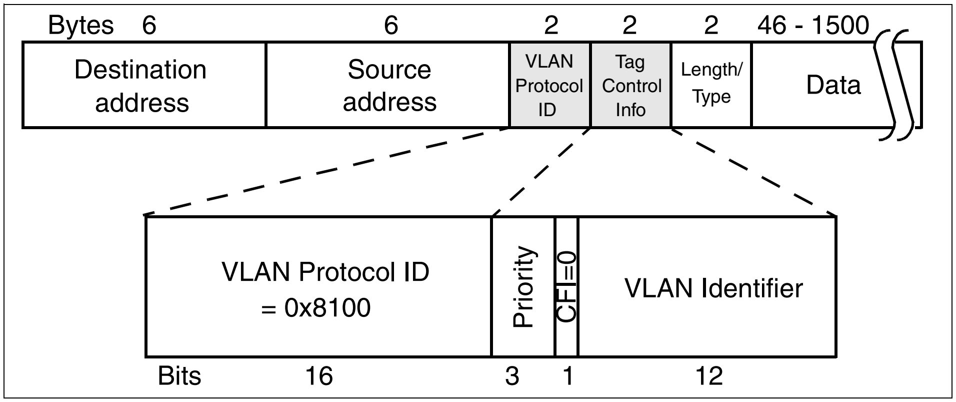


Figure C-5 VLAN-tagged Ethernet frame

Network nodes connected to the 802.1Q VLAN ports are expected to implement virtual network interfaces in order to explicitly specify VLAN IDs (shown as VLAN Identifier in Figure C-5). A VLAN ID is a digit number ranging from 1 to 4094 (the VLAN ID 1 is used as the default value). An Ethernet frame that does not contain the VLAN tag information (or contains the VLAN tag information with null VLAN ID) is called an untagged frame. All untagged frames are grouped into a VLAN, called the default VLAN, regardless of the source physical ports, MAC addresses, or IP addresses.

[3] A multi-protocol network uses multiple protocols, such as TCP/IP and IPX/SPX, to convey network traffics.

Figure C-6 illustrates the 802.1Q VLAN concept. On node A, in addition to the base network interface, there are two VLAN interfaces defined; one is with VLAN ID 2, another is with VLAN ID 3. On Node B, a VLAN interface with VLAN ID 2 is defined. If IP addresses with different subnets are assigned on VLAN interfaces, these VLANs can be seen as logically split subnets, even though a single physical network adapter on the node is connected to a single physical port[4].

Some switch products support the capability to set up a filtering rule on a port-basis. If such a filter is set up appropriately, the switch can be configured to discard all incoming frames from the specific port on which the filter is configured, except for frames with the specific VLAN tag ID.

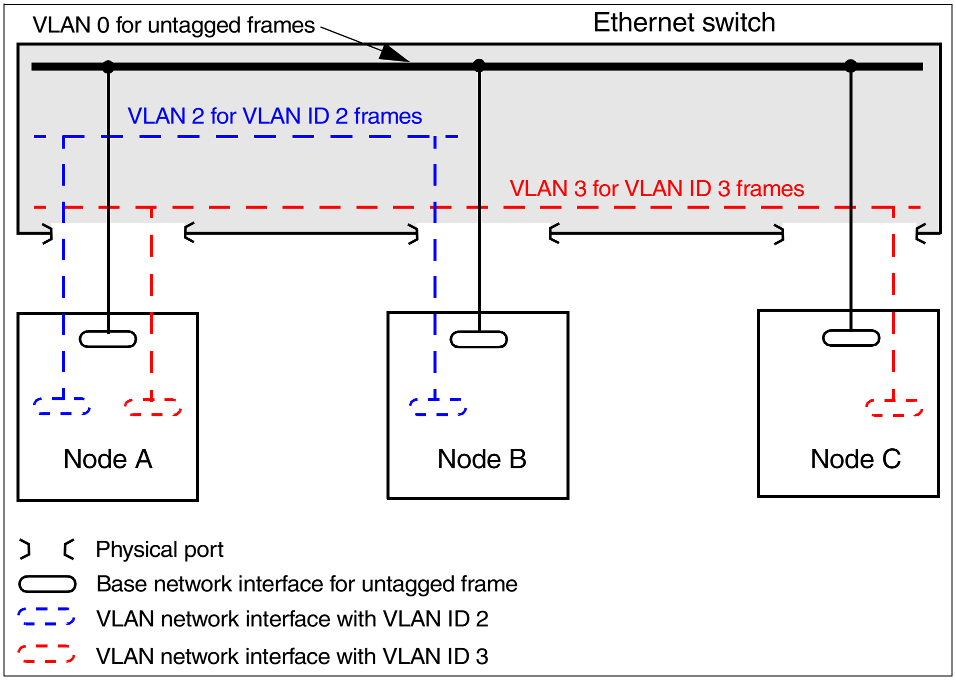

VLAN 0 for untagged frames
Ethernet switch
VLAN 2 for VLAN ID 2 frames
VLAN 3 for VLAN ID 3 frames
Node A
Node B
Node C
Physical port
Base network interface for untagged frame
VLAN network interface with VLAN ID 2
VLAN network interface with VLAN ID 3

Figure C-6 802.1Q VLAN concept

To use 802.1Q VLAN, the following must be understood:

- VLANs with associated VLAN tag IDs must be defined on switches.
- Although it is possible to define multiple VLAN interfaces on a single network adapter, it is not always the best approach from the availability. Should the adapter or port fail, all VLAN interfaces become unavailable.

[4] A port that is used for multiple VLAN interfaces is generally called a trunk port.

AIX VLAN support (802.1Q VLAN interface)

Beginning with Version 5.1, AIX has been supporting 802.1Q VLAN. To define VLAN interface, do the following after logging on to the system as the root user:

1. Select SMIT panels as follows:

   ```
   # smit
       Devices
           Communication
               VLAN
                   Add A VLAN
   ```

2. Select the base network adapter device (such as ent0) to define a VLAN interface on top of it, then press Enter.
3. Specify the VLAN ID (1 - 4095) in the VLAN Tag ID field shown in Example C-1, then press Enter:

Example: C-1 Add A VLAN SMIT panel

```
                              Add A VLAN

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
  VLAN Base Adapter                                   ent0
* VLAN Tag ID                                         [] #
```

4. Verify if the VLAN interface is configured successfully as follows:

   ```
   # lsdev -Cc adapter | grep ent
   ent0    Available 10-80    IBM 10/100 Mbps Ethernet PCI Adapter (23100020)
   ent1    Available 10-88    IBM 10/100 Mbps Ethernet PCI Adapter (23100020)
   ent2    Available          VLAN
   # lsdev -Cc if | grep en
   en0 Available 10-80 Standard Ethernet Network Interface
   en1 Defined   10-88 Standard Ethernet Network Interface
   en2 Defined         Standard Ethernet Network Interface
   ```

   In this example, the VLAN Ethernet interface en2 is configured on the VLAN adapter object ent2.

5. Assign a unique IP address on en2, by selecting the following SMIT panels: **Communications Applications and Services** → **TCP/IP** → **Further Configuration** → **Network Interfaces** → **Network Interface Selection** → **Change / Show Characteristics of a Network Interface**, then select en2.

To confirm what VLAN tag ID is associated, use the **`lsattr`** command as follows:

```
# lsattr -El ent2
```

```
base_adapter ent0 VLAN Base Adapter True
vlan_tag_id  10   VLAN Tag ID       True
```

Note: Currently, HMC does not support 802.1Q VLAN.

Vendor-specific VLAN technologies (Cisco)

As explained in the previous sections in this appendix, standard VLAN technologies cannot be used to implement a secure network in a partitioned environment, which is explained in 8.1, “Networking in a partitioned environment” on page 156.

However, several network hardware vendors, such as Cisco, provide vendor-specific advanced VLAN technologies in order to implement the secure network in a partitioned environment.

Note: Before implementing the secure network in a partitioned environment using the technologies explained in this section, we strongly recommend you consult with your network hardware vendor or reseller to verify the detailed information about the switch product you are going to install.

Private VLAN

The private VLAN technology, or PVLAN, enables you to define multiple secondary VLANs in a single primary VLAN as shown in Figure C-7 on page 327. The HMC belongs to the primary VLAN. The switch port to which the HMC is connected is called a *promiscuous* port. Each partition (partition 1, 2, and 3) belongs to its own secondary VLAN; therefore there are three secondary VLANs defined in total.

Although partitions can communicate with the HMC, they cannot communicate with each other in this configuration. The ports belonging to the partitions are called *isolated* ports.

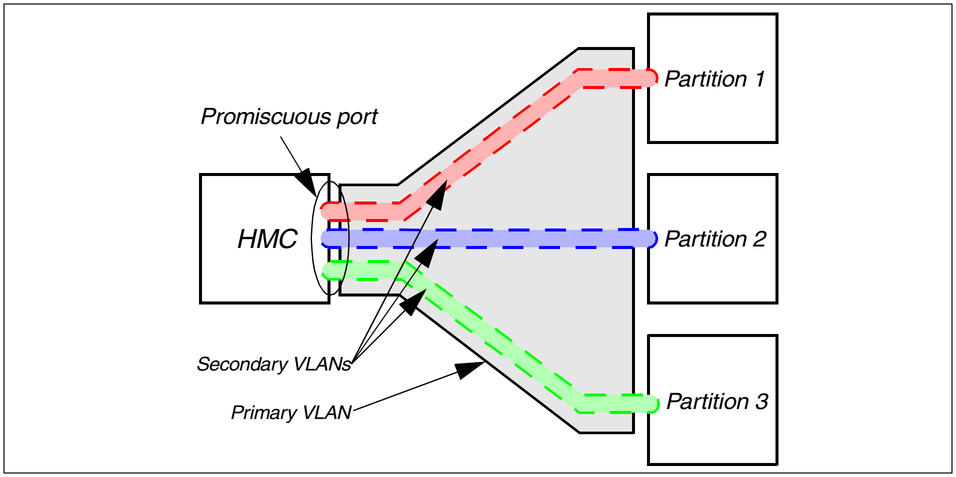


Figure C-7 Private VLAN concept

PVLAN is only supported on the high-end Cisco Catalyst switch products, such as Catalyst 6500 series and Catalyst 4500 series.

Most low-end switch products, for example Catalyst 2950, only support a subset of the PVLAN function. On Catalyst 2950, there is a concept of *protected* or *non-protected* ports instead of promiscuous and isolated ports.

The concept of protected ports is summarized as follows:

- A protected port can not forward any traffic (uni-cast, multicast, or broadcast) to any other protected ports. Traffic cannot be forwarded between protected ports at Layer 2; all traffic between protected ports must be forwarded through an L3 device.
- A protected port can forward traffic to any non-protected ports within the VLAN.
- By default, all ports on Catalyst 2950 are set to the non-protected port mode; you must explicitly set the protected port mode on port-basis.

VLAN ACL

VLAN ACL (Access Control List) can be set on port-basis to control access for all packets that are bridged within a VLAN or that are routed into or out of a VLAN. The access control function found on conventional router devices, which is configured only on routed interfaces, is applied only on routed packets. However, VLAN ACLs are applied to all network frames and can be applied to any VLANs or network interfaces.

Note: VLAN ACLs can be defined on protocol-basis (IP or IPX) or MAC-address basis.

When you define a VLAN ACL and apply it to a VLAN, all packets entering the VLAN are checked against this VLAN ACL. If you apply a VLAN ACL to the VLAN and an ACL to a routed interface in the VLAN, a packet coming in to the VLAN is first checked against the VLAN ACL; then, if permitted, it is checked against the input ACL before it is handled by the routed interface. When the packet is routed to another VLAN, it is first checked against the output ACL applied to the routed interface; then, if permitted, it is checked against the VACL configured for the destination VLAN. If a VLAN ACL is defined for a specific type of packets and a packet does not match with the ACL, the default action is to deny.

Note: At the time of writing this book, most Cisco Catalyst products, except for Catalyst 2950 Series, support the VLAN ACL function.

Abbreviations and acronyms

ACL	Access Control List
AIX	Advanced Interactive Executive
ALPAR	Affinity Logical Partition
APAR	Authorized Problem Analysis Report
ASIC	Application-Specific Integrated Circuit
ASCII	American National Standard Code for Information Interchange
BOS	Base Operating System
BPA	Bulk Power Assembly
BPC	Bulk Power Controller
CA	Certified Authority
CD	Compact Disk
CDE	Common Desktop Environment
CD-R	CD - Recordable
CD-ROM	CD - Read Only Media
CEC	Central Electronics Complex
CIM	Common Interface Method
CMM	Customer Managed Microcode
CPU	Central Processing Unit
CSM	Cluster Systems Management
CSP	Converged Service Processor
CUoD	Capacity Upgrade on Demand
DCE	Data Communication Equipment
DLPAR	Dynamic logical partitioning
DMTF	Desktop Management Task Force
DNS	Domain Name Service
DoS	Denial of Service
DSA	Digital Signature Algorithm
DTE	Data Terminal Equipment
DVD	Digital Versatile Disk
DVD-RAM	DVD - Random Access Media
DVD-ROM	DVD - Read Only Media
EIA	Electronic Industry Association
ESS	Electronic Server System
FC	Feature Code
FDDI	Fibre Distributed Data Interface
FQDN	Fully Qualified Domain Name
FRU	Field Replaceable Unit
FTP	File Transfer Protocol
FTSS	Field Technical Support Specialist
GB	Gigabyte
GID	Group Identification
GUI	Graphical User Interface
HACMP	Highly Available Cluster Multiprocessing
HMC	IBM Hardware Management Console for pSeries
HPC	High Performance Computing
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IBF	Internal Battery Feature
IBM	International Business Machines Corporation
ICMP	Internet Control Protocol Message

IEEE	Institute of Electrical and Electronic Engineers
IHS	IBM HTTP Server
I/O	Input/Output
IP	Internet Protocol
ISO	International Organization for Standardization
IT	Information Technology
ITSO	International Technical Support Organization
L2	Level 2
L3	Level 3
L4	Level 4
LAN	Local Area Network
LDAP	Light Directory Access Protocol
LED	Light Emitting Diode
LMB	Logical Memory Block
LPAR	Logical Partition
LPP	Licensed Program Product
MA	Maintenance Agreement
MAC	Media Access Control
MB	Megabyte
MT-MDL	Machine Type - Model
MTU	Maximum Transfer Unit
NFS	Network File System
NIM	Network Installation Manager
NIS	Network Information System
NVRAM	Non-volatile random access memory
ODM	Object Database Manager
ODS	On-demand service
OF	Open Firmware
OS	Operating System
PAM	Pluggable Authentication Module
PC	Personal Computer
PCI	Peripheral Component Interface
PID	Process ID
PMR	Problem Management Record
POWER	Performance Optimized with Enhanced RISC
PMTU	Path Maximum Transfer Unit
PPID	Parent Process ID
PSSP	Parallel System Support Program
PTF	Program Temporary Fix
PVLAN	Private VLAN
RAN	Remote Access Node
RAS	Reliability, Availability, and Serviceability
RFC	Request for Comment
RISC	Reduced Instruction Set Computer
RIP	Routing Information Protocol
RMC	Resource Monitoring and Control
RMO	Real Mode Offset
RPM	Red Hat Package Manager
RS	Recommended Standard
RSA	Rivest-Shamir-Adleman Algorithm
RSCT	Reliable Scalable Cluster Technology
S/N	Serial Number
SCSI	Small Computer System Interface
SFP	Service Focal Point
SMIT	System Management Interface Tool
SMP	Symmetrical Multi-Processing
SMS	Systems Management Service
SMTP	Simple Mail Transfer Protocol

SNMP	Simple Network Management Protocol
SP	Service Processor
SSH	Secure Shell
SSL	Secure Socket Layer
TCP	Transmission Control Protocol
TTY	Teletypewriter
UDP	User Datagram Protocol
UID	User Identification
URL	Universal Resource Locator
USB	Universal Serial Bus
VACL	VLAN ACL
VGA	Video Graphics Adapter
VLAN	Virtual LAN
VPD	Vital Product Data
WebSM	Web-based System Manager

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this book.

IBM Redbooks

For information about ordering these publications, see “How to get IBM Redbooks” on page 337.

- *A Practical Guide for Resource Monitoring and Control*, SG24-6615
- *IBM @server pSeries 670 and pSeries 690 System Handbook*, SG24-7040
- *Linux Applications on pSeries*, SA24-6033
- *Managing AIX Server Farms*, SG24-6606
- *POWER4 Processor Introduction and Tuning Guide*, SG24-7041
- *The Complete Partitioning Guide for IBM @server pSeries Servers*, SG24-7039

IBM Redpapers

IBM Redpapers are available only in softcopy.

- *IBM @server pSeries 615 Models 6C3 and 6E3 Technical Overview and Introduction, REDP0160*
- *IBM @server pSeries 630 Models 6C4 and 6E4 Technical Overview and Introduction*, REDP0195
- *IBM @server pSeries 650 Model 6M2 Technical Overview and Introduction*, REDP0194

pSeries hardware publications

The following publications are shipped with the IBM @server pSeries servers. These publications are also available through this Web site:

`http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base/hardware.htm`

- *128-Port Asynchronous PCI Adapter Installation and User's Guide*, SA23-2563
- *8-Port Asynchronous PCI Adapter Installation and User's Guide*, SA23-2562
- *Adapter, Devices, and Cable Information for Multiple Bus Systems*, SA38-0516
- *D10 I/O Drawer Installation Guide*, SA23-1296
- *D20 I/O Drawer Installation Guide*, SA23-1295
- *IBM @server pSeries 615 Model 6C3 and 6E3 Installation Guide*, SA38-0628
- *IBM @server pSeries 615 Model 6C3 and 6E3 Service Guide*, SA38-0629
- *IBM @server pSeries 615 Model 6C3 and 6E3 User's Guide*, SA38-0630
- *IBM @server pSeries 630 Model 6C4 and 6E4 Installation Guide*, SA38-0605
- *IBM @server pSeries 630 Model 6C4 and 6E4 Service Guide*, SA38-0604
- *IBM @server pSeries 630 Model 6C4 and 6E4 User's Guide*, SA38-0606
- *IBM @server pSeries 650 Model 6M2 Installation Guide*, SA38-0610
- *IBM @server pSeries 650 Model 6M2 Service Guide*, SA38-0612
- *IBM @server pSeries 650 Model 6M2 User's Guide*, SA38-0611
- *IBM @server pSeries 655 Installation Guide*, SA38-0616
- *IBM @server pSeries 655 Service Guide*, SA38-0618
- *IBM @server pSeries 655 User's Guide*, SA38-0617
- *IBM @server pSeries 670 Installation Guide*, SA38-0613
- *IBM @server pSeries 670 Service Guide*, SA38-0615
- *IBM @server pSeries 670 User's Guide*, SA38-0614
- *IBM @server pSeries 690 Installation Guide*, SA38-0587
- *IBM @server pSeries 690 Service Guide*, SA38-0589
- *IBM @server pSeries 690 User's Guide*, SA38-0588
- *IBM @server pSeries 7311 Model D10 and Model D20 Service Guide*, SA38-0627
- *IBM Hardware Management Console for pSeries Maintenance Guide*, SA38-0603
- *IBM Hardware Management Console for pSeries Installation and Operations Guide*, SA38-0590
- *Installation Guide 61D I/O drawer 61R Second I/O Rack*, SA23-1281

- *PCI Adapter Placement References*, SA38-0538

AIX official publications

The following publications are contained in the *AIX 5L for POWER V 5.2 Documentation CD*, 5765-E62, that is shipped as a part of the AIX 5L Version 5.2 CD-ROM media set. These publications are also available from this Web site:

http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base/aix.htm

- *AIX 5L Version 5.2 Asynchronous Communications Guide*
- *AIX 5L Version 5.2 Installation Guide and Reference*
- *AIX 5L Version 5.2 Reference Documentation: Commands Reference*
- *AIX 5L Version 5.2 Security Guide*
- *AIX 5L Version 5.2 System Management Guide: AIX 5L Version 5.2 Web-based System Manager Administration Guide*
- *AIX 5L Version 5.2 System Management Guide: Communications and Networks*
- *AIX 5L Version 5.2 System Management Guide: Operating System and Devices*
- *AIX 5L Version 5.2 Understanding the Diagnostic Subsystem for AIX*
- *AIX Installation in a Partitioned Environment*, SC23-4382
- *IBM Reliable Scalable Cluster Technology for AIX 5L: Messages*, SA22-7891
- *IBM Reliable Scalable Cluster Technology for AIX 5L, RSCT Guide and Reference*, SA22-7889
- *IBM Reliable Scalable Cluster Technology for AIX 5L, Technical Reference*, SA22-7890
- *IBM Reliable Scalable Cluster Technology for AIX 5L and Linux, Group Services Programming Guide and Reference*, SA22-7888

CSM for AIX official publications

The following publications are contained in the Cluster Systems Management for AIX 5L product (Program Number: 5765-F67). These publications are also available at this Web site:

http://www.ibm.com/servers/eserver/pseries/library/clusters/aix.html

- *IBM Cluster Systems Management for AIX 5L, Administration Guide*, SA22-7918

- *IBM Cluster Systems Management for AIX 5L, Hardware Control Guide*, SA22-7920
- *IBM Cluster Systems Management for AIX 5L, Planning and Installation Guide*, SA22-7919

CSM for Linux official publications

The following publications are contained in the Cluster Systems Management for Linux product (Program Number: 5765-E88). These publications are also available at this Web site:

`http://www.ibm.com/servers/eserver/clusters/library/linux.html`

- *IBM Cluster Systems Management for Linux, Administration Guide*, SA22-7873
- *IBM Cluster Systems Management for Linux, Hardware Control Guide*, SA22-7856
- *IBM Cluster Systems Management for Linux, Planning and Installation Guide*, SA22-7853
- *IBM Reliable Scalable Cluster Technology for Linux, Mesages*, SA22-7894
- *IBM Reliable Scalable Cluster Technology for Linux, RSCT Guide and Reference*, SA22-7892
- *IBM Reliable Scalable Cluster Technology for Linux, Technical Reference*, SA22-7893
- *IBM Reliable Scalable Cluster Technology for AIX 5L and Linux, Group Services Programming Guide and Reference*, SA22-7888

Other publications

These publications are also relevant as further information sources:

- Bill McCarty, *Red Hat Linux Firewalls*, John Wiley & Sons, 2002, ISBN 0-764-52463-1.
- Rich Seifert, *The Switch Book: The Complete Guide to LAN Switching Technology*, John Wiley & Sons, 2002, ISBN 0-471-34586-5
- Larry Wall, *Programming Perl*, O'Reilly & Associates, 2000, ISBN 0-596-00027-8

Online resources

These Web sites are also relevant as further information sources:

- *AIX toolkit for Linux applications*

  `http://www.ibm.com/servers/aix/products/aixos/linux/download.html`
- *The DMTF Standards web site*

  `http://www.dmtf.org/standards/standard_cim.php`
- *IBM @server pSeries Information Center*

  `http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base/index.htm`
- *IBM @server pSeries & RS/6000* Microcode Updates

  `http://techsupport.services.ibm.com/server/mdownload`
- *IBM @server pSeries Support Hardware Management Console*

  `https://techsupport.services.ibm.com/server/hmc?fetch=home.html`
- *Electronic Service Agent for pSeries and RS/6000 User's Guide*

  `ftp://service.software.ibm.com/aix/service_agent_code/AIX/svcUG.pdf`
- *Electronic Service Agent for pSeries HMC User's Guide*

  `ftp://service.software.ibm.com/aix/service_agent_code/HMC/HMCSAUG.pdf`
- *Microcode Discovery Service*

  `http://techsupport.services.ibm.com/server/aix.invscoutMDS`
- *OpenSSH Web site*

  `http://www.openssh.com`
- *VPD Capture Service*

  `http://techsupport.services.ibm.com/server/aix.invscoutVPD`

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`

Index

IBM

Redbooks

Effective System Management Using the IBM Hardware Management Console for pSeries

(0.5” spine)
0.475”<->0.875”
250 <-> 459 pages

Effective System Management Using the IBM Hardware Management Console for pSeries

Using service-related functions on the HMC

Planning and implementing a secure network

Exploiting HMC commands

The IBM Hardware Management Console for pSeries (HMC) is a tool used for administration and management of IBM @server pSeries servers. It was first announced in late 2001 with the IBM @server pSeries 690 Model 681, the first partitioning-capable pSeries server model, and has been supporting the other partitioning-capable pSeries server models in conjunction with several software release level updates.

The major function provided by the HMC is partitioning management, which is well covered well by several other publications. This IBM Redbook, designed to be used as a deskside reference for systems administrators who manage partitioning-capable pSeries servers using the HMC, is meant to complement these other publications by covering the following topics:

- Configuring the HMC
- Managing software levels on the HMC
- Secure remote GUI access to the HMC
- Secure networking in a partitioned environment
- Service functions on the HMC

In addition, this book covers the basic usage of the HMC graphical user interface. New HMC commands, available with the HMC software Release 3, Version 2, are detailed in Chapter 9, "HMC command line interface" and Chapter 10, "Advanced HMC command examples"

INTERNATIONAL TECHNICAL SUPPORT ORGANIZATION

BUILDING TECHNICAL INFORMATION BASED ON PRACTICAL EXPERIENCE

IBM Redbooks are developed by the IBM International Technical Support Organization. Experts from IBM, Customers and Partners from around the world create timely technical information based on realistic scenarios. Specific recommendations are provided to help you implement IT solutions more effectively in your environment.

For more information:
ibm.com/redbooks

SG24-7038-00 ISBN 0738499714